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The Nigerian Society of Anaesthetists is an organization with the mandate to promote excellence and quality service among Anaesthetists practicing in Nigeria. It enhances the much-needed interaction and communication among Physician anaesthetists through various educational activities and research. The Society was formally launched in 1979 and registered officially in 2000. It has been a member of the World Federation of Societies of Anaesthesiologists (WFSA) as far back as 1966 and has over 1000 members both within Nigeria and in the diaspora.

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CELEBRATING THE FIRST YEAR OF NJA

Yes, you read correctly!

It has been one full year of service to the Nigerian Society of Anaesthetists in meeting the publication needs of its members.

Tangible work has been done within this short space of time, starting with the maiden edition launched at the 32nd Annual Scientific Conference - (NSA Enugu) in the Coal City on November 13th, 2024. The Journal has made it to its 2nd issue in 2025 (Volume 2: Issue 2), but 3rd Release in the ongoing 33rd Scientific Conference NSA Lagos in the Centre of Excellence.

The Board of Trustees of the Nigerian Society of Anaesthetists keeps nurturing from behind the scenes and you are warmly appreciated at a time like this.

The Editorial Advisers and the Editorial team deserve great acknowledgments for being always available as a team to navigate through these foundational stages.

Our Dear Authors who believed in this timely vision and invested their academic publications (like the proverbial clients) are greatly cherished. We do not take you for granted!

Our highly Esteemed and dedicated team of Reviewers can not be rewarded enough, but providence will remember you for good for making this vision viable by your sacrifices, even at the shortest possible times.

The Distinguished Medical Elders and other NSA members have been supportive.

To you Readers, you are not hidden as you are spotted daily in the traffic of visitors to the journal website!

The Tireless Technical team has also been very dutiful.

What more can be say but to plead for your continued support, so this vision lives from its infancy stage to full adulthood without a thwarted growth!

Standards will be maintained on the part of the Editorial team.

Do not hesitate to offer constructive ideas to move NJA to global heights.

Its your Journal and Its our Journal!

Thank you and Congratulations to Everyone for this Landmark achievement.

Sincerely,

ALAGBE-BRIGGS O.T

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EDITORIAL

Advancing Anaesthesia Practice through Local Evidence and Global Standards: Reflections from the Second Issue of the Nigerian Journal of Anaesthesia

It is with great pleasure and a sense of profound responsibility that I welcome readers to the second issue of the Nigerian Journal of Anaesthesia (NJA). Although the field of anaesthesiology has made remarkable progress globally, local challenges, contextual realities, and unique clinical experiences continue to shape practice in low- and middle-income countries. These realities have given rise to this dedicated platform that captures indigenous evidence, amplifies local innovation, and stimulates scholarly discourse on issues central to patient safety, perioperative care, and the wellbeing of anaesthesia providers.

Anaesthesia practice in Nigeria stands at a pivotal moment. The country has witnessed steady growth in specialist training, increased exposure to advanced surgical techniques, and renewed interest in sub-specialties ranging from cardiothoracic anaesthesia to pain medicine and critical care. Yet, persistent barriers, such as limited resources, workforce shortages, and variable access to modern equipment, continue to challenge the delivery of high-quality anaesthetic care. More than ever, the profession requires a robust research culture driven by clinicians who are eager to interrogate practice patterns, evaluate outcomes, adopt best practices, and ask questions that matter for our patient populations. This journal is intended as a vehicle to support that culture by giving opportunities for evidence generation, knowledge sharing, and professional growth.

The manuscripts featured in this reflect the breadth and depth of contemporary anaesthesia practice in Nigeria. They highlight emerging themes that are both locally relevant and globally significant: regional anaesthesia uptake, advances in cardiothoracic anaesthesia, provider wellbeing, comparative effectiveness of anaesthetic techniques, perioperative analgesia, and the complexities of managing rare cardiac anomalies. Together, they paint a compelling picture of a discipline committed to innovation, safety, and continuous improvement.

The assessment of regional anaesthesia exposure and utilisation among anaesthetists in Nigeria provides an important window into practice trends within the country. Regional anaesthesia has gained recognition globally for its benefits in postoperative pain control, early mobilisation, reduced opioid requirements, and improved patient satisfaction. However, the extent to which these benefits are realised depends on adequate training, confidence, and institutional support. The findings presented in this issue underscore existing gaps in exposure and highlight opportunities for strengthening residency training, investing in ultrasound technology, and promoting continuing professional development. As surgical volumes rise and the burden of multimorbidity increases in Nigeria, expanding capacity in regional anaesthesia will be essential for improving perioperative outcomes.

Complementing this is a scoping review on recent advances in cardiothoracic anaesthesia, a field that continues to expand with rapid technological innovations and evolving practice paradigms. For African anaesthetists, many of whom practise in resource-limited settings, this review serves as an invaluable reference point for understanding global trends while identifying areas where local practice can be strengthened. Importantly, it also points to the need for targeted investment in specialised training and infrastructure to enable the growth of cardiothoracic services on the continent.

Three clinical case reports in this issue further emphasise the critical thinking, adaptability, and ingenuity required of anaesthetists who work in challenging environments. The report detailing anaesthetic management of a patient with cor triatriatum dexter and multiple cardiac anomalies brings to the fore the complexity of providing safe care for patients with rare congenital heart defects, particularly when advanced diagnostic tools and monitoring devices may not be readily available. Similarly, the case describing spinal anaesthesia for posterior spinal decompression in a patient with an intracoronary stent illustrates the art of balancing surgical needs, patient comorbidities, and anaesthetic risk in order to minimise potentially catastrophic perioperative cardiovascular events. These cases are more than clinical narratives; they are reflections of the resilience and clinical acumen that define anaesthesia practice in Nigeria.

Provider wellbeing is an emerging area of global concern, and this issue includes a timely scoping review examining burnout among anaesthesia providers in sub-Saharan Africa. The challenges faced by anaesthetists which include high

workload, inadequate staffing, limited equipment, and exposure to high-stress emergencies, are all well documented. Yet, African perspectives on burnout remain under-represented in the literature. By synthesising available evidence, the authors highlight not only the prevalence and drivers of burnout but also the urgent need for institutional reforms, investment in workforce expansion, and development of organisational support systems that safeguard both provider safety and quality of patient care.

Several studies in this issue also examine the comparative effectiveness of anaesthetic techniques and adjuncts. A comparative analysis of postoperative recovery following posterior lumbar laminectomy under general versus spinal anaesthesia adds to the growing body of evidence on optimising perioperative care in spine surgery. The inclusion of a clinical trial assessing the effects of intravenous magnesium sulphate on postoperative analgesia after myomectomy and hysterectomy further enriches the discourse on multimodal analgesia, a key strategy for improving surgical outcomes, reducing opioid consumption, and enhancing patient comfort. Such studies are essential for guiding context-appropriate practice, especially in environments where cost, resource availability, and patient preferences influence decision-making.

Taken together, the manuscripts featured in this issue reflect the vibrancy and promise of anaesthesia research in Nigeria. They demonstrate that, despite resource challenges, Nigerian anaesthetists continue to ask important questions, conduct meaningful research, and contribute to the global body of knowledge. We appreciate the authors who entrusted us with their work, the reviewers who generously offered their expertise, and the editorial board members whose dedication has made this issue possible. I invite clinicians, researchers, trainees, and students to join us in this scholarly endeavour by submitting manuscripts, serving as peer reviewers, and contributing to the growth of anaesthesia research in Nigeria.

Prof. Tonia C. Onyeka
Member, Editorial Team

ORIGINAL ARTICLE

Effects of Intravenous Magnesium-Sulphate on Postoperative Analgesia following Myomectomies and Hysterectomies

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ABSTRACT **Background:** Opioids are the mainstay of postoperative analgesic, but with many side effects. We explored the analgesic effects of magnesium preloading in abdominal surgeries.
Methodology: Eighty patients, 18 – 65 years, ASA I-III, were randomised into groups M and N. Prior to induction of general anaesthesia, group M received IV magnesium 50mg/kg preloading while group N received placebo, both in 100mls 0.9% saline over 15 mins. All patients had paracetamol 1gm, pethidine 0.5mg/kg and wound infiltration. The time to first request for rescue IV pentazocine, total rescue opioid use, postoperative VAS pain scores over 24-hours, side effects profile and satisfaction score were compared.
Results: Demographic parameters were comparable, p-value > 0.05. The mean time to first request for rescue analgesia was prolonged in group M (219.25 ± 148.88 mins) compared to group N (82.25 ± 46.51 mins). The mean postoperative VAS pain scores were lower in group M versus group N over 24-hours ($p < 0.05$). The mean 24-hours rescue opioid use was lower in group M (49.23 ± 20.05mg) versus group N (87.00 ± 15.27mg), p-value 0.001. PONV was lower in group M versus N, p-value 0.001. Group M had better satisfaction score versus N, p-value 0.001.
Conclusion: Magnesium 50mg/kg preloading provided effective postoperative analgesia, and lower rescue opioid use and PONV incidence following gynaecological surgeries.
Keywords: Magnesium Sulphate, Pain, Opioids, Myomectomy, Hysterectomy.

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INTRODUCTION

Postoperative pain is a significant surgical concern for patients, especially in low-resource countries (LRCs), where analgesic options are limited.[1,2] For instance, the incidence of moderate to severe pain following caesarean section (CS) in Nigeria is between 54.6 - 79.6%.[1] Another African study reported a moderate to severe pain incidence 73.1% after gynaecological procedures.[3] The fear of pain and death are the commonest concerns in Nigerian surgical patients.[4]

The problem of inadequate postoperative analgesia is far reaching. These includes myocardial ischaemia, arrythmias, hypoventilation, atelectasis, hypoxia, postoperative delirium, thromboembolism, and hyperglycemia. Also, it delays recovery, prolong hospital stay and its attendant economic consequences.[2]

The current approach to postoperative analgesia is multimodal. It employs the use of more than one drug, mechanism, and techniques to target several sites in the pain pathway.[5]

Opioids such as morphine, fentanyl, alfentanil and pethidine form the cornerstone of multimodal analgesia, owing to their potent analgesic effects. However, the draw-backs are sedation, ventilatory depression,

vomiting, constipation, urinary retention and urethral catheterization. These problems add to patient's morbidity. Thus, there is a need to explore agents that can lower opioids requirements, and consequently its side effects.[6]

Several agents have been explored i.e., muscle relaxants e.g., gabapentin, antidepressant e.g., amitriptyline, benzodiazepines e.g., midazolam, and alpha-agonists e.g., dexmedetomidine, with mixed outcomes.[2,5,6]

Magnesium is increasingly used in anaesthesia due to its anti-convulsant, anti-inflammatory, and modulatory properties. It stabilise cell membrane, via the blockade of N-methyl-D-Aspartate (NMDA) receptor and calcium ion cellular influx. It modulates pain pathway, and promotes neuronal hyperpolarisation, thus precluding pain intensity.[7] It lowers postoperative pain severity after laparoscopies,[8] abdominal surgeries,[9] hysterectomies,[10,11] and spine surgeries.[12] We noted that magnesium's analgesic property is rarely studied in sub-Saharan African population, where variations in physiology, genetics, and surgical settings may influence its efficacy and safety.

This study aimed to investigate the effect of intravenous (IV) magnesium 50mg/kg preloading, on the time to first request for rescue analgesic, postoperative VAS pain scores, total rescue analgesic consumed, PONV incidence, and satisfaction score in women undergoing hysterectomies or myomectomies, at Ile-Ife, Nigeria.

PATIENTS AND METHOD

This prospective, randomised controlled study was conducted between October 2021 and April 2022. Approval was obtained from Ethics committee of Obafemi Awolowo University Teaching Hospitals complex (OAUTHC), Ile-Ife, Nigeria, protocol No: ERC 2021/03/06.

Women, aged 18 – 65 years, with ASA status I, II and III scheduled for myomectomies and hysterectomies were included. Consent refusal, cyesis, obesity, severe heart, lung, and liver disease, allergy to study drug, malignancy, and behavioral illness were exclusion criteria.

The minimum sample size was on the mean on two non-dependent variables, using Kirkwood formula,[13] based on the time to first request for rescue analgesia

$$n = \frac{(u + v)^2 (SD1^2 + SD2^2)}{(U1 - U2)^2}$$

$$= \frac{(1.28 + 1.96)^2 (140.1^2 + 93.34^2)}{(90.61)} = 36.7$$

Adding 10% attrition = 40 per group. Thus, a total of 80 patients were studied.

A statistician used a computer-generated table to prepare random numbers, written on leveled cards, stored in an envelope, and un-coded after the study. For each patient, the pharmacist was informed, who prepare the study drugs. Thus, the anaesthetist and patients were blinded. The Anaesthestist gave the anaesthesia, and recorded all data. Group M received 50mg/kg magnesium (AS Kalceks) while group N patients received saline 0.9%.

Patients were recruited a day to surgery. History, examination and investigations, i.e., full blood count, electrolytes, coagulation, 12-lead electrocardiograph (ECG), and chest imaging were reviewed. Informed consent was taken.

On the morning of surgery, the anaesthesia machine was checked. Patients baseline pulse rate (PR), blood pressure (BP), saturation (SPO_2), and 5-lead ECG tracing were recorded. IV access was secured and 0.9% saline 500ml commenced. Ondansetron 4mg and dexamethasone 8mg were given. Just before induction, 100mls of the study drugs were infused over 15mins.

Patients were preoxygenated with 100% oxygen for 2 – 3 mins. Induction was done with propofol 1.5 – 2mg/kg. Succinylcholine 1.5mg/kg was administered. Tracheal intubation was done with endotracheal tube (ETT) 7.0mm, confirmed with capnography, connected to the Anaesthetic machine via circle system, and maintained with 0.8 – 1.5% isoflurane in oxygen. Ventilation was controlled mechanically. Muscle paralysis was maintained with vecuronium 0.lmg/kg, as required. Paracetamol 1gm and pethidine 0.5mg/kg was given. Stable haemodynamic, normocapnia, normoxia, and normothermia were maintained.

After the surgery, the wound site was infiltrated with 40mls of 0.25% plain bupivacaine. Isoflurane was turned off, residual paralysis reversed with neostigmine 0.05mg/kg and atropine 0.02mg/kg, airway suctioned, extubated and given 100% oxygen by facemask. Afterwards, the patient was transferred to the recovery room for monitoring, and discharged to the ward using modified Aldrete score of at least 9. IM diclofenac 75mg 12 hourly and paracetamol 1gm 8 hourly were given for 48-hours.

The postoperative VAS pain scores were assessed at 0-, 1-, 2-, 4-, 8-, 12-, and 24-hours. Rescue analgesic (IV pentazocine 0.5mg/kg) was given if in pain, or VAS pain score was above 3, and recorded. Drugs side effects and satisfaction score was recorded after 24-hours.

Data Analysis: Data were analysed using SPSS 25.0. Student's t-test summarised categorical data e.g., VAS pain scores as mean and standard deviation. Chi-square test summarised continuous data e.g., ASA status as frequencies and percentages. P-value < 0.05 was significant.

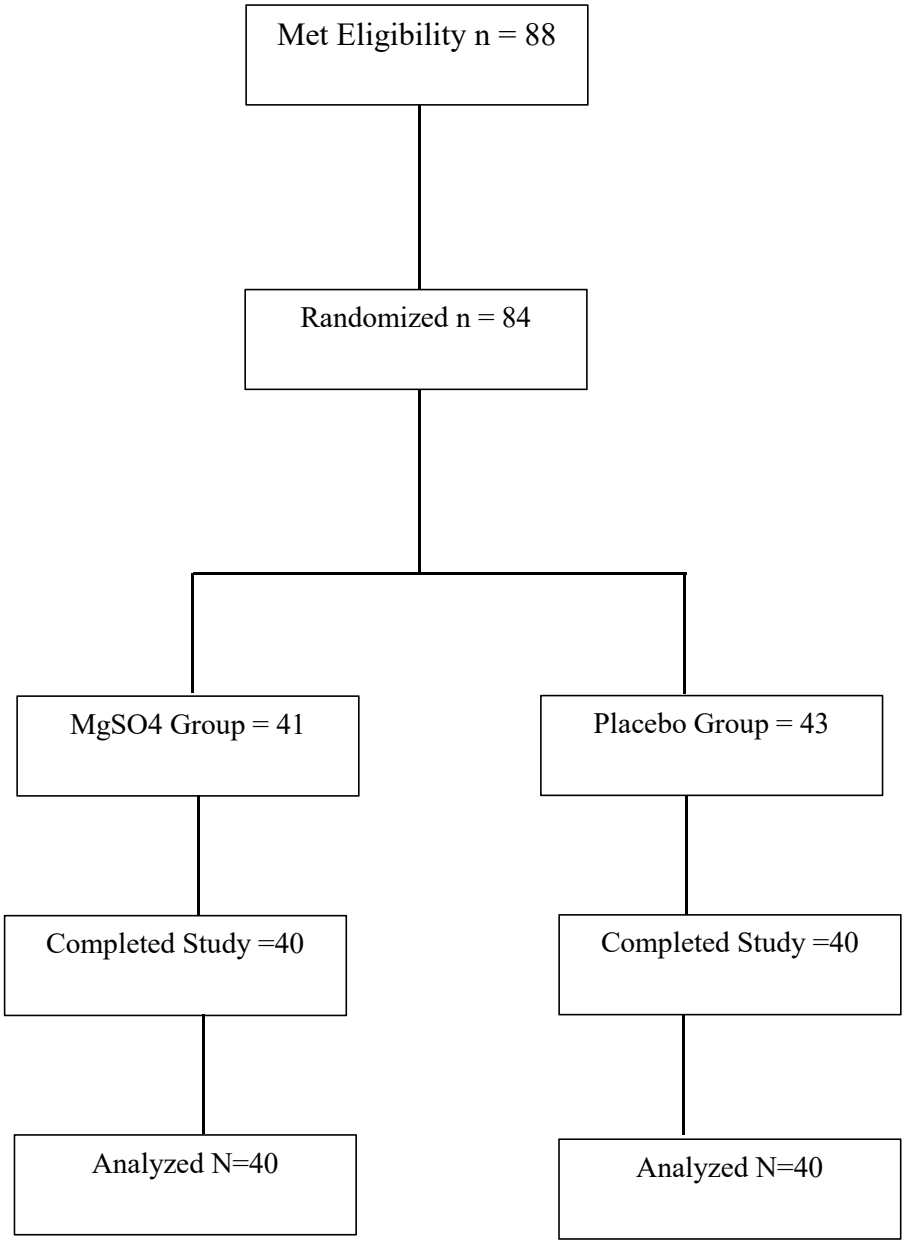

Figure 1: Flowchart Diagram

RESULTS

Eighty patients concluded the study (Figure 1). Demographics, i.e., age, weight, height, BMI, ASA, and duration of surgery were comparable, p-value of 0.80, 0.30, 0.51, 0.49 and 0.74 respectively. The baseline mean serum magnesium was similar, p-value- 0.32 (Table I). The time to first request for rescue analgesic in 219.25 ± 148.88mins group M, was statistically longer than 82.25 ± 46.51mins in group N, p- 0.001. The mean total rescue pentazocine consumed was 25.45 ± 10.75mg Group M which is less than 55.50 ± 15.25mg in Group N, p- value 0.001. The total number of patients who requested rescue doses was 8 (20%) in group M which is lower than 18 (45%) in group N p-value 0.001. (Table II). The mean VAS pain scores were lower in group M versus N at -0, -1, -2, -8, -12 and 24-hours, p-value 0.001 at each hour (Table III). PONV incidence was 4 (10%) in group M, which is lower than 37 (77.5%) in group N p-value 0.001. Group M 39 (97.5%) had better satisfaction versus 23 (53.55%) in group N, p-value 0.001 (Table IV).

Table I: Demographic and Clinical Characteristics

Variables (Mean ± SD)	M-Group n = 40 (Mean ± SD)	N- Group n = 40 (Mean ± SD)	*P*- value
Age in years	44.08 ± 9.39	44.55 ± 6.66	0.80
Weight (kg)	79.41 ± 23.81	74.86 ± 8.60	0.30
Height (m)	1.63 ± 0.07	1.619 ± 0.08	0.51
BMI (kg/m^2)	29.608 ± 7.42	28.69 ± 3.81	0.49
ASA	n (%)	n (%)	
I	15 (37.5)	18 (45.0)	
II	24 (60.0)	21 (52.5)	0.79
III	1 (2.5)	1 (2.5)	
Duration of surgery (minutes)	179.25 ± 71.10	185.68 ± 95.96	0.74
Serum magnesium (mmol/L)	0.84 ± 0.07	0.85 ± 0.21	0.65

P-value < 0.05 is significant
* Significant at 95% CI

Table II: Comparison of the mean time to first request for analgesia (min) and postoperative rescue opioid consumed in the two groups

	M-Group N = 40 (Mean ± SD)	N- Group N = 40 (Mean ± SD)	P- value
Time to first request for analgesia (min)	219.25 ± 148.88	82.25 ± 46.51	0.001*
Analgesic consumed			
Mean Rescue Pentazocine (mg)	25.45 ± 10.75	55.50 ± 15.25	0.001*
Mean No of patient who took Rescue Pentazocine (doses)	8 (20.00%)	18 (45.00%)	0.001*

P-value < 0.05 is significant
* Significant at 95% CI

Table III: Comparison of the postoperative Visual Analogue Scale pain score over 24 hours in the two groups

Hour	M- Group (Mean ± SD)	N-Group (Mean ± SD)	P- value
0	0.27 ± 0.72	2.11 ± 3.10	0.001*
1	2.82 ± 2.13	4.98 ± 1.96	0.001*
2	2.89 ± 1.57	4.40 ± 1.16	0.001*
4	4.46 ± 1.87	4.46 ± 1.71	0.965
8	3.74 ± 1.34	5.05 ± 1.39	0.001*
12	3.08 ± 0.93	4.47 ± 1.39	0.001*
24	2.26 ± 0.76	2.64 ± 1.17	0.092

P-value < 0.05 is significant
* Significant at 95% CI

Table IV: Comparison of the side effects and satisfaction score in the two groups

Side effect	M-Group n = 40 (%)	N- Group n = 40 (%)	*P*- value
PONV	4 (10.0)	31 (77.5)	0.001*
Respiratory Depression	1 (2.5)	0 (0.0)	0.314
Pruritus	0 (0.0)	2 (5.0)	0.152
Satisfaction score			
Very Unsatisfied	0 (0.0)	0 (0.0)	
Unsatisfied	0 (0.0)	2 (5.0)	0.001*
Neutral	1 (2.5)	15 (37.5)	
Satisfied	18 (45.0)	18 (45.0)	
Very Satisfied	21 (52.5)	5 (12.5)	

P-value < 0.05 is significant
* Significant at 95% CI

DISCUSSION

This study showed that 50mg/kg IV magnesium preloading improves postoperative analgesia profile in women undergoing myomectomy or TAH. Specifically, magnesium prolonged the time to the first request for rescue analgesics, lower rescue pentazocine used, VAS pain scores, and improve satisfaction scores compared to placebo, in the first 24-hours, after surgery.

These findings align with and build upon a growing body of literature supporting the role of magnesium as an effective adjunct in multimodal analgesia protocol. Our study extends these findings by evaluating both myomectomies and hysterectomies, thus broadening the gynaecologic data. Magnesium has been proven useful in African population, where analgesic adjuvants options are limited.

Magnesium's role as a physiologic blocker of NMDA receptors has been demonstrated. NMDA receptors are involved in central sensitization, and pain hypersensitivity. The receptors are located on central and peripheral neurons. NMDA receptor blockade reduces spinal cord excitability, and wind-up phenomenon, i.e., progressive increase in pain sensation with repeated stimulation. Magnesium also inhibits calcium ion channel cellular inflow at nerve terminals, which inhibits the release of excitatory pain neurotransmitters e.g., glutamate and substance P.[7,14] In addition, magnesium blocks acetylcholine and histamine release, which are important for pain stimuli transmission.[15] In this study, the time to the first request for rescue analgesics is taken as the effective postoperative analgesia period.

Similarly, Shamin et al[8] showed that following laparoscopic cholecystectomies, magnesium 50mg/kg preloading prolonged the time to the first request for rescue analgesics, 131.7 ±140.1mins compared to 49.3 ± 93.4mins in placebo. Yazdi et al[9] stated that in abdominal surgeries, 25 mg/kg magnesium, and 100 mg/kg/24-hour infusion lower postoperative NRS pain scores, and decrease rescue morphine intake, 8±3.5mg versus 13.2±5.7mg in placebo. Jarahzadeh et al[10] observed that 50mg/kg magnesium preloading lower mean VAS pain scores at 0, 1, 2, 6, and 12hour, decrease rescue narcotic used, and opioid's side effects, after hysterectomies. Tamdogan et al[11] stated that 20 mg/kg magnesium preloading, followed by 20 mg/kg/hour infusion lower rescue opioid use (35.6 ± 15.2mg compared to 44.9 ± 14.1mg in placebo), and decrease pain scores, and opioid's side effects.

Magnesium preloading has produced similar outcomes outside gynaecological procedures. Jin et al[12] in a meta-analysis of ten randomised trials of 641 patients, reported that magnesium decreases postoperative pain scores, and rescue opioid use. Singhal et al[16] stated that 50mg/kg magnesium preloading and 15mg/kg/hour infusion, reduce postoperative VAS score over 12-hours, extended rescue analgesic use period 246 mins, versus 144 mins in placebo, lower rescue analgesic pethidine consumed 181.67mg versus 251.67mg in placebo, in elective lower limb surgeries.

However, contrary to the above findings, Wilder-Smith et al[17] observed no postoperative analgesic effect with magnesium preloading. They administered magnesium 8mmol bolus and hourly for another 5 hours to women undergoing hysterectomies. Thus, the total magnesium given (48mmol) could be sub-optimal. Also, the use of 24 patients total population may have resulted to an under-powered study.

We also report that magnesium preloading lowers PONV incidence to 10% compared to 77.5% in placebo, following gynaecological procedures. This is a useful outcome since known PONV predisposing factors such as female, non-smokers, age < 50years, volatile anaesthetics, surgery beyond 90mins, perioperative opioids, and gynaecological surgeries are present in our patient population. PONV is distressing, increases the risk of gastric aspiration, and fluid imbalance.[18]

PONV results from a complex interaction of dopaminergic (D2), muscarinic (M1 and M2), serotonergic (5-HT3), histaminergic (H1), and neurokinin (NK1) neurotransmitters, the area postrema in the floor of the 4th ventricle, and the lower pons, i.e., the chemoreceptor trigger zone (CTZ), vestibular system, vagus nerve, gut, limbic system, nucleus tractus solitarius, rostral nucleus, the nucleus ambiguus, and the dorsal motor nucleus of the vagus.[18]

Similarly, Maghsoudi et al[19] stated that in 70 patients who had abdominal surgeries, magnesium 50mg/kg preloading lower PONV incidence compared to placebo. Since pain and opioid use are PONV risk factors, magnesium's opioid sparing effect may reduce PONV incidence.[20]

All patients in the magnesium group except one, were satisfied with their surgical outcome, compared to about 50% in the placebo group.

Magnesium sulphate side effects such as sedation, loss of reflexes, and oliguria, and respiratory depression were not noticed. However, the management modalities for magnesium toxicity include surveillance, use of 10% calcium gluconate 10mls over 10-15mins, and if needed, haemodialysis, cardiac and respiratory support.[21,22]

There are limitations to this study. The sample size, though adequately powered for the primary outcome, limits generalisability across diverse populations and surgical settings. Serum magnesium were not serially monitored, leaving a gap in understanding the pharmacokinetic-pharmacodynamic context. Future multicenter trials with larger cohorts and biomarker correlation may refine optimal dosing strategies.

RECOMMENDATION

Clinicians can consider magnesium 50mg/kg preloading in patient undergoing open gynaecological surgeries, for safe and effective postoperative analgesia.

CONCLUSION

This study demonstrated that 50mg/kg magnesium preloading provided effective postoperative analgesia, lower opioids use, and PONV incidence after gynaecological surgeries.

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ORIGINAL ARTICLE

Burnout among Anaesthesia Providers in Sub-Saharan Africa: A Scoping Review

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ABSTRACT **Background:** Anaesthesia providers are a unique population of healthcare workers because of the specialised nature of their work in the perioperative period. Sub-Saharan Africa (SSA) with its large proportion of Low-and Middle-Income Countries (LMICs) has limited manpower and resources. This scoping review was aimed at investigating the prevalence of burnout amongst Anaesthesia providers in SSA from previous research, to identify factors related to burnout, consequences of burnout, and possible interventions to mitigate burnout among SSA anaesthesia providers.

Methodology: This is a scoping review of research in the last ten years on burnout amongst SSA anaesthesia providers. Peer-reviewed studies published between the years 2013 to 2023 were included in this study. Google Scholar, Research gate, National Library of Medicine and Web of science databases were searched for eligible studies. Eleven were identified.

Results: The synthesized prevalence of burnout was 38.05%. The subscales of high Emotional Exhaustion (EE) of 50.37%, high depersonalisation (DP) 44.05%, and moderately low Personal Accomplishment (PA) of 35.7% were found. Several factors were identified as impacting Anaesthesia providers in SSA such as their years of experience, age of the Anaesthesia provider, and their work environment. Data was limited on the outcomes of burnout, and no studies on the interventions aimed at ameliorating burnout amongst SSA Anaesthesia providers.

Conclusion: Findings highlight the need for more research on burnout among SSA anaesthesia providers, and an urgent need for the implementation of interventions to mitigate burnout in SSA anaesthesia providers.

Keywords: Burnout, Physician Anaesthetist, Non-physician anaesthetist, Anaesthesia providers, Sub-Saharan Africa.

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INTRODUCTION

The term burnout was coined by an American psychologist Herbert Freudenberger in the 1970s, where he used the term to describe the implications of severe stress in helping professionals.[1] It is a syndrome seen in professions that care for others, such as healthcare workers, teachers and social workers.

The World Health Organization's ICD-11 defines burnout as a syndrome that results from chronic workplace stress that has not been successfully managed, and is characterized by three main components; feelings of energy exhaustion or depletion (Emotional Exhaustion, EE), increased mental distance from one's job (Depersonalisation, DP), and reduced professional efficacy (low Personal Accomplishment, PA) .[2] Healthcare professionals are exposed to a lot of stress at work, with chronic stress leading to emotional exhaustion and energy depletion.

Some consequences of Healthcare professionals' burnout are objectification of their patients, negative attitude towards their colleagues and their profession, as well as increased risk of medical errors. Fatigued and emotionally drained anaesthesia providers are more likely to make errors in medication dosages, monitoring, and other critical tasks, putting patients at risk.[3,4]

At an individual level, burnout has been linked to mood disorders, substance abuse, depression and even suicide.[3] Prolonged burnout can contribute to the development of mental health conditions such as anxiety, depression, post traumatic stress disorder amongst anaesthesia providers. Romani et al[4] characterized burnout as a serious disorder that could lead to devastating personal and professional consequences.

Burnout not only affects the individual, but has both societal and organizational implications. Medical errors, poor physician performance, disharmony among team members affecting team work, are some of the organizational consequences of teamwork.[3] This ultimately alters the quality of care delivered to patients, thus compromising patient safety.

Anaesthetists are a unique form of healthcare professionals as they work in various settings ranging from the operating theatres, critical care units, emergency roms, radiology units, endoscopy units amongst others. Anaesthesia providers play an important role in healthcare by administering anaesthesia during surgical operations and other procedures, thus ensuring patient safety and comfort. They also handle emergencies, and are involved in the resuscitation and care of the critically ill. Due to the high stress situations they are exposed to, high workload, and limited resources, Anaesthesia providers in Sub-saharan Africa are prone to develop burnout[5,6]. The consequence of burnout among Anaesthesia providers is therefore grave.

In Sub Saharan Africa these healthcare professionals face unique challenges that contribute to high levels of burnout. Being an Anaesthetist is associated with a lot of stress and high work load, plus low number of providers to deal with the high burden of disease in SSA.[6]

Burnout among healthcare professionals has a reported prevalence of more than 50% in the United States of America.[5] Despite having ample resources and advanced infrastructure, anaesthesia providers in developed nations also face challenges that contribute to high levels of burnout. These challenges are even more accentuated in developing countries where there is limited manpower and resources

The Anaesthesia workforce in Sub-Saharan Africa mainly consists of an anaesthetist, usually a consultant, resident doctors, and nurse anaesthetists. nurse anaesthetist, also known as non-physician anaesthetists form a major part of the global anaesthesia workforce. An Anaesthesia workforce survey conducted by the World Federation of Societies of Anaesthesiologists (WFSA) between the years 2015 and 2016 illustrated the distribution and training of physician anaesthesia providers and non-physician anaesthesia providers globally was conducted. A ratio of 5 specialist anaesthesia providers (Anaesthesiologist) per 100,000 population has been recommended as the reasonable target by the WFSA. The density of physician anaesthesist to patient levels were particularly low in African and South-East Asian countries. South Africa was the only African country that had a ratio of more than 5 per 100,000 with all other African countries ranking below this range .[7] Similarly, the Lancet Commission on Global Surgery has recommended a minimum density of surgical specialists, anaesthetists, and obstetricians of 20 to 100,000 population.[8] However, in contrast with what the WFSA recommended, their recommendation didn't give the exact proportions for each specialist per population. Davies and colleagues recommended 4 anaesthesiologists per 100,000 population by using best-fit curves for Maternal Mortality Ratio and physician anaesthesia Providers.[9] Despite the recommendations on the numbers of specialists per population, there is limited data on the available manpower in Sub Saharan Africa. A study on the existing surgeon to anaesthetist ratio in West Africa was found to be 49:1.[10]

The shortage of Anaesthetists in Sub-Saharan Africa is mostly on account of loss to brain drain. This has further increased the burden on the anaesthesia providers available. In 2015 it was estimated that worldwide, there were 550,134 Anaesthesiologists (IQR 529,008-572,916), and 1,112,727 specialist surgeons (IQR 1,059,158-1,117,912). Of these, only 15% of these anaesthesiologists were in LMICs.[8] A similar survey in 2018 also showed that of the global 436,596 Physician anaesthetists in that year, only 12% worked in Low and Middle Income Countries.[6] This workforce shortage has lead to excessive workload on the available anaeasthesia providers, more frequent call duties, with minimal support, thus making work conditions even more unfavourable.

The purpose of this scoping review is to explore what is known about burnout among anaesthesia providers in Sub-Saharan Africa, to guide future research on this population, explore its contributing factors, and measures to alleviate burnout.

Tools used to Measure Burnout

There are various tools used to measure burnout, with the Maslach Burnout Inventory considered to be the gold standard and the most widely used tool.[11] It was developed in the late 1970's and modified into MBI-Human Services Survey(MBI-HSS) for individuals working in healthcare, and MBI-Educators Survey (MBI-ES) for individuals working in the educational sector. The MBI-General Survey was also later developed when burnout was noticed in individuals who were not in people oriented careers. All versions of the MBI have 3 subscales; Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA), but have variable number of items measured. The MBI-HSS and MBI-ES measure twenty two items, while the MBI-GS measures sixteen items.[12] For medical personnel, another form of MBI-HSS was adapted; the MBI-HSS-MP.

Burnout is said to be absent when the cumulative score is less than 20, possible burnout when cumulative score is between 21-40, mild burnout when the score is between

41-60, moderate burnout between 61-80, and high burnout between 81-100.

Table I: Maslach Burnout Scale Severity Score

Burnout severity	Cumulative score
Burnout absent	<20
Possible burnout	21-40
Mild burnout	41-60
Moderate burnout	61-80
High burnout	81-100

However, the severity may also be further classified based on the MBI Sub scales[13];

Table II: Maslach Burnout Inventory Severity Subscale Scores[13].

Subscale	Category	Cut-off scores
Emotional Exhaustion (EE) Score 0-54	High	>27
	Moderate	19-26
	Low	0-18
Depersonalisation (DP) Score 0-30	High	>10
	Moderate	6-9
	Low	0-5
Personal Accomplishment (PA) Scores 0-48	High	0-33
	Moderate	34-39
	Low	>40

METHODOLOGY

This is a scoping review of literature which studied burnout amongst anaesthesia providers in the past ten years. This review was able to gather and synthesize research evidence on current literature on burnout among anaesthesia providers in Sub-Saharan Africa. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework guidelines was used to perform this scoping review.

The following questions guided this scoping review;

1. What is the prevalence of burnout among anaesthesia providers in Sub-Saharan Africa?
2. What are the factors that contribute to burnout among anaesthesia providers in Sub-Saharan Africa?
3. What interventions could alleviate burnout among anaesthesia providers in Sub-Saharan Africa?

Search Strategy

The following electronic databases were used to search for literature; Google Scholar, PubMed, National Library of Medicine (NLIM), Research Gate and Web of Science. The keywords burnout, anaesthesia, sub-saharan africa were used. Science direct was used to search for grey literature.

Eligibility Criteria

Papers on anaesthesia provider burnout included in this scoping review were all in English language, published between the years 2013 to 2023, involved human participants, and were all peer-reviewed. All included research were from Sub-Saharan Africa. Editorials and commentaries were excluded. Disserartions, scoping reviews and systematic reviews were also excluded from the study, but their reference list was also screened for inclusion.

Selecting Sources

All sources were downloaded from the above listed databases into EndNote reference manager and duplicates were deleted. Titles and abstracts were screened against the eligibility criteria, and ineligible sources were excluded from the review. Full text screening was then performed, and more ineligible sources were further excluded. The reference lists of included studies were also screened to identify further eligible sources.

Data Charting Process

Data were extracted from the included articles and entered into a Microsoft Word table. The following data were extracted; title, authors, year of publication, country of publication, sample size, study population, tool used to measure burnout, burnout prevalence, burnout subscale scores, factors associated with prevalence, and consequences of burnout.

Synthesis of Results

A quantitative synthesis specific to the prevalence and degree of burnout was calculated based on the number of included articles that reported raw scores for Maslach Burnout Inventory (MBI) and its subscales. A mean score of the prevalence of burnout was calculated by hand, by totaling the raw scores and dividing by the total number of studies. For the burnout subscales, the mean score was also calculated by hand across studies for each subscale and divided by the total number of studies that included a raw score for that subscale.

RESULTS

A total of eleven studies met the inclusion criteria for this scoping review**.** Most were sourced from Google Scholar and PubMed.

Distribution: The country with the highest number of studies was South Africa, with a total of five. The remaining six were from Ethiopia, Ghana, Morocco, Rwanda, Nigeria, and Zambia.

Three of these studies were conducted among both physician and non-physician anaesthetists, six studies among physician anaesthetists alone, and 2 conducted on only non-physician anaesthetists.

Two studies compared burnout amongst anaesthesia providers in the public health sector versus those working in the private sector.

Most sources were published in 2023 (36%), 2022 (27%), and 2020 (18%), with the least published in 2015 and 2021 (9% each). There were no eligible studies published in 2013, 2014, 2016, 2017, 2018, and 2019.

Nature of Studies: The tool used to measure burnout was mainly the Maslach Burnout Inventory. Amongst the included studies, five used the Maslach Burnout Inventory[14,15], 3 utilised its modification Maslach Burnout Inventory Human Services Survey (MBI-HSS),[16,17,18] and 2 used the Maslach Burnout Inventory Human Services Survey for Medical Personnel (MBI-HSS MP)[19,20]. Only one study used the Oldenburg Burnout Inventory to measure burnout.[21]

Table III represents the characteristic of studies included in the study. The prevalence obtained from each study is in the fifth column.

Table III: Characteristics of Studies included in the Scoping Review

Author(s), Year, Country	Sample Size and Study Population	Study Design	Burnout Measuring Tool	Prevalence
Allie L., et al.[14] 2023, South Africa.	139 anaesthesia providers (medical officers, registrars, and consultants) from 2 hospitals in KwaZulu Natal, South Africa.	Prospective descriptive analytical and observational study	MBI	18.7% of respondents had extreme burnout.
Benhamza et al.[15] 2023, Morocco	396 anaesthesiologists and nurse anaesthetists from all hospitals in Morocco	Multicentre cross-sectional study	MBI	83% PhA, 95% NPA (average 89%)
Coetzee et al.[19] 2020, south Africa.	498 anaesthesia Providers working in the Private and Public sectors		MBI-HSS(MP), Areas of Worklife Survey	22.7%
Mamorobela et al.[23], 2023, South Africa	150 doctors; 19 anaesthetists.	Cross-sectional study	MBI	36%
Mumbwe et al.[16], 2020, Zambia	160 physician and non-physician anaesthesia providers in Zambia.	Cross-sectional study	MBI-HSS	51.3%
Nazeema et al.[20], 2023, South Africa	327 doctors; 34 anaesthetists	Cross-sectional study	MBI-HSS(MP)	46.2% of respondents (Anaesthetists made up 10.1% of study population).
Nwosu et al.[21],2022, Nigeria.	129 physician anaesthetists who attended the NSA AGM	Cross-sectional study	Oldenburg Burnout Inventory	68.3%
Opoku et al.[22], 2022, Ghana	391 nurses; 43 anaesthesia and intensive care nurses	Cross-sectional study	MBI	
Tuyishime et al.[24] 2022, Rwanda	137 anaesthesiologists, resident doctors and Non-physician anaesthetists from 4 teaching hospitals	Multicentre cross-sectional study	MBI	26.3%,
Van der walt et al.[18], 2015, South Africa.	205 physician anaesthetists in the private and public sectors.	Cross-sectional, descriptive, prospective, contextual study.	MBI-HSS	High level of burnout in 21% of respondents.
Yetneberk et al.[17], 2021, Ethiopia	650 non-physician anaesthetists	Cross-sectional study	MBI-HSS	17.1%

MBI- Maslach Burnout Inventory; MBI-HSS- Maslach Burnout Inventory-Human Services Survey; MBI-HSS(MP)- Maslach Burnout Inventory-Human Services Survey for Health Personnel; NSA- Nigerian Society for Anaesthetists; NPA- non-physician anaesthetist; PA-Personal Accomplishment; PhA-physician anaesthetist.

Synthesised Findings

The mean burnout score from this review was 38.05%. The mean of the reported raw scores for Emotional Exhaustion was 50.37, for Depersonalization it was 44.05, and 35.7 for Personal Accomplishment. Table IV illustrates burnout tools used in the various studies, as well as the subscale scores obtained.

Table IV: Burnout Tools Used and the Subscale Scores Obtained

Author	Number of Anaesthesia Providers	Burnout Tool Used	Burnout Subscale Scores
Allie et al.[14]	139	MBI	High EE-42% High DP-38% Low PA-52%
Benhamza et al.[15]	396	MBI	High EE-48% High DP-43.2% Low PA-21%
Coetzee et al[19]	489	MBI-HSS(MP)	22.7% of respondents had clinical burnout; Extreme burnout in 10.6% High EE+high cyinism-7.4% High EE+low efficacy-4.6%
Mumbwe et al.[16]	184	MBI-HSS	High EE-106(66.3%, CI 58.7%-73.2%) High DP-72(45%, CI 37.4%-52.7%) Low PA-38(23.8%, CI 17.7%-30.8%)
Nazeema et al.[20]	327 doctors; 34 anaesthetists	MBI-HSS	Low PA in anaesthesia residents.
Van der walt et al.[18]	205	MBI-HSS	EE-45.2%, DP-50%, PA-46%.

Anaesthesia Provider Personal Factors: There were various results on the association between burnout and Anaesthetic providers' age, sex, and years of experience. Young age was associated with burnout in four of the studies. Participants aged between 30-40 years had higher emotional exhaustion (OR 2.214 CI: 1.462-3.352) compared to their older counterparts demonstrated by Benhamza et al. in Morrocco.[15] It was also demonstrated by Nazeema et al and Coetzee in South Africa, and Opoku et al in Ghana that younger aged participants had higher levels of burnout.[19,20,22] Most of the studies did not show an association between the respondents' sex and burnout. Only 2 studies demonstrated that females had higher burnout compared to their male counterparts.[14,22] None of the studies demonstrated a relationship between an individual's marital status and burnout.

Most of the studies demonstrated fewer years of work experience were associated with more burnout.[14,15,17,19,22] Resident doctors, interns and medical officers had more burnout, while older experienced anaesthetist had less burnout.[14,20] However, one study demonstrated no association between years of practice and burnout.[23]

No association between respondents' demographic data and burnout was found in three of the studies.[16,21,23]

All but one of the studies related race with burnout. Caucasians had more burnout compared to Africans and Asians.[20]

Two of the studies showed an association between burnout and psychiatric disorders.[20,21] In the Nigerian study by Nwosu et al[21] respondents that had depression had high levels of burnout (p=0.001), while Nazeema et al[20] in Zambia showed an association between a psychiatric diagnosis and burnout (RR 1.49; CI 1.13-1.97), particularly anxiety disorders and depression.

The study in Zambia demonstrated that non-physician anaesthetists had more burnout compared to their physician anaesthetist counterparts.[16]

Table V. Factors related to burnout

Author(s), Year, Country	Factors Associated with Burnout
Allie L., et al.[14] 2023, South Africa.	Excellent sleep quality was associated with low emotional exhaustion scores and low depersonalisation scores. Exam preparation was associated with high emotional exhaustion. Female gender had more Emotional Exhaustion compared to their male counterparts (49% vs 29%, p<0.05).
Benhamza et al.[15] 2023, Morocco	Age between 30-40 years Years of practice less than 25 years Being part of an on-call system Working in a primary health care centre Career choice regret Inability to take vacations
Coetzee et al.[19] 2020, South Africa.	Comparison between anaesthetists in the private and public sector. Extreme burnout noticed more in those practicing in the public sector (18%) compared to those working in private facilities (7%),
Mumbwe et al.[16], 2020, Zambia	Anaesthesia providers perceived that they did not have the right team around them to do their job (OR 2.91, 95% CI, 1.33-6.39) Being a non-physician anaesthetist (OR 3.4, 95% CI 1.25-12.34) was associated with higher levels of burnout
Nazeema et al.[20], 2023, South Africa	Increased burnout risk noticed in younger age anaesthesia providers, caucasian race, being a resident doctor, having a prior psychiatric diagnosis of anxiety and or depressive disorder.
Nwosu et al.[21],2022, Nigeria.	Age more than 43 years Being a resident doctor
Tuyishime et al.[24] 2022, Rwanda	Lacking the right team around to support with the job, Lack/availability of essential drugs and equipment
	frequency of seeing patients with negative outcomes were associated with burnout.
Van der walt et al.[18], 2015, South Africa.	Higher burnout among females, age group 30-40 years, Resident doctors and working experience between 4-8 years. (Not statistically significant)
Yetneberk et al.[17], 2021, Ethiopia	Work experience less than 5 years (p<0.001), Parenthood (p<0.01), consumption of more than 5 alcoholic drinks per week (p<0.002), anaesthetists with academic roles (p=0.01).

Work Environment: Some studies showed that respondents work environment has impact on individual well being. Lack of the right team, drugs and equipment was demonstrated to be related to burnout in two studies.[16,24] The lack of support from management, fewer number of staff on duty were found to be related to burnout in Ghana in the research by Opoku et al.[22]

Anaesthetists working in Primary Health Centers had more burnout compared to those working in University Hospitals and Regional Hospital centers in one of the studies.[15] Similarly, Anaesthetists working in public health sector had more burnout compared to their colleagues working in the private health sector.[19]

Also individuals who work entails staying overnight while being on-call system, and lack adequate rest following the call had high levels of burnout (Benhamza, 2023) .[15] Individuals who perceived their salaries were insufficient also had more burnout.[15] Residents preparing for examinations were also demonstrated to have high burnout.[14]

Work Outcomes: Burnout has negative impact on an individual's performance at work. This scoping review revealed some of the impact burnout had on the Anaesthetist performance and patient safety.

Table VI: Consequences of Burnout on Anaesthesia Provider and Patient Safety

Author(s), Year, Country.	Consequences/Mishaps
Benhamza et al.[15] 2023, Morocco	Sleep disorders in 42.7% of participants, 22.5% had toxic habits (use of anaesthetic products 4.8%, cannabis 13.63%, alcohol 32%), Suicidal ideation (0.25%)
Yetneberk et al.[17], 2021, Ethiopia	Mistakes made with negative consequence to patients multiple times (29.3%), Lack enough time/attention to patients (33%), don't monitor patient in the OR as closely as they should multiple times (3.3%), medication errors once in the last year(41.8%).

Burnout Interventions: None of the studies included had implemented a burnout intervention.

DISCUSSION

The mean of the reported raw scores in this scoping review for emotional exhaustion was 50.37, which indicates high emotional exhaustion among anaesthesia providers in Sub-Saharan Africa. The mean of the reported raw scores for depersonalization was 44.05, which indicates high levels of depersonalization among SSA anaesthesia providers. However, 35.7 was the mean of the reported scores for personal accomplishment, which indicated moderate levels of personal accomplishment.

The Medscape Physicians Burnout and Depression report 2024 ranked the incidence of burnout among categories of physicians. This report showed that anaesthesiologists had high levels of burnout, being among the top 10 category of physicians, with a prevalence of 50%. Physicians working in emergency medicine, obstetrics and gynaecology, and oncologists had the highest levels of burnout in this survey (about 63%, 53% and 53% respectively).

However, Afonso et al recorded a burnout incidence of 13.8% among anaesthesia providers in the United States of America.

The prevalence of burnout was particularly exacerbated during the COVID-19 pandemic as reported by the American Society of Anaesthesiologists because of the major roles played by anaesthetists during this period. Anaesthetists' expertise in airway management, ventilation, resuscitation, and care of the critically ill during the pandemic made them even more frontline. Furthermore, they worked in more remote areas, worked more irregular shifts, and were exposed to greater occupational hazards.[25]

The difference in study design, instruments for studying burnout, sample size, nature of the healthcare system and difference in study period could account for the varying prevalence rates.

Anaesthesia Providers' Personal Factors: This scoping review revealed younger anaesthetists, and those with fewer years of experience were associated with burnout. Individuals who were younger than 35 years had higher depersonalisation and Personal accomplishment scores in a study among Turkish healthcare workers implying greater burnout.[27] Findings in this scoping review are also similar to a survey conducted by John and colleagues on burnout among Indian anaesthesiologists. In their study, senior residents had higher levels of burnout compared to assistant professors and professors.[28] Health workers with more than 10 years experience were found to have lower DP and PA scores compared to those with less than 10 years in another study by Guclu et al.[27] However, some studies revealed that the incidence of burnout was independent of age category.[29] Older physicians have the advantage of having more experience, have elevated positions, in comparison to younger physicians with less experience, coping skills, and work more night shifts.[27]

Some studies in this scoping review associated burnout with psychiatric disorders such as anxiety and depression. Guclu and colleagues in Turkey showed a positive correlation between burnout, insomnia, and anxiety disorders.[27]

Work Environment: Factors identified in the professional environment that lead to burnout syndrome include high workload, ambiguity on roles, multiple responsibilities, overworking, prolonged working hours, unsatisfactory colleague relationships, lack of autonomy, lack of appreciation, and unfavorable events.[28,29] This scoping review revealed that some work environmental conditions such as the lack of the right equipment, lack of the right team, and lack of support from hospital management contribute to burnout. This is quite similar to what Afonso and colleagues reported, following a study on burnout among American Anaesthesiologists.[32] They found that the perceived lack of support at work (Odds ratio 10.0, 95% Confidence Interval 5.4-18.3), lack of support at home (Odds ratio 2.13, 95% CI 1.69-2.69) and staff shortages were associated with a high risk for burnout (OR 2.06, 95% CI 1.76-2.42). Working for more than 8 hours per day, and more than 10 night shifts per month was associated with high prevalence of burnout in Indian anaesthesiologists.[28]

Too many bureaucratic tasks, long hours at work, insufficient compensation, lack of autonomy, lack of respect from administrators, colleagues, patients were some of the factors identified that contributed most to burnout according to the Medscape Physician Burnout and Depression Report 2024.[26]

One out of every eight sub Saharan African medical personnel emigrate to high income countries.[33] With the impact of brain drain contributing to burnout among SSA Anaesthesia providers, Skelton and colleagues explored the push and pull factors associated with migration of anaesthesiologist's in Rwanda by conducting in-depth 60 minute interviews with Rwandan Anaesthsiologists'. Poor working conditions, lack of professional support, low salary and financial struggles, and demoralization when others emigrate were identified as the push factors. Major attractions to the High Income Countries (HICs) were better working conditions and higher salaries. However, family and community ties, patriotism, and optimism for the future were identified as some of the reasons why some of the Rwandan anaesthesiologists didn't migrate.[34]

Work Outcomes: a few of the studies included in this scoping review reported outcomes of burnout among Anaesthesia providers. In the United States of America, a nationwide survey of American Physicians in 2018 revealed that majority of physicians that reported medical errors had higher prevalence of burnout ($p < 0.001$). These errors were in the form of either an error in judgement, wrong diagnosis, technical mistakes during procedure, wrong prescription, wrong dosage, or

intervention for the wrong patient. These errors had resulted in patient death in 4.5% of respondents and permanent major morbidity in 5.3% of respondents during the period which the study was conducted.[5]

Burnout interventions: None of the studies in this scoping review included interventions on mitigating burnout; they however mentioned some causes. Aryankhesal et al did a systematic review on interventions on reducing burnout among physicians and nurses. Gratitude and thankful events, professional identity development programs, communication skills training, online programs and internet based interventions, psychosocial training intervention, mindfulness training, yoga, meditation, relaxation, touch therapy were all associated with a positive effect on burnout. The most effective skills identified in their study was training and communication skills improvement.[35]

A three step intervention was administered to 8 interdisciplinary units taking care of adult cystic fibrosis patients, with a significant impact on reducing their burnout.[36] The first intervention entailed an exercise that involved recording 3 good things daily in a journal, and then spending 5 minutes at the beginning of each meeting to share a good thing for 4 weeks. The second step was a presentation on strategies and tools to work more efficiently with less stress, and the last intervention was meditation. Mindfulness exercises were also included in the intervention. Using the Perceived Stress Scale-10 (PSS-10), a significant decrease from the 54th percentile before the intervention, to 36th percentile post-intervention was observed. Seven out of the 8 members had a decrease in their PSS-10 score. Fifty percent of the team members planned on using the intervention again.

Chesak and colleagues suggested some interventions to mitigate burnout in women physicians. Barriers to career progression should be addressed, identifying and reducing maternal bias, provision of mentorship opportunities, as well as policies supporting child care support, lactation and family leaves were suggested.[3]

Afonso and colleagues also suggested that support; both familial support and mentorship as actionable interventions to mitigate burnout among American anaesthesiologists.[32] Exercise, adequate sleep, meditation and stress reduction techniques were some of the coping mechanisms adopted by some physicians in order to reduce burnout.[26]

Medscape physician burnout and depression 2024 report revealed that majority of individuals with burnout haven't sought for help from mental health professionals and don't intend to do so.[26] However, as this was conducted in a high income country, it can not be extrapolated to the sub-Saharan region which is comprised mainly of Low and Middle Income Countries (LMICs). This report also stated schedule flexibility and raising physicians pay were some interventions noted to reduce burnout.

RECOMMENDATIONS

This scoping review has revealed that there are no/limited studies on burnout interventions targeted at Anaesthesia providers in Sub Saharan Africa. Interventions to mitigate burnout should be aimed particularly at the most vulnerable group identified in this scoping review; the young and the less experienced Anaesthesia providers.

This scoping review revealed that incentives should be aimed at individuals working in the public health sector. Improvement in working conditions of SSA Anaesthesia providers with better renumeration could lead to a decrease in emigration of these individuals, improved healthcare provider satisfaction. Provision of appropriate equipment, and team composition could also address some of the factors contributing to burnout identified in this review.

LIMITATIONS OF THE STUDY

Lack of studies with interventions, limited overall number of studies on burnout in SSA Anaesthesia providers. Heterogenous amount tools were used to measure burnout, and there were various interpretations of burnout scores.

CONCLUSION

Burnout, a triad characterized by emotional exhaustion, depersonalization and decreased personal accomplishment has a high prevalence in anaesthesia providers in Sub-Saharan Africa due to unique challenges. This scoping review has revealed that burnout among Sub Saharan Africa Anaesthesia providers is prevalent, particularly among the younger Anaesthesia providers and individuals working with inadequate team members and resources. Interventions to prevent and mitigate burnout among SSA anaesthesia providers were not suggested by the studies sampled in this review, and thus further studies are recommended.

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ORIGINAL ARTICLE

Postoperative Recovery Profile Following Posterior Lumbar Laminectomy: A Comparative Study Of General Anaesthesia And Spinal Anaesthesia

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ABSTRACT **Background:** Elective lumbar laminectomy can be done under both general and spinal anaesthesia. Many authors have suggested that the choice of anaesthetic technique influences postoperative recovery outcomes. Existing literature provides inconsistent findings regarding which technique offers superior recovery profile. Furthermore, there is paucity of well- designed comparative studies evaluating the recovery profile of patients who had lumbar laminectomy under spinal anaesthesia with those under general anaesthesia. This lack of conclusive evidence underscores need for further research to determine the optimal anaesthetic approach that enhances recovery profile.

Subjects and Methods: Fifty eligible patients were recruited and randomized into two groups (25 each) using block technique. Each group received either general anaesthesia or spinal anaesthesia. The discharge time from post anaesthetic care unit (PACU), pain scores at 4, 8, and 24hrs from the end of surgery, time at first ambulation and time of discharge from the hospital were assessed and recorded. The data were analyzed using Statistical Package for Social Sciences (SPSS) 26 for windows.

Results: The mean duration of PACU stay was comparable (GA.=74.44±3.94 mins, SA=73.56±14.44 mins, p = 0.770). The spinal anaesthesia group had a significantly (p=0.003) lower mean pain scores (3.323.32±0.9) than the general anaesthesia group (4.08±0.81) at 4hr from the end of the surgery, thereafter the pain scores became comparable. The time to first ambulation after surgery (GA=67.92±13.14hrs, SA=62.70±12.60hrs), and the time to hospital discharge (GA=7.56±1.53days, SA=7.16±1.41days) in both groups were comparable with P=0.158, P = 0.340 respectively.

Conclusion: Spinal anaesthesia offered a better early postoperative recovery profile than general anaesthesia, as evidenced by a lower pain score at 4hrs postoperative time.

Keywords: Elective Laminectomy, General Anaesthesia, Lumbar spine, Postoperative Recovery profile, Spinal Anaesthesia.

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INTRODUCTION

Severe pain and surgical stress hamper postoperative recovery following lumbar laminectomy.[1] Laminectomy, also known as posterior spinal decompression, is the surgical removal of the lamina and the spinal canal roof.[1]

Surgery evokes a wide variety of neuroendocrine responses postoperatively. These include increased secretion of adrenocorticotropic hormone (ACTH), antidiuretic hormone (ADH), growth hormone (GH), prolactin from the pituitary, increased outflow from the brainstem autonomic fibres leading to increased catecholamine release, activation of the renin-

angiotensin-aldosterone system, increase in glucagon secretion and immunosuppression. These neuroendocrine effects result in increased protein catabolism, reduced substrate utilisation, persistent water/sodium retention with associated dilution hyponatremia, and inadequate clearance of metabolic by-products leading to acidosis. Other effects include pain, nausea, vomiting, ileus,impaired pulmonary function,increased cardiac demand and risk of thromboembolism.[2] These negatively affect patients' recovery by increasing morbidity, delaying recovery and prolonging hospital stay.[2] Therefore, modification of endocrine and metabolic responses following surgery is desirable.[3]

Adequate control of postoperative pain enables early mobilisation exercise, attenuates surgical stress and permits early oral nutrition, and goes a long way to improve postoperative outcome.[2] Anaesthetic techniques can influence the stress response to surgery and postoperative pain.[4] There is evidence that anaesthetic management exerts some previously unrecognised long-term postoperative influences. These effects include surgical site infection (SSI), cancer recurrence and metastasis, chronic post-surgical pain, blood transfusion requirement, postoperative myocardial infarction (MI), stroke, neurocognitive effect on the immature brain, and cognitive dysfunction in the elderly.[5]

Lumbar laminectomy can be done under general anaesthesia or spinal anaesthesia[6] and each has possible advantages and disadvantages in the perioperative period.[7,8]

General anaesthesia renders the patient motionless throughout the procedure. It provides a secure airway, although it may lead to haemodynamic instability, greater intraoperative blood loss, greater analgesic requirements, postoperative nausea and vomiting compared to spinal anaesthesia.[9] Spinal anaesthesia requires no airway instrumentation, provides profound analgesia with less surgical blood loss, and thus improved operating conditions;[10] however, reported disadvantages during laminectomy include intraoperative anxiety, cough, hiccups, and movement.[11,12]

It also blocks the efferent autonomic neural pathways to the liver and adrenal medulla thereby inhibiting stress response to surgery and positively influence the postoperative outcome of organ function.[4]

In the study by Gupta et al[13],they reported that spinal anaesthesia is a better option than general anaesthesia in laminectomy as it is economical with a speedy recovery. Also according to Kara and co-workers[14], they documented that spinal anaesthesia could be augmented intraoperatively during lumbar laminectomy via repeated intrathecal injection of local anaesthetic agents under direct vision. Most of the studies compared general anesthesia with spinal anaesthesia during laminectomy by assessing mostly their intraoperative characteristics and postoperative pain profiles and timing, however, there is paucity of studies assessing the recovery profile between general anaesthesia and spinal anaesthesia following laminectomy with conflicting results. Lohchab et al[15] revealed that spinal anaesthesia provided better perioperative outcome than general anaesthesia for posterior spinal decompression, however, Florinella et al[16] reported that spinal and general anaesthesia showed no clinical relevant difference in their perioperative variables during lumbar decompression. Hence, the study is aimed at comparing the recovery profile between general anaesthesia and spinal anaesthesia after lumbar laminectomy.

SUBJECT AND METHODS

Ethical clearance for this prospective, randomized controlled study was obtained from the Research and Ethics Committee of National Orthopaedic Hospital Enugu, with IRB/HEC and Protocol number 5.313/10/202102002 and also an informed written consent from the patients before they were enrolled into the study. Patients aged 18 to 65yrs with ASA I-II scheduled for elective one level/ two levels lumber spine laminectomy for spinal stenosis without instrumentation were recruited. Exclusion criteria included patient's refusal, patients with renal impairment, patients with uncontrolled cardiovascular dysfunction associated with hypotension,valvular defects and hepatic impairment, coagulopathy, previous lumbar surgery and allergy to local anaesthetics. Other exclusion criteria included patients with spinal instability due to intervertebrate disc degeneration, infectious process at the site of spine injection and need for instrumentation. Pre-operative assessment was done at least a day before the surgery and informed consent obtained. Recruited and eligible patients were randomized by block randomization using a computer generated random numbers that was enclosed in a sealed opaque envelope, into group GA to receive general anaesthesia and group SA to receive spinal anaesthesia. Postoperative recovery variables assessed include duration of PACU stay, postoperative pain assessment using VRS, time to ambulation and duration of hospital stay. All the patients received 10mg of oral diazepam at night before the surgery and on the morning of the surgery with a sip of water, and fasting guideline was observed. On arrival at the operating room, monitors were attached, and baseline vital signs were obtained and recorded. Intravenous access was established with two 16-gauge cannulae, and normal saline infusion commenced after completing WHO surgical checklist. End-tidal carbon dioxide monitoring with capnography was done for GA patients. All the patients were anaesthetized by the same anaesthesia team. Two Consultant Orthopaedic spine surgeons operated on all the patients.

All patients in the GA group were positioned supine on the trolley. After pre-oxygenation with 100% oxygen for 3 minutes, they were induced with intravenous propofol 2.5mg/kg and fentanyl 2µg/kg IV and intubated with an appropriately sized armored cuffed endotracheal tube, facilitated with 0.5 mg/kg intravenous atracurium. After confirmation of the correct placement of tube with capnogragh, the tube was secured and the eyes were

covered with eye pads to avoid extrinsic pressure on the globes.

The patient was log-rolled from a trolley to a prone position onto a standard soft bolsters placed on a standard operating table with bony prominences padded, and breast in females and testicles in male protected from pressure. Endotracheal tube placement was reconfirmed by auscultation of the chest posteriorly after prone positioning and ventilation was adjusted to maintain an end-tidal $EtCO_2$ of 30–40 mmHg. Anaesthesia was maintained with isoflurane 1-2% MAC in oxygen/medical air combinations at 2/4 litres/min, respectively while muscle relaxation was maintained with intermittent doses of atracurium 0.1 mg/kg when necessary and analgesia with a multimodal analgesic module which included intravenous fentanyl 2µg/kg stat (given at induction), then IV paracetamol 15 mg/kg, intermittent boluses of fentanyl 1µg/kg every 30 minutes, and the infiltration of the site of surgery with 15 ml of 1% lidocaine containing 1 in 200,000 epinephrine before knife-on-skin. Fluid maintenance was with warm normal saline according to 4-2-1 rule[17] while blood loss was assessed and documented. At the end of the surgery, patient was returned to supine position back on the trolley and appropriately recovered from anaesthesia.

In Spinal Anaesthesia (SA) patients, they were preloaded with 15ml/kg of normal saline, after which spinal anaesthesia was instituted at either L_{2-3},L_{3-4}, or L_{4-5} interspace with 25-guage pencil point spinal needle after cleaning the back with antiseptic solution. Following the free back flow of clear CSF through the spinal needle, 15mg of 0.5% heavy marcain with 25µg of fentanyl was injected into the subarachnoid space and patient was subsequently returned to supine position. When the desired level of block up to T_6 was achieved, patient was log-rolled from a trolley to a prone position on bolsters on an operating table with the genitals and bony prominences well padded. All SA patients were given oxygen via nasal prong at 2litres/min with IV paracetamol 15mg/kg to achieve a multimodal analgesia and sedated with intravenous propofol infusion at 25-50µg/kg/min. The surgical site was infiltrated with 15 ml of 1% lidocaine containing 1in 200,000 epinephrine before surgical incisions for each patient. Spinal anaesthesia was augmented during surgery by intrathecal injection of 5mg of heavy bupivacaine when patient complained of discomfort at the surgical site by the researcher after giving 500ml of fluid to prevent hypotension. This was achieved in collaboration with the surgeon under aseptic condition; the intervertebral space L_{3-4} and L_{4-5} was accessed through the surgical field under direct vision and 5mg of heavy marcaine was deposited via spinal needle.

Fluid was maintained with normal saline based on 4-2-1 rule[17] and blood loss was monitored and documented. Intraoperatively, hypotension was defined as systolic blood pressure below 90 mmHg, while bradycardia was defined as HR less than 60 beats per minute.[3,16] Hypotension was treated with aliquots of ephedrine 5mg IV and rapid normal saline or blood transfusion when necessary, while bradycardia was treated with atropine 0.6 mg IV. Hypertension was defined as systolic blood pressure above 140 mmHg, while tachycardia as HR above 100 beats per minute.

At the end of the surgery, patients were log-rolled to supine position onto a trolley. All the patients received intravenous pethidine 1mg/kg and intramuscular diclofenac 1mg/kg and then transfered to post-anaesthetic care unit (PACU). Subsequently, postoperative analgesia was achieved with IV pethidine 1mg/kg 8hourly, IV paracetamol 15mg/kg 6hourly and IM diclofenac 1mg/kg 12hourly. In the PACU, patients' vital signs including pain assessment using verbal rating scale were assessed and recorded. The GA group patients were discharged from PACU fully awake, alert, and responsive, with an Aldrete score of at least 9 while those in the SA group were discharged following Aldrete score of at least 9 with receding of sensory block by four dermatomes (T10), and Bromage score of 3 (able to flex the knee). Comprehensive postoperative evaluation of recovery profile concentrated on recording the duration of PACU stay (time of admission into PACU to the time of discharge from PACU), pain assessment using the verbal rating scale (VRS) at 4, 8, and 24 hours with intravenous pethidine 1mg/kg as rescue analgesia, time to ambulation (end of surgery time to time of the first step after surgery), and duration of hospital stay (day of surgery to the day of discharge).

Sample size was calculated using the formular for comparing two independent groups' mean in an experimental study[18] in a previous study by Finsterwald et al[19] using the PACU time between spinal anaesthesia group and general anaesthesia group. . Data were collected and analyzed using the statistical package for social sciences (SPSS) 26 for windows, and was presented with tables and figures. Continuous variables were presented with means $\pm$ standard deviations while categorical data were presented as frequencies and percentages. Continous data were analyzed using independent samples t-test. Categorical data were analyzed using chi-square test. A P-value of less than 0.05 was considered significant.

RESULTS

Fifty patients were recruited and they completed the study. One patient received top up spinal anaesthesia in SA group.

The groups were comparable in the demographic and ASA physical characteristic variables. [Table I]

The mean pain score was significantly ($p=0.003$) lower in SA group (3.32±0.9) than the GA group (4.08±0.81) in the immediate postoperative period, thereafter it remained comparable ($p=0.537$, $p=0.859$) at 8hr and 24hr postoperative respectively. [Table II]

Table III shows that the difference in mean duration of PACU stay between the GA group (74.44 ± 3.94mins) and SA group (73.56 ± 14.22mins) was not significant (p

= 0.77). The mean time to ambulation between GA group (67.92 ± 13.14) and SA group (62.70 ± 12.60) were comparable (p=0.158). [Table III]. Similarly both treatment groups had comparable (p=0.340) mean time to discharge from the hospital. [Table III]

The trend in MAP showed a lower mean MAP in PACU in the SA group than in the GA group. There was no incidence of hypotension or hypertension in both groups.[Fig 1]. The trend in mean PR showed a more stable PR in the SA group (75-82)/mins compared to the GA group (70-86)/mins. [Fig 2]. These differences in mean MAP and mean PR were not significant(p=0.580, p=0.577) respectively.

Table I: Demographic data and ASA physical status between the GA and SA groups

Variables		GA group	SA group	P value
Age		46.92±10.56	49.28±12.85	0.481
BMI		27.45±6.22	29.26±3.99	0.226
ASA	I	9(18%)	10(20%)	0.771
	II	16(32%	15(30%)	

Table II: Comparing the pain scores at specific times among groups GA and SA.

Variables	GA group	SA group	P value
VRS@ 4hr Postop	4.08 ± 0.81	3.32± 0.90	0.003*
VRS@8hr Postop	3.24 ± 0.78	3.36 ± 0.57	0.537
VRS@24hr Postop	0.84 ± 0.75	0.88 ± 0.83	0.859

*= significant value.

Table III: Comparison of mean PACU stay, mean time to ambulation and discharge from hospital between GA group and SA group

Variable	GA group	SA group	P value
Mean PACU time (hrs)	74.44 ± 3.94	73.56 ±14.22	0.77
Mean time to ambulation(hrs)	67.92±13.14	62.70±12.60	0.158
Time to discharge from hospital(days)	7.56 ± 1.53	7.16 ± 1.41days	0.340.

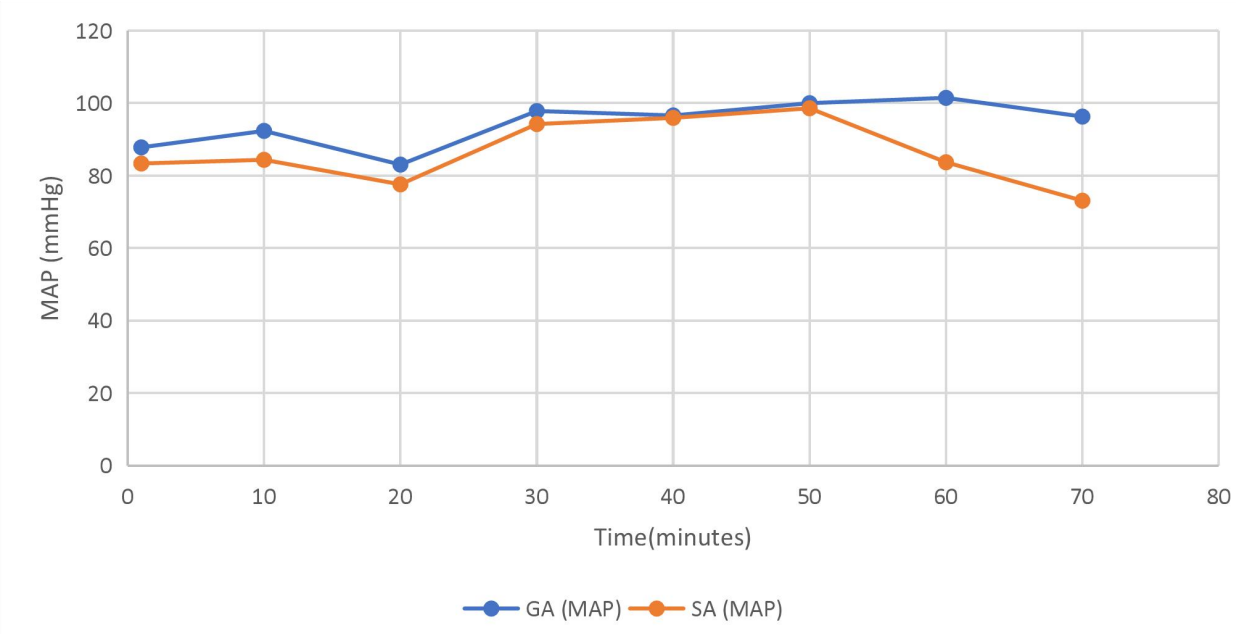

Figure 1: Trend of the post operative MAP from admission into PACU to discharge from PACU among the groups.

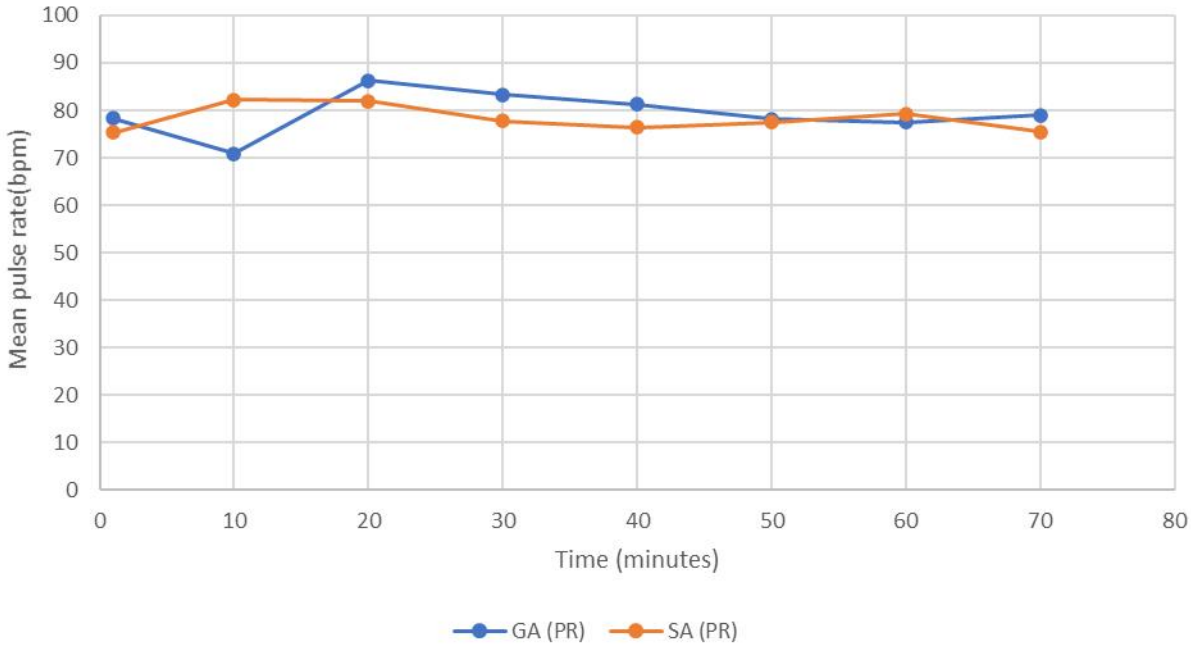

Figure 2: Trend of the postoperative PR from admission into and discharge from PACU between groups GA and SA.

DISCUSSION

The recovery profile after laminectomy done under spinal anaesthesia was superior to general anaesthesia as demonstrated by a lower pain score in the spinal group in the postoperative period

Inadequate pain control, postoperative nausea and vomiting (PONV), and other early postoperative complications have been shown to prolong PACU stay.[20] The index study showed that the mean duration of PACU stay was comparable between the two groups. This is consistent with the findings of Jellish et al.[21] The reason for the similarity can be explained by similar intraoperative drugs and probable similar criteria for discharge from PACU. Similarly, Kahveci et al[22] also found no statistical difference in PACU stay between the GA and SA groups (GA = 20.85 ± 5.20mins, SA = 19.55 ± 4.58mins p = 0.507), however, their patients had lesser stay in PACU compared to the index study.The reason for the disparity in PACU stay between the index study and the study by Kahveci et al[22] can be explained by the difference in the protocol for patients discharge from PACU and pharmacokinetics of intraoperative drugs. The index study discharged the GA group patients from PACU fully awake, alert, and responsive, with an Aldrete score of at least 9 while those in the SA group were discharged following Aldrete score of at least 9, receding of sensory block by four dermatomes (T10), and Bromage score of 3. However, Kahveci et al[22] discharged patients from PACU following an Aldrete score of 8 and patients' ability to move the lower limb, which could be a Bromage score of 1. This lower Aldrete score and possibly lower Bromage score may have contributed to their findings of lesser time of stay in PACU compared to the index study. Also Kahveci et al[22] used sevoflurane to maintain GA, which enables patients to have faster, clear-headed recovery compared to the isoflurane used in the index study. On the contrary, Pierce et al[23] reported a longer PACU stay in the SA group than in the GA group (GA = 116.5mins, SA = 178mins p = < 0.001). The difference between the index and pierce et al[22] may be as a result of their protocol for discharge of patient from PACU and pharmacokinetics of drug used for subarachnoid block. In the index study, patients in the spinal group were discharged from PACU after the spinal sensory block regressed to T10 and Bromage score of three (3), however, Pierce et al [23] allowed complete recovery of SA patients from the block before discharge leading to longer stay in PACU. Also the index study used 0.5% heavy bupivacaine for the subarachnoid block while Pierce et al [23] used 0.75% heavy bupivacaine for SAB. A higher concentration of bupivacaine may have caused the prolonged motor block leading to the SA group spending more time in PACU than the GA group.

The index study showed that the mean pain score was significantly lower in the SA group than in the GA group at 4 hours post-surgery, thereafter the pain scores became comparable. This finding is consistent with the work done by Finsterwald et al [19] despite having lower pain scores in the immediate postoperative period than the index study. The probable reason for the similarity in their report with the index study may be due to the mechanism of pre-emptive analgesia and residual

sensory block associated with subarachnoid block in the SA group which may have complemented the postoperative analgesics. The residual sensory block would have completely receded at 24 hour postoperative time, and may be the probable reason for similar pain score at the 24 hour postoperative time between the groups.

Early ambulation aids quick recovery.[24] There was no difference in the average time to ambulation after surgery between the two treatment groups in the index study. This was corroborated by the study conducted by McLain et al[25], although they had lesser time to ambulation compared in the index study. In the index study, the surgery team insisted on the availability of postoperative x-ray before mobilization. This was to confirm the patient's suitability for mobilization. This often took about 24hrs. Even when the patient was ready to be mobilized, the availability of a physiotherapist took an additional 6 to 12hrs. These may have contributed to the prolonged time to ambulation in the index study compared to the study by Mclain et al. [25] In contrast, Rodriguez et al [26] reported that patients in the SA group took significantly less time to walk for the first time after surgery. This difference in the mobilisation time may be explained by the better postoperative pain profile of the patients in SA group postoperatively in their study.

Faster recovery will amount to early hospital discharge. There was no significant difference in the time to hospital discharge in the index study between the SA and GA groups. This is similar to study by Kara et al [14], although their study reported lesser time to discharge compared to the index study. The difference in time of hospital discharge between both studies could be due to difference in the time of mobilization;While kara et al.[14] study started mobilizing on the surgery day (GA = 46.6%, SA = 36.6%), patients in the index study were mobilized from the 2nd postoperative day. Delay in mobilization may have contributed to the delay in hospital discharge in the index study. Also the delay in the hospital discharge in the index study compared to the study by Kara et al[14] can also be explained by the difference in the patient population; While the Kara et al[14] study were patients for discectomy, the index study involved patients with spinal stenosis for laminectomy. Laminectomy for spinal stenosis requires a more extensive surgery compared to discectomy. This may have prolonged recovery and subsequent prolonged hospital stay in the index study. Conversely, Chen et al[27] reported a shorter hospital stay for the regional anaesthesia group than for the general anaesthesia group. The difference in results could be attributed to difference in anaesthesia techniques and surgical procedures studied. While Chen et al[27] compared local anaesthesia with general anaesthesia, they also studied laparoscopic microdiscectomy, a less invasive procedure compared with open laminectomy done in the index study which may contribute to less hospital stay in their study.

CONCLUSION

Lumbar laminectomy can safely be done with spinal or general anaesthesia. However, spinal anaesthesia provided a better early postoperative recovery profile, as evidenced by a reduced pain score in the first 4hours postoperative time compared to general anaesthesia.

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ORIGINAL ARTICLE

Recent Advances in Cardiothoracic Anaesthesia: A Scoping Review of Innovations, Outcomes, and Future Directions

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ABSTRACT **Background**: Cardiothoracic anaesthesia has rapidly evolved owing to advances in monitoring, pharmacology, and perioperative care. Increasingly complex surgical techniques have positioned anaesthetists as key contributors to optimising outcomes, minimising complications, and supporting enhanced recovery. Despite these developments, the evidence base remains fragmented, emphasising the need for a comprehensive synthesis of recent progress.

Objectives: This scoping review summarises recent innovations in cardiothoracic anaesthesia, assesses their effects on perioperative and long-term outcomes, and highlights priorities for future research and practice.

Methods: The review followed Arksey and O'Malley's framework and PRISMA-ScR guidelines. Major databases (PubMed, Embase, Scopus, Web of Science, and Cochrane Library) were searched for articles published from 2010 to 2025. Eligible studies reported empirical research on innovations in monitoring, pharmacology, intraoperative techniques, or perioperative care in cardiothoracic anaesthesia. Data were thematically organised under innovations, outcomes, and future directions.

Results: Key innovations included advanced transesophageal echocardiography, near-infrared spectroscopy, AI-assisted monitoring, short-acting pharmacological agents, multimodal analgesia, and fast-track anaesthesia protocols. These advances were associated with improved patient outcomes, such as reduced morbidity, earlier extubation, shorter ICU stays, and enhanced recovery. Healthcare systems benefited from decreased costs and resource utilisation. Future directions focus on precision medicine, AI-driven decision support, tele-anaesthesia, and global implementation of scalable innovations.

Conclusion: Cardiothoracic anaesthesia is entering a transformative era characterised by precision, digital integration, and inclusivity. Although perioperative care and outcomes have improved, gaps remain in long-term evidence, paediatric populations, and global applicability.

Keywords: Cardiothoracic Anaesthesia, Perioperative Outcomes, Fast-track Anaesthesia, Artificial Intelligence, Precision Medicine.

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INTRODUCTION

Cardiothoracic anaesthesia has undergone remarkable evolution in recent decades, driven by advances in surgical techniques, perioperative monitoring, pharmacological innovations, and critical care integration.[1] As cardiac and thoracic procedures become increasingly complex, the role of anaesthetists has expanded beyond intraoperative care to encompass perioperative optimisation, risk stratification, and long-term outcome improvement.[2] The traditional emphasis on maintaining haemodynamic stability has now been complemented by innovations aimed at myocardial protection, neurological preservation, enhanced recovery, and reduced hospital stays. These changes reflect

broader global trends towards patient-centred care and value-based healthcare delivery.[3]

Despite the growing body of research, the literature on cardiothoracic anaesthesia remains fragmented, with studies often focused on narrow aspects such as drug efficacy, monitoring technologies, or single-centre experiences.[4] A comprehensive mapping of recent advances is therefore needed to identify not only what has been achieved but also the persisting gaps that limit translation into routine practice.[5] Scoping reviews are particularly suited for this purpose, as they allow for systematic exploration of heterogeneous evidence without the restrictions of meta-analysis.

This review aims to synthesise current knowledge on innovations in cardiothoracic anaesthesia, evaluate their impact on perioperative and long-term outcomes, and highlight emerging trends that are shaping the future of practice. Specifically, the review addresses three guiding questions: (1) What are the most significant recent innovations in cardiothoracic anaesthesia? (2) How have these innovations influenced patient outcomes and clinical practice? (3) What directions should future research and practice take to strengthen the field? By adopting this approach, the review seeks to provide clinicians, researchers, and policymakers with a structured understanding of the evolving landscape of cardiothoracic anaesthesia and its implications for patient care.

METHODOLOGY

This scoping review adopted the methodological framework proposed by Arksey and O'Malley and further refined by the Joanna Briggs Institute (JBI) for scoping reviews.[6] The review process was conducted in line with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) guidelines to ensure transparency and reproducibility.[7]

A systematic search was performed across major biomedical databases, including PubMed/MEDLINE, Embase, Scopus, Web of Science, and the Cochrane Library. The search strategy combined key terms such as "cardiothoracic anaesthesia," "cardiac anaesthesia," "thoracic anaesthesia," "advances," "innovations," and "outcomes." Reference lists of included studies and relevant review articles were also hand-searched to capture additional literature. The search was limited to publications from the past 15 years (2010–2025) to reflect recent advances and emerging practices. Only peer-reviewed articles published in English were included.

Eligibility criteria were defined using the Population Concept Context (PCC) framework.[8] Eligible studies included patients undergoing cardiothoracic surgery (Population), innovations in anaesthetic practice, pharmacology, monitoring, or perioperative care (Concept), and any clinical or experimental setting globally (Context). Both quantitative and qualitative studies, as well as grey literature from professional bodies, were considered. Exclusion criteria were case reports, opinion pieces without empirical basis, and studies unrelated to anaesthetic practice.

Data charting involved the extraction of study characteristics (author, year, country, design, sample size), type of innovation, outcomes assessed, and key findings. To ensure rigour, two independent reviewers conducted screening and data extraction, with discrepancies resolved through consensus. Findings were synthesised thematically, allowing classification under three domains: innovations, outcomes, and future directions.

Innovations in Cardiothoracic Anaesthesia

Recent years have witnessed significant innovations in cardiothoracic anaesthesia, spanning monitoring technologies, pharmacological strategies, intraoperative techniques, and digital integration. These advances are redefining the standard of care by promoting precision, enhancing safety, and supporting faster recovery.[9]

One major area of innovation is perioperative monitoring. The introduction of advanced transesophageal echocardiography (TEE) has enabled real-time assessment of ventricular function, valvular pathology, and fluid responsiveness, thereby guiding individualised haemodynamic management.[10] Near-infrared spectroscopy (NIRS) now provides non-invasive monitoring of cerebral and somatic tissue oxygenation, reducing the risk of neurological injury. More recently, artificial intelligence (AI)–assisted platforms and machine learning algorithms are being integrated into anaesthetic monitoring to predict adverse events and support clinical decision-making.[11]

Pharmacological developments have also reshaped cardiothoracic anaesthesia. The adoption of short-acting agents such as remifentanil and dexmedetomidine has facilitated early extubation and reduced intensive care unit (ICU) stay.[12] Multimodal analgesia, incorporating regional techniques such as paravertebral and erector spinae plane blocks, is increasingly replacing opioid-heavy regimens, thereby improving recovery profiles and minimising opioid-related complications.[13] Cardioprotective drugs, including selective β-blockers and newer inotropes, are also being studied for enhanced myocardial preservation.[14]

Regional anaesthesia has re-emerged as an important component of multimodal analgesia in contemporary cardiothoracic anaesthesia, complementing general anaesthesia and supporting enhanced recovery protocols. Techniques including thoracic epidural anaesthesia (TEA), paravertebral block (PVB), erector spinae plane block (ESPB), pectoralis (PECS) blocks, and serratus anterior plane (SAP) blocks have demonstrated potential to improve perioperative outcomes. TEA and PVB are associated with superior analgesia, decreased opioid requirements, improved pulmonary function, and reduced stress response following cardiac surgery, particularly in off-pump and minimally invasive procedures. More recently, ultrasound-guided fascial

plane blocks such as ESPB and PECS have attracted interest due to their relative technical simplicity and lower risk of hemodynamic instability or epidural haematoma, which is advantageous for patients receiving perioperative anticoagulation or antiplatelet therapy.[15]

Intraoperative innovations include fast-track anaesthesia protocols that allow early tracheal extubation, even in high-risk cardiac procedures, without compromising safety.[16] Anaesthetic approaches tailored for minimally invasive cardiac and thoracic surgeries, such as video-assisted thoracoscopic surgery (VATS) and robotic-assisted cardiac interventions, demand specialised techniques for one-lung ventilation and precise haemodynamic control.[17]

Furthermore, the digitisation of perioperative care through electronic anaesthesia records and tele-anaesthesia platforms has improved documentation, continuity of care, and multidisciplinary collaboration.[18] Simulation-based training has also emerged as a critical innovation for skill acquisition in advanced cardiothoracic anaesthesia.[19] Collectively, these innovations signify a paradigm shift from a purely intraoperative focus to a holistic, patient-centred, and technologically supported model of care, laying the foundation for future precision anaesthesia for cardiothoracic surgery.

Outcomes of Recent Advances

The implementation of recent innovations in cardiothoracic anaesthesia has translated into meaningful improvements in perioperative and long-term outcomes for patients undergoing cardiac and thoracic procedures.[20] These outcomes can be broadly categorised into patient-centred benefits, perioperative safety enhancements, and healthcare system efficiencies.

From a patient perspective, innovations such as multimodal analgesia and enhanced recovery protocols have reduced postoperative pain, improved respiratory mechanics, and facilitated faster mobilisation.[21] Early extubation strategies, supported by the use of short-acting anaesthetic agents, have significantly shortened intensive care unit (ICU) and overall hospital stays, thereby improving patient satisfaction and quality of recovery.[22] Enhanced monitoring modalities, including advanced echocardiography and near-infrared spectroscopy, have been associated with reductions in postoperative neurological complications and improved myocardial preservation.[23]

In terms of perioperative safety, the integration of AI-driven predictive tools and goal-directed haemodynamic management has reduced the incidence of adverse events, including low cardiac output syndrome, acute kidney injury, and major arrhythmias.[24] Moreover, the use of regional anaesthetic techniques in thoracic surgery has been shown to decrease pulmonary complications, particularly in patients with underlying respiratory disease, by reducing the need for prolonged opioid administration and mechanical ventilation.[25]

Healthcare systems have also benefited from these advances. Fast-track anaesthesia protocols and minimally invasive surgical techniques supported by tailored anaesthetic approaches have reduced ICU bed utilisation, hospital length of stay, and readmission rates, thereby lowering overall costs of care.[26] These gains are especially important in places with limited resources, where better perioperative outcomes are key for fair access to care. While most evidence for these methods comes from high-income countries, enhanced recovery protocols are starting to be used in Nigeria. For instance, the Nigerian Chapter of the ERAS Society now promotes evidence-based perioperative care. An audit at Mary Immaculate Specialist Hospital (Benin) found that following ERAS-type protocols rose from about 48% to 87%, and the number of elective abdominal surgery patients discharged within 48 hours went from one-third to over 70%. This shows that even in resource-limited settings, structured perioperative care, including fast-track anaesthesia, can shorten hospital stays.[27] Paediatric cardiac anaesthesia at Obafemi Awolowo University Teaching Hospital also uses fast-track practices, and other small studies have found earlier ambulation, early feeding, and shorter hospital stays with these protocols.[28] However, there is still little published data on ICU bed use, readmission rates, or cost savings in Nigeria. So, while these approaches are promising, their adoption is still new, and more local research is needed to measure their impact on ICU use, hospital costs, and fair access to care.

Importantly, these outcomes extend beyond the immediate postoperative period. Studies increasingly highlight that innovations in anaesthetic management contribute to better long-term survival, reduced incidence of chronic pain, and improved functional capacity.[29] However, variations in outcomes across institutions underscore the need for standardisation and broader multi-centre validation of these practices.

Future Directions in Cardiothoracic Anaesthesia

The trajectory of cardiothoracic anaesthesia points towards an era of personalisation, digital integration, and global applicability. Future developments are likely to be shaped by precision medicine, artificial intelligence, and an increasing emphasis on equity of access across diverse healthcare systems.[30]

Personalised anaesthesia, guided by genomics and pharmacogenomics, is expected to refine drug selection, dosing, and risk stratification. Genetic profiling of enzymes involved in anaesthetic metabolism, for instance, could minimise variability in drug responses, optimise haemodynamic stability, and reduce adverse outcomes.[31] Integration of big data and predictive analytics into perioperative care will further enable real-time risk assessment and individualised decision-making, potentially transforming anaesthetists into "perioperative data scientists."[32]

Artificial intelligence and machine learning applications are projected to expand from predictive monitoring to

fully integrated clinical support systems. Future anaesthetic workstations may autonomously adjust ventilation, fluid therapy, and drug delivery based on continuous multimodal monitoring, enhancing precision while reducing cognitive workload on clinicians.[33] Advances in tele-anaesthesia and remote perioperative monitoring also hold promise, particularly for extending specialist expertise to underserved regions.[34]

Training and skill development will remain central to sustaining these innovations. Simulation-based learning, virtual reality platforms, and AI-enhanced decision-training modules will become essential tools for preparing anaesthetists to manage complex cardiothoracic cases.[35] Equally important will be cross-disciplinary collaboration with cardiologists, surgeons, engineers, and data scientists to foster innovation.

Globally, there is an urgent need to adapt these advances to low- and middle-income countries (LMICs). Simplified monitoring technologies, cost-effective pharmacological strategies, and scalable training models could bridge gaps in resource-constrained settings, ensuring that innovations benefit patients universally rather than being confined to high-income contexts.[36] Taken together, these future directions signal a paradigm shift towards precision, automation, and inclusivity in cardiothoracic anaesthesia, with the potential to redefine perioperative care for the next generation.

GAPS IN CURRENT LITERATURE

While recent advances in cardiothoracic anaesthesia have produced measurable benefits, several gaps in the literature limit their translation into universal practice. One of the most notable deficiencies is the scarcity of large-scale, multi-centre randomised controlled trials (RCTs) evaluating the comparative effectiveness of new pharmacological agents, monitoring technologies, and fast-track protocols.[37] Much of the available evidence remains confined to single-centre studies with heterogeneous methodologies, limiting external validity and generalisability.

Another critical gap lies in the underrepresentation of long-term outcomes. Most studies focus on perioperative morbidity and short-term mortality, with little attention to functional recovery, quality of life, neurocognitive function, and long-term survival. This omission is particularly relevant as cardiac and thoracic surgical populations are ageing, with many patients living for decades after surgery.[38] Understanding the extended impact of anaesthetic strategies on their overall health trajectory is essential.

Paediatric and congenital cardiothoracic anaesthesia also remains relatively underexplored. Innovations in monitoring and pharmacology have largely been validated in adult populations, leaving gaps in their applicability to neonates, infants, and children who have unique physiological challenges.[39] Similarly, thoracic anaesthesia literature is less developed than its cardiac counterpart, especially in the context of minimally invasive procedures and novel regional techniques.

From a global health perspective, disparities in access to advanced anaesthetic technologies and training further highlight gaps in applicability. The majority of published studies emerge from high-income countries, while data from low- and middle-income countries (LMICs) remain scarce.[40] This creates uncertainty about the feasibility and impact of implementing these innovations in resource-constrained settings.

Finally, the integration of artificial intelligence and big data analytics into cardiothoracic anaesthesia is still in its infancy. Although promising, evidence on its clinical utility, ethical considerations, and cost-effectiveness is insufficient. Addressing these gaps through collaborative, interdisciplinary, and globally inclusive research will be key to shaping the next phase of cardiothoracic anaesthesia practice.[41]

CONCLUSION

Cardiothoracic anaesthesia has evolved into a dynamic speciality characterised by technological innovation, refined pharmacological strategies, and enhanced perioperative care models. This scoping review has mapped recent advances across three domains: innovations, outcomes, and future directions, demonstrating how the field has progressed from a primarily intraoperative focus to a holistic, patient-centred, and precision-driven discipline.

The innovations identified, including advanced monitoring techniques, multimodal analgesia, fast-track anaesthesia, and digital integration, have collectively transformed perioperative management. These practices have been shown to improve short-term outcomes such as reduced morbidity, earlier extubation, shorter hospital stay, and greater patient satisfaction, while also signalling potential long-term benefits for survival and functional recovery. Furthermore, advances in minimally invasive and robotic-assisted surgery have reshaped anaesthetic approaches, requiring anaesthetists to adapt to increasingly complex surgical environments.

Looking ahead, the field is poised to embrace personalised anaesthesia informed by genomics, big data, and artificial intelligence. These tools promise to revolutionise risk stratification, drug selection, and perioperative decision-making. At the same time, simulation-based training, tele-anaesthesia, and collaborative research are expected to prepare the next generation of anaesthetists for the challenges of highly specialised cardiothoracic care. Importantly, global adaptation of these advances will be essential to ensure equity, especially for patients in low- and middle-income countries where resource constraints limit access to cutting-edge technologies.

Nevertheless, gaps persist in the evidence base, particularly regarding long-term outcomes, paediatric and thoracic subpopulations, and the generalisability of innovations beyond high-income contexts. Addressing these limitations through multi-centre trials, global collaborations, and inclusive research agendas will be critical. In conclusion, cardiothoracic anaesthesia stands

at the threshold of a transformative era. By integrating innovations with patient-centred outcomes and global applicability, the speciality is well-positioned to redefine standards of care and improve the lives of patients undergoing cardiac and thoracic surgery worldwide.

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ORIGINAL ARTICLE

Clinical Profile of Children Admitted in a General ICU and Outcome at The University of Port Harcourt Teaching Hospital, Nigeria

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ABSTRACT **Background**: Admission of children for intensive care results from different causes and has varying outcomes.

Objectives: The pattern of admissions and outcomes in children admitted between January 2021 - October 2022, at the intensive care unit (ICU) of UPTH was assessed in a retrospective study.

Methods: Data on demography, clinical characteristics and outcomes of admission of children between one month – 17years old, admitted in the ICU during the study period were collected, using records from patient's folders and intensive care registers. SPSS v.25 was used for analysis and results presented as frequencies and percentages.

Results: From a total of 430 patients admitted, children were 47(11.0%) with mean age 7.0 ± 5.5yrs, and M:F ratio 1.9:1. Admissions were for postoperative care [(21/45.0%)], neurological diseases [11(23.0%)], respiratory distress and TBI [(6(13.0% each)] and neuromuscular diseases [3(6.0%)]. Admitting specialties were paediatric respiratory 6(12.8%), neurology 12(25.5%) and neurosurgical teams for nonoperative care 8(17.0%), and surgical specialties for critical postoperative care 21(44.7%). Postoperative patients were admitted following general paediatric 14(29.8%), cardiac and oral maxillofacial surgeries 2(4.3%) each and others 3(6.3%) for postoperative care 21(44.7%), low GCS 15(31.9%) and cardiorespiratory support 11(23.4%). Complications were severe brain injuries 17(36.2%), severe haemorrhage 9(19.1%), respiratory failure 8(17.0%), sepsis 7(14.8%) and electrolyte imbalance 2(4.3%). Mean duration of stay was 5.6 ± 6.3 days, 22(46.8%) were discharged and mortality rate was 25(53.2%), majority being CNS/neuromuscular diseases (17/68.0%).

Conclusion: Critical postoperative care was commonest indication for ICU admission in children, but mortality was highest in CNS/Neuromuscular pathologies.

Keywords: Children, ICU admissions, Outcome.

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INTRODUCTION

Critical illness in the paediatric age group is life threatening and management requires specialized care. This level of care is particularly indicated because as paediatric patients, they are already high risk due to their peculiar physiology, anatomy and pharmacology. They are therefore not to be managed like small adults. It is important to note that the paediatric age spans through a wide age range from birth to 17years, and the neonatal intensive care units (NICU) and paediatric intensive care units (PICU) are readily available dedicated care units for critically ill paediatric patients in the developed economies. Further specialised care centres like the trauma, burn, cardiac or neuro ICU's also have a place in the care of some paediatric patients who suffer from trauma, cardiac or neurological diseases. In the low- and middle-income countries (LMIC) however, the adult intensive care unit (ICU) serves as the place for

dedicated care of the critically ill of all ages and from diverse aetiologies in most centres[1,2]. It therefore serves as a general ICU in most hospitals in these regions. Besides, some paediatric admissions may be for close monitoring and organ support postoperatively, due to the preoperative illness severity, nature of the surgery, type of patient or perioperative events/course[2,3]. Highly invasive surgery or surgery involving major organs fall in this category (e.g. cardiothoracic, neurosurgery, major abdominal or organ transplant). Management of perioperative organ dysfunction or failure may also be an indication for ICU admission, and some postoperative organ dysfunction or failure are a progression from poor preoperative patient conditions, especially with patients in the American Society of Anesthesiologists' (ASA) Physical Status Classes 3 - 5. Some postoperative admissions may also be indicated following critical perioperative incidences such as severe hypoxia, shock, massive haemorrhage, pulmonary aspiration, major drug reactions, convulsions, cardiorespiratory arrest, etc.[3,4]

The PICU and the specialised intensive care units are absent or few when present in many parts of our subregion, and their absence or admission delays (when few), can contribute to grave outcomes. Furthermore, high dependency units (HDU's) are not readily available in many hospitals. The adult general ICU available in most hospitals therefore remains the unit or "go to centre" for acute care of diverse cases that require critical care or monitoring (beyond the routine ward care); best provided in NICU, PICU and other specialized care units listed earlier,[2,3,4] with the Anaesthetist being the Critical Care Physician coordinating required care by different specialists.

The aim of this study therefore was to retrospectively review the clinical profile of children admitted in a general ICU and the outcome at the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria. The findings from the study will reveal the key profiles of pediatric patients who require critical care, and assist with needs assessment and prioritisation in preparedness for future care and improved outcomes.

METHODOLOGY

Following approval from the Institutional Research and Ethics Committee, a retrospective study was conducted to review relevant data in the folders and ICU records of all paediatric patients who were admitted into the general ICU of the University of Port Harcourt Teaching Hospital. All paediatric patients from one month to 17 years who were managed over a 22-month period from January 2021 - October 2022 were recruited.

Relevant data collected including demographics (age, gender), clinical characteristics (diagnosis, type of monitoring, ventilatory and laboratory support, complications, length of stay), and outcome were analysed using the Statistical Product and Service Solutions (SPSS) v. 25.0. Categorical variables were summarized and presented using frequencies and percentages and continuous variables using the mean. Associations between the final outcome and variables were derived using the Chi-square and t test.

RESULTS

Of the 430 patients admitted into the ICU over the study period, 47(11.0%) were paediatric patients (Figure 1) with a male to female ratio of 1.9:1, adult to paediatric ratio of 9.1:1 and mean age of 7.0 ± 5.5 years (range =1month-17years). The mean duration of stay in the ICU was 5.6 ± 6.3 days with a range of 1-26days. Table I.

The primary diagnosis necessitating ICU admission is shown in Figure 2 with the highest proportion of paediatric patients admitted for postoperative monitoring (21/45.0%) followed by neurological diseases (11/23.0%), respiratory diseases and traumatic brain injury-TBI (6/13.0%) each. Neuromuscular diseases were 3(6.0%). The admitting specialties are shown in Table I with surgical specialties being the highest (21/44.7%). The breakdown of the different surgical specialties that managed paediatric patients shows Paediatric surgical team managed 14(66.7)% surgical patients (29.8% of overall), while others were managed by Cardiothoracic and Oral maxillofacial (2/9.5% each), and Neurosurgery, Orthopaedic and Ophthalmology teams (1/4.8%) each. Types of surgery requiring ICU admission showed exploratory laparotomy as the highest (10/47.6%) - Table II.

There were generally three indications for paediatric admissions into the ICU with postoperative care accounting for majority (21/44.7%), while low Glasgow Coma Scale (GCS) and cardiorespiratory support accounted for 15(31.9%) and 11(23.4%) respectively (Table I). Some of the complications that were managed in these patients while on admission in the ICU included severe brain injury 17(36.2%), severe haemorrhage 9(19.1%) and others as shown in Table I. Four (8.5%) patients had no complications.

The overall mortality in this study was 25(53.2%), and majority were patients managed by Paediatric Neurology [11(44.0%)] and Neurosurgery [6(24%)] teams. The relationship between nature of disease and outcome is summarised in Figure 3; while Figure 4 shows the relationship between planned and unplanned postoperative; as well as nonsurgical ICU admissions and outcome. Of the 21(44.7%) postoperative surgical patients who were admitted into the ICU, 16 (76.2%) were transferred to the ward, whereas 5 (23.8%) patients did not survive; this consisting of 2(28.0%) unplanned and 3(21.0.%) planned postoperative admissions. The highest mortality was seen among the nonsurgical ICU patients, these accounting for 80.0% (20) of all deaths in the ICU among paediatric patients. There was a significant association between nature of disease and outcome ($p = 0.001$). Table III.

Complications like unconsciousness and respiratory distress on admission (5/62.5%) were associated with a higher risk of death compared to other complications. (2/22.2%) ($p=0.001$).

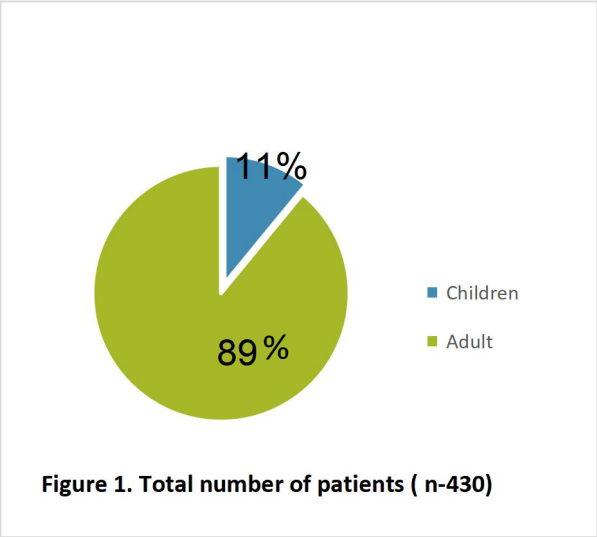

Figure 1. Total number of patients (n-430)

Table I: Demographic and clinical characteristics of paediatric admissions in ICU (n-47)

Characteristic	Value
Gender	
Male	31 (66%)
Female	16 (34%)
Mean age (years)	7.0 ± 5.5
Indications for admission	
Postoperative care	21(44.7%)
Glasgow Coma Scale (GCS) <10	15(31.9%)
Cardiorespiratory support	11(23.4%)
Admitting Specialties	
Paediatric Respiratory	6 (12.8)
Neurosurgery (non operative care)	8 (17.0)
Paediatric Neurology	12 (25.5)
Surgical specialties (postoperative care)	21 (44.7)
Complications in ICU	
Severe brain injury	17(36.2%)
Severe haemorrhage	9(19.1%)
Respiratory failure	8(17.0%)
Sepsis	7(14.8%)
Electrolyte imbalance	2(4.3%).
None	4(8.5%)
Days of ICU stay (mean/range)	5.6 ± 6.3/1-26

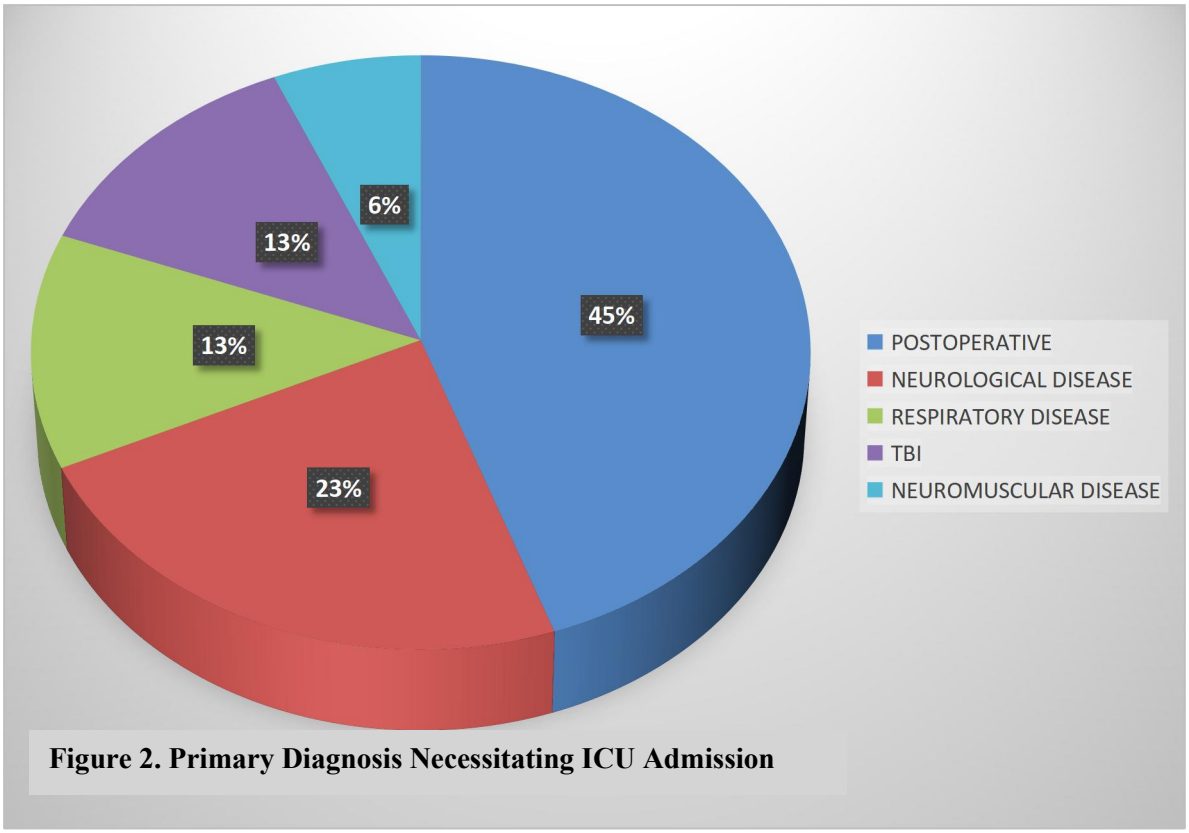

Figure 2. Primary Diagnosis Necessitating ICU Admission

Table II: Types of surgery in paediatric patients admitted for ICU care.

SURGICAL UNIT	N (%)
Paediatric	
Exploratory laparotomies	10 (47.6)
PSARP	1 (4.8)
Ramstedt pylorotomy	1 (4.8)
Axillary lymphangioma excision	1 (4.8)
Cervical haemangioma excision	1 (4.8)
Cardiac	
Patent ductus arteriosus (PDA) ligation	2 (9.5)
Maxillofacial	
Cleft lip repair & Excision of facial neurofibrosis (1 each)	2 (9.5)
Neurosurgery	
Extensive scalp laceration suture	1 (4.8)
Orthopaedic	
Implant removal	1 (4.8)
Ophthalmologic	
Trabeculectomy	1 (4.8)
TOTAL	**21 (100.0)**

Table III. Relationship between outcome of paediatric patients in ICU and other variables

Indices	Chi square	P value
Age	1.629f	0.737
Gender	0.869[f]	0.351
Indication for admission	14.7[f]	*0.001
Nature of disease	16.5[f]	*0.001
Specialty	19.1[f]	*0.002
Pathology	20.27[f]	1.000
Complication	21.6[f]	*0.001
Duration of stay	8.316[f]	0.396

***P < 0.05 - significant**

DISCUSSION

In this study, paediatric patients accounted for 10.9% of all ICU admissions, and males were nearly twice the number of females. The incidence was much smaller to similar studies. Abubakar et al[5] reported 19.8% with a M:F ratio of 1.3:1. Embu et al[3] reported 22.1% with M:F female ratio of 1.5:1. An explanation for the lower reported incidence in the present study could be due to the shorter study duration and paediatric burn patients were not managed in our ICU because of the availability of a Regional Burn Centre and a high dependency unit in the Paediatric department. The consistent gender variation is not surprising, as gender difference among paediatric admissions has often been reported.[3,5,6] Almossawi et al[7] reported a more males at PICU admission but observed that mortality was more in females. The gender difference in admission into our general ICU was significant, but we observed no association between gender and outcome (p = 0.351). similar studies reported this disparity in admission based on gender. Investigating the reasons for this disparity may help provide insight for further care and policy in our society.

Postoperative care was a major reason for admission as reported by previous workers. Embu et al[3] reported 51.6%, while Abubakar et al[5] reported 69.5%. Certain factors contribute to postoperative ICU admission such as diminished reserve from immature organs like the cardiorespiratory and renal systems in the face of acute illness, age, metabolic demands in the postoperative period, as well as the presence of comorbidities. Health facilities in low resource countries may not have a well-equipped high dependency unit, thereby contributing to the high postoperative ICU admissions. Although it was observed that a third of postoperative ICU admissions were unplanned, some have reported even higher values. The poorer the ASA physical status classification, the more likely a patient would require postoperative ICU admission.[6]

Sepsis, neurological and cardiorespiratory diseases are some reasons for non-surgical ICU admissions. In our study, low GCS from different causes (managed by Paediatric Neurology and Neurosurgery teams) and respiratory support accounted for significant patient admissions which would have required specialized ICU's in other climes. Having a dedicated PICU; or trauma, burn or neuro ICU would provide the added advantage of specialised staff for paediatric, trauma, burn or neurological care in the respective units as indications for ICU admission in the paediatric age can be diverse. With these units, closer monitoring or organ support (neurological, neuromuscular, cardiovascular, respiratory, renal, or metabolic) requiring multispecialty care is facilitated. Neurological failure may be associated with altered consciousness levels, while neuromuscular cases may be related to bulbar paralysis and respiratory failure. Cardiorespiratory failure requires cardiorespiratory support, and severe renal or metabolic failure are associated serum electrolyte derangements and with severe disturbances of the internal milieu of and major organs.

The presence of complications arising from the primary condition that necessitated ICU admission is a significant indicator of the admission outcome. Such complications like ARDS, Sepsis, heamodynamic instability requiring the use of inotropes will worsen outcome. In a study by Dendir and colleagues[8], they reported that presence of comorbidities, the need for mechanical ventilation and use of inotropes were all significant determinants of poor outcome among patients managed in their intensive care unit. The presence of complications, as seen in this study, was a significant determinant of mortality among paediatric patients managed in the ICU.

A mortality rate of 53.2% was considerably high and could be a reflection of the severity of the critical illnesses managed. In low resource settings, critically ill patients often present late. McCrossan et al[9] reported an

overall mortality of 30.3%. Among postoperative patients, they had 44% mortality and 89% in children considered too ill, whereas only 15% was reported among patients who were not considered too ill. The more critical a paediatric patient, the higher the risk of mortality especially in resource poor societies. Embu et al[3] reported 36.1% mortality, similar to other related studies.[2] A recent study also corroborated the poor outcome of very ill children with severe neurological illnesses/coma,[10] a finding that was observed in the index study with highest mortality in nonoperative paediatric admissions with neurological diseases.

In a publication from the same institution in 2009 by Mato and co-workers,[11] critically ill children were managed in the adult ICU. With the same finding in the present study, a need for an upgrade to a specialized and dedicated care facility such as PICU for critically ill children is overdue in our subregion for enhanced care.

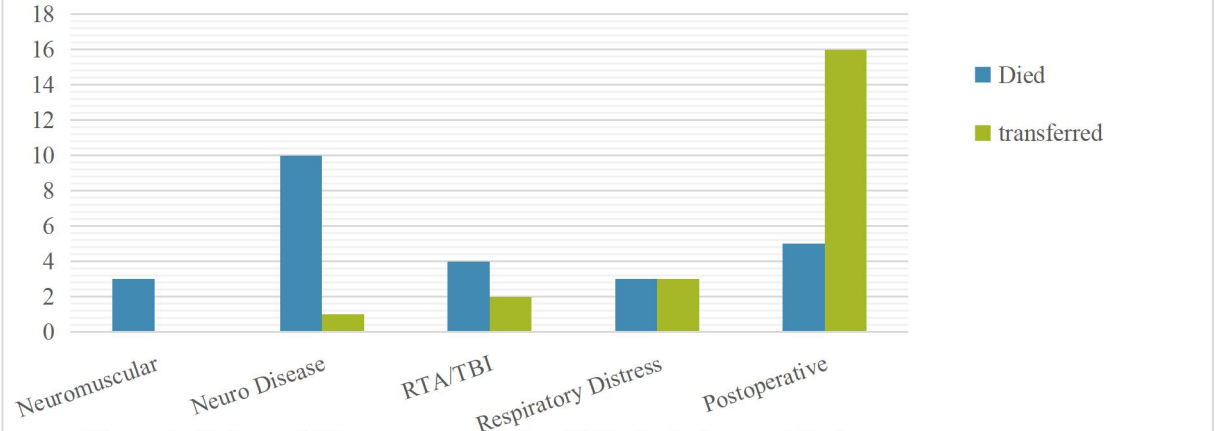

Figure 3: Nature of Diseases necessitating ICU admission and Outcome

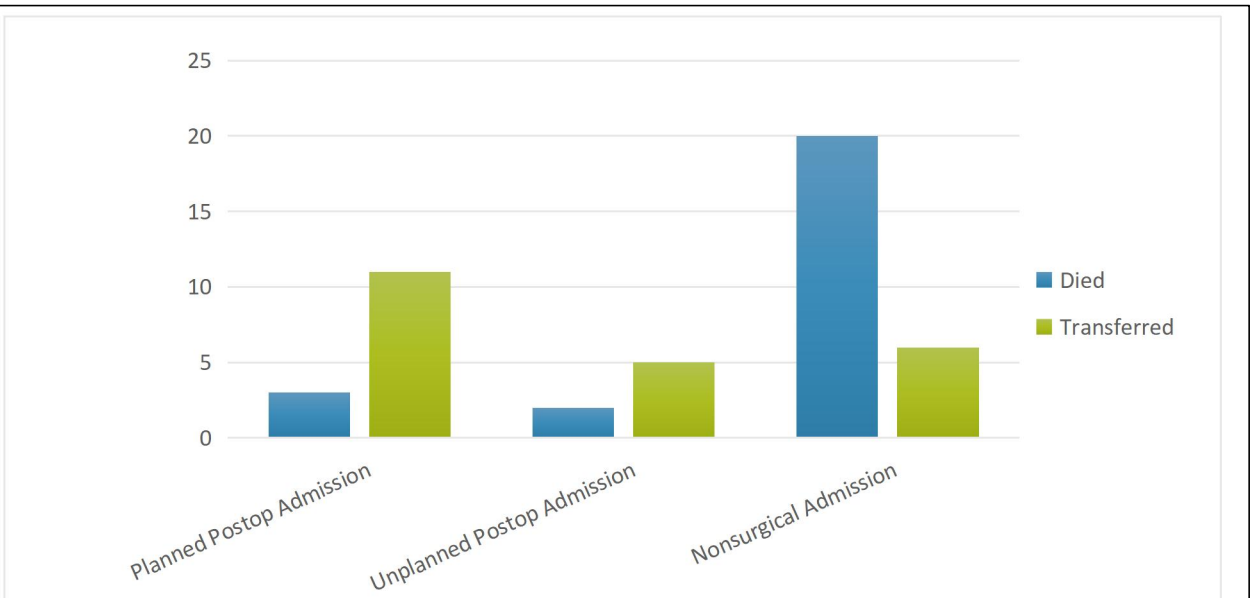

Figure 4: Nature of postoperative and nonsurgical ICU admission and final outcome

CONCLUSION

Critical postoperative care was commonest indication for children's admissions into our general ICU. It was associated with a better outcome compared with admissions following CNS/Neuromuscular pathologies which constituted the commonest non-surgical reason for admissions and with the highest mortality.

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ORIGINAL ARTICLE

Assessment of Regional Anaesthesia Exposure and Utilisation by Anaesthetists in Nigeria

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ABSTRACT **Background:** Although regional anaesthesia (RA) is a vital component of modern anaesthesia, it is underutilised and RA exposure appears to be limited in Nigeria.
Aim: This study explored the exposure and use of RA among anaesthesia residents in Nigeria.
Material: This was a prospective, cross-sectional study. A simple, convenience-based sampling was employed. Participants were contacted via Google forms using a self-administered structured questionnaire. The self-reported levels of access, exposure, competence, practice, and mentorship were assessed. Descriptive statistics were used to summarise results.
Results: From 180 questionnaires, 129 were returned, i.e., 71.6% response rate. Of the responder's centers, 92 (71.3%) were fully accredited, while 35 (27.1%) had partial accreditation. Daily exposure to SA and EA was 64 (49.6%) and 11 (8.5%), respectively, with 120 (93.0%) and 36 (27.9%) reporting competence. Daily or weekly exposure to PNBs was ≤ 5% in all categories. Four (3.1%) had competence in LLNB. Spinal and epidural kits were accessible to 126 (97.7%) and 85 (65.9%), respectively, while 6 (4.6%) had nerve stimulators and 11 (8.5%) had ultrasound. Mentorship was universal i.e., 129 (100%) for neuraxial techniques, but 9 (6.9%) for PNBs.
Conclusion: The study highlights gaps in regional anaesthesia practice in Nigeria. Despite universal access to neuraxial blocks, limited exposure to PNBs reduces proficiency. Improving RA services requires access to equipment, mentorship, simulation, and curriculum reforms aligning with global standards.
Keywords: Regional anaesthesia, Spinal anaesthesia, Epidural anaesthesia, CSE, Peripheral nerve blocks, Nigeria.

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INTRODUCTION

Regional anaesthesia (RA) is an integral component of modern anaesthesia care.[1] Advantages include safety, efficiency, reliability, and usefulness where general anaesthesia (GA) is undesirable. Others are airway- and opioid-sparing, and reduced bleeding, postoperative nausea and vomiting (PONV), and thromboembolism risks. RA's role in enhanced recovery after surgery (ERAS) is established.[1,2]

The goals of anaesthesia, i.e., safety, comfort, and rapid return to the pre-operative state are often compromised in low-resource countries (LRCs).[2,3,4,5] However, the availability and use of RA which provides superior intraoperative physiology, haemodynamic stability and perioperative analgesia are limited in LRCs due to lack of skills and resources.[3] For instance, the Lancet Commission reported a severe shortfall in access to safe anaesthesia services in Nigeria, and underscored the need to expand capacity and systems to meet the demand.[6]

In settings with a constricted supply of oxygen, power, and consumables, RA offers a transformative approach. It lowers case cancellations, improves turnover, and is cost-effective.[4,5]

Yet, RA is underutilised in Africa, where it is most needed, due to a lack of trained specialists.

For instance, there are 0.25 – 0.58 physician anaesthetists per 100,000 population in Nigeria,[7] against 5 per 100,000, which is recommended by the Global Anaesthesia Workforce.[8]

Proficiency in RA techniques directly correlates with the frequency of exposure and practice.[9,10] Studies from the United States[11] and the United Kingdom[12] suggest that anaesthesia residents reported higher proficiency with practice and exposure.

There are limited studies assessing the level of resident anaesthetist's exposure to RA in Nigeria. This study aims to identify access, experience, practice, level of competence, and barriers and, propose modalities to improve RA services in Nigeria.

MATERIALS AND METHODS

This descriptive cross-sectional study assessed exposure, proficiency, and use of RA techniques by anaesthesia residents in Nigeria. The study analysed responses to a survey that was sent to residents. The data was obtained from structured questionnaires adapted from existing literature. Senior anaesthetists were asked to validate the questionnaire. Also, a pilot study conducted selected anaesthesia residents, verified the questions and corrections were made.

The survey was conducted between December 2024 and February 2025.

Responses from residents in anaesthesia training who completed the questionnaire were included. Questionnaires that were incomplete, lost, or unreturned were excluded.

A simple, purposive, convenience-based sampling was employed. The questionnaire was distributed via Google forms to residents on the WhatsApp page of the Nigerian Society of Anaesthetists (NSA) Appendix I. Additionally, residents were reached through contact persons in various institutions across the country.

The questionnaire captured demographic, e.g., age, sex, and years of residency. Others were RA exposure i.e., frequency of exposure to spinal anaesthesia (SA), epidural anaesthesia (EA), combined spinal-epidural (CSE) and peripheral nerve blocks (PNBs) such as upper limb nerve blocks (ULNB) e.g., the interscalene block (ISB), supraclavicular block (SCB), infraclavicular block (ICB), and axillary block (AxB); truncal block e.g., the transversus abdominis plane (TAP) block, and ilio-inguinal/ilio-hypogastric nerve block (IIIH-NB; and lower limb nerve blocks (LLNB) e.g. femoral nerve block (FNB), fascia iliaca block (FIB), lumbar plexus (psoas compartment) block (LPB/PCB), the lateral femoral cutaneous nerve block (LFCNB), adductor block (AB), and the popliteal sciatic nerve block (PSNB).

Self-reported level of competence, access to resources, e.g., ultrasound-nerve stimulators, and structured mentorship were assessed.

Data Analysis: Data were collected, cleaned and analysed using the Statistical Package for the Social Sciences (SPSS) (IBM, Chicago, Illinois, USA) version 25.0. Descriptive statistics, e.g., frequencies and percentages as well as means, and standard deviations were used to summarise demographic data, RA exposure, competence, and training.

RESULTS

There were 129 responses, out of 180 contacts, i.e., 71.6%, with a male and female ratio of 1.4:1. Years of training were fairly distributed. Accreditation was full in 92 (71.3%), partial in 35 (27.1%) and none in 2 (1.6%) centers (Table 1).

Daily and weekly–monthly exposure to SA were 64 (49.6%) and 60 (46.5%), and EA were 11 (5.8%) and 76 (58.9%). Full competence was reported by 120 (93.0%) in SA and 36 (27.9%) in EA. Sixteen residents (12.4%) had regular CSE exposure, 54 (41.9%) had none, while 35 (27.1%) reported competence. Daily or weekly exposure to peripheral nerve blocks (PNBs) was ≤ 5% in all categories (Table 2).

For ULNB, 18 (13.9%) had performed SCB, while ISB and ICB were each performed by two (1.6%) residents. For truncal blocks, 6 (4.7%) reported IIIH–NB, and only one (0.8%) reported TAP block. For LLNBs, only 2 (1.6%) reported PNB, and none were performing FNB, FIB, LBP/PCB, LFCNB, or AB. SA and EA kits were accessible to 126 (97.7%) and 85 (65.9%), participants respectively. Nerve stimulators were accessible to 6 (4.6%), while ultrasound was available to 11 (8.5%). Mentorship was universal for neuraxial techniques (129, 100%) but limited for PNBs (9, 6.9%). All (100%) wish to learn RA techniques (Table 3).

Table I: Demographic and Workplace Profile

Parameter		Variable N – 129 (n – %)
Age group	≤ 30 years	23 (17.8)
	31 – 40 years	73 (56.6)
	41 – 50 years	30 (23.3)
	> 50 years	3 (2.3)
Sex	Male	76 (58.9)
	Female	53 (41.1)
Years of residency	1	24 (18.6)
	2	27 (20.9)
	3	26 (20.2)
	4	15 (11.6)
	5	37 (28.7)
Type of hospital	Federal	102 (79.1)
	State	24 (18.6)
	General	3 (2.3)
	Private	0 (0.0)
Accreditation status	Full	92 (71.3)
	Partial	35 (27.1)
	None	2 (1.6)

Table II: Self-reported Exposure and Competence Profile in Selected RA Techniques

Technique	**Frequency of Exposure** **N – 129** **(n – %)**	Level of Competence N – 129 (n – %)
SAB	Daily – 64 (49.6) Weekly/Monthly – 60 (46.5) Rarely/Never – 5 (3.9)	C – 120 (93.0) US – 7 (5.4) NC – 2 (1.6)
EA	Daily – 11 (5.8) Weekly/Monthly – 76 (58.9) Rarely/Never – 42 (35.3)	C – 36 (27.9) US – 85 (65.9) NC – 8 (6.2)
CSE	Daily/Weekly – 16 (12.4) Rarely – 59 (45.7) Never – 54 (41.9)	C – 35 (27.1) US – 84 (65.1) NC – 10 (7.8)
ULNB	Daily/Weekly – 4 (3.1) Rarely/Never – 125 (96.9)	C – 4 (3.1) US/NC – 125 (96.9)
LLNB	Daily/Weekly – 6 (4.7) Rarely/Never – 123 (95.3)	C – 2 (1.6) US/NC – 127 (98.4)
Truncal blocks	Daily/Weekly – 3 (2.3) Rarely/Never – 126 (97.7)	C – 2 (1.6) US/NC – 127 (98.4)
Scalp block	Daily/Weekly – 2 (1.6) Rarely/Never – 127 (98.4)	C – 2 (1.6) US/NC – 127 (98.4)

C: Competent

US: Under supervision

NC: not competent

Table III: Exposure and Practice profile of Peripheral Nerve Blocks

Item		**Variable (n, %)** **N – 129** **(n – %)**
ULNB	ISB	2 (1.6)
	SCB	18 (13.9)
	ICB	2 (1.6)
	AxB	0 (0.0)
Truncal	TAP	1 (0.8)
	IIIH – NB	6 (4.7)
LLNB	FNB	0 (0.0)
	FIB	0 (0.0)
	AB	0 (0.0)
	LFCNB	0 (0.0)
	PSNB*	2 (1.6)
Regular access to RA equipment	SA kit	126 (97.7)
	EA kit	85 (65.9)
	Nerve stimulator	6 (4.6)
	Ultrasound	11 (8.5)
Access to Mentorship	SA/EA/CSE	129 (100)
	PNB**	9 (6.9)
Number who wish to learn RA techniques		129 (100%)

*Popliteal Sciatic Nerve Block (PSNB)

**Peripheral Nerve Blocks (PNB)

Abbreviations

AB – Adductor block

AXB – Axillary block

CSE – Combined Spinal-Epidural

EA – Epidural anaesthesia

FIB – Fascia Iliaca block

FNB – Femoral nerve block

GA – General anaesthesia

ICB – Infraclavicular block

II/IH-NB – Ilio-inguinal/Ilio-hypogastric nerve block

ISB – Interscalene block

LFCNB – Lateral Femoral Cutaneous nerve block

LLNB – Lower limb nerve block

LPB/PCB – Lumbar plexus (Psoas compartment) block

NSA – Nigerian Society of Anaesthetist

PNB – Peripheral Nerve Blocks

PSNB – Popliteal Sciatic nerve block

RA – Regional anaesthesia

SA – Spinal anaesthesia

SCB – Supraclavicular block

TAP – Transversus Abdominis Plane block

ULNB – Upper Limb nerve blocks

USS – Ultrasound

DISCUSSION

This study assessing the clinical experience and practice of RA services in Nigeria reported a high proficiency in neuraxial techniques among anaesthesia residents, with limited competence in PNB.

A 71.5% response rate was obtained from residents across Nigeria, representing 98.4% from fully or partially accredited training programs. These respondents were at various levels of training and had exposure to a wide range of surgeries and surgical specialties.

Unsurprisingly, we found that SA was the principal RA technique. SA is widely applied in trauma, obstetrics, gynaecological, plastic, urological, and general surgery.[2] Nearly 93% of residents reported competence in SA, emphasising its central role, while 27.9% and 27.1% reported same in EA and CSE respectively. The high competence in neuraxial block is reassuring, given its pivotal role in safe surgery.[1,2] It is simple, reliable, requires minimal equipment, and effective.

However, the study found low exposure to PNB, with under 5% of residents having regular experience. SCBwas performed by 13.9% of respondents, while other nerve block such as AxB and FNB exposure were absent.

Similarly, Rukewe et al[3] reported that among Nigerian anaesthetists, 92.9%, 15%, and 2.9% regularly use SA, EA, and PNB respectively, with 47.1% never performing a nerve block. In comparison, the reported 27.9% EA competence in this study is an improvement. This may result from increased access to EA kits, better training, which promote more regular practice by the Nigerian anaesthetists, over the years.

On the contrary, a survey of 42 United States anaesthesia programs found excellent and moderate proficiency in neuraxial and PNB respectively, based on exposure.[11] Additionally, a European study of 492 trainees reported proficiency in limb blocks, low confidence in truncal blocks and in non-obstetric epidurals.[12] These studies highlight how practice builds confidence.

The limited competence in PNB is concerning. PNB is beneficial in systems that is burdened by reduced resources, monitoring, intensive care and bed space. It provides earlier mobilisation, haemodynamic stability, preserves consciousness and airway reflexes, attenuates metabolic responses, and provides flexibility, i.e., can be used alone, as adjunct for GA or for postoperative analgesia [9,10]

In this study, 6.9% of respondent reported regular access to mentorship. This is low compared to a 70% of the anaesthesia residents in a UK survey who reported access to supervised training.[12] RA proficiency requires frequent practice, positive, and reinforced feedback through mentorship. Lack of specialists with post-fellowship training in RA may be responsible. Low proficiency indicates low independent practice, reduced options for surgery, and higher reliance on GA.[4,5] Modern surgery requires versatility in anaesthetic techniques, with choices tailored to age, American Society of Anesthesiologists (ASA) physical status, co-morbidities, fasting state, surgical duration and severity, fluid shifts, pain, institutional practices, elective or emergency procedure.[2,8,9]

The reduced PNB exposure and practice fall below the global standard. The European[13] and North American[14] anaesthesia programs treat PNB as core skills. In such settings, anaesthesia resident's graduate with proficiency in wide number of PNBs including limb and truncal blocks. The Lancet Commission on Global Surgery reported that in settings with limited intensive care units (ICUs), robust RA practices can reduce perioperative mortality.[4]

The study highlights an infrastructural gap and low workforce, noting that while SA and EA kits were widely available, access to ultrasound and nerve stimulators was limited.[9] Without a workforce proficient in diverse RA techniques, Nigeria cannot guarantee universal access to safe, and affordable surgery. Progress demands investment in infrastructure, structured training beyond neuraxial block, faculty development,

mentorship, and RA integration into national surgical strategies.[5,6]

Improving RA services in Nigeria requires broader specialist access, competence-based training, and access to ultrasound, nerve stimulators, local anaesthetic, adjuvants, and lipid emulsion. Supportive policies, funding, insurance, task-sharing, theatre-use protocols, public–private partnerships, and PNB registries will enhance RA application in obstetrics, trauma, paediatrics, and day-case surgeries.

Importantly, all residents demonstrated interest in learning RA techniques, which showcase potential to strengthen proficiency through structured exposure and guided practice.

The strength of this study is the direct reports from residents across accredited centers in Nigeria. However, limitations include the reliance on self-reported competence which may overestimate true skill levels. While the study identifies gaps in practice, it does not explore institutional barriers such as workload, staffing, or case-handling policies. The cross-sectional design precludes conclusions about changes in exposure or competence over time. The use of simple convenience sampling may introduce selection bias that limits inclusiveness. Thus, residents with varying RA exposure levels might have been excluded, potentially serving as a source of confounding.

CONCLUSION

This study reveals significant gaps in regional anaesthesia services in Nigeria. While SA remains essential, limited proficiency in PNBs undermines safe surgery. Addressing this requires investing in equipment, mentorship, simulation training, and curriculum reforms which aligned with global standards.

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APPENDIX I

QUESTIONNAIRE

ASSESSMENT OF EXPOSURE AND UTILISATION OF REGIONAL ANAESTHESIA BY ANAESTHETISTS IN NIGERIA

Dear Doctor,

This questionnaire is designed to assess the exposure, experience, and training of resident anaesthetists in regional anaesthesia techniques across Nigeria. Your participation is voluntary, and all responses will remain strictly anonymous. The data collected will be used solely for academic and research purposes. By proceeding with this questionnaire, you confirm your consent to participate in this study.

Section 1: Demographic Information

1. Age: _____
2. Gender: ☐ Male ☐ Female
3. Year of Residency Training: ☐ 1st Year ☐ 2nd Year ☐ 3rd Year ☐ 4th Year ☐ 5th Year ☐ > 5 Years
4. Type of Hospital: ☐ Federal Teaching Hospital ☐ State Teaching Hospital ☐ Private Teaching Hospital ☐ General Hospital
5. Institutional Accreditation Status: ☐ Fully Accredited ☐ Partially Accredited ☐ Not Accredited

Section 2: Exposure to Regional Anaesthesia Techniques

6. Have you been exposed to regional anaesthesia techniques during your training?
   ☐ Yes ☐ No
7. If *Yes*, specify the types of regional anaesthetic techniques you have been exposed to:
   _____
8. How often do you perform regional anaesthesia procedures? ☐ Daily ☐ Weekly ☐ Monthly ☐ Rarely ☐ Never
9. Please indicate your frequency of performing each Regional Anaesthesia techniques

Technique	Never	Rarely	Monthly	Weekly	Daily
Spinal) Anaesthesia (SA)	☐	☐	☐	☐	☐
Epidural Anaesthesia (EA)	☐	☐	☐	☐	☐
Combined Spinal–Epidural (CSE)	☐	☐	☐	☐	☐
Upper Limb Nerve Blocks (ULNB):					
– Interscalene Block (ISB)	☐	☐	☐	☐	☐
– Supraclavicular Block (SCB)	☐	☐	☐	☐	☐
– Infraclavicular Block (ICB)	☐	☐	☐	☐	☐
– Axillary Block (AxB)	☐	☐	☐	☐	☐
Lower Limb Nerve Blocks (LLNB):					
– Femoral Nerve Block (FNB)	☐	☐	☐	☐	☐
– Fascia Iliaca Block (FIB)	☐	☐	☐	☐	☐
– Lumbar Plexus (Psoas Compartment) Block (LPB/PCB)	☐	☐	☐	☐	☐
– Lateral Femoral Cutaneous Nerve Block (LFCNB)	☐	☐	☐	☐	☐
– Adductor Canal Block (AB)	☐	☐	☐	☐	☐
– Popliteal Sciatic Nerve Block (PSNB)	☐	☐	☐	☐	☐
Truncal Blocks:					
– Transversus Abdominis Plane (TAP) Block	☐	☐	☐	☐	☐
– Ilio-inguinal / Ilio-hypogastric Nerve Block (IIIH-NB)	☐	☐	☐	☐	☐
Scalp Block	☐	☐	☐	☐	☐

10. Please indicate your current level of competence for each Regional Anaesthesia technique.

Technique	Independent	Under Supervision	Not Competent
Subarachnoid (Spinal) Anaesthesia (SA)	☐	☐	☐

Technique	Independent	Under Supervision	Not Competent
Epidural Anaesthesia (EA)	☐	☐	☐
Combined Spinal–Epidural (CSE)	☐	☐	☐
Upper Limb Nerve Blocks (ULNB):			
– Interscalene Block (ISB)	☐	☐	☐
– Supraclavicular Block (SCB)	☐	☐	☐
– Infraclavicular Block (ICB)	☐	☐	☐
– Axillary Block (AxB)	☐	☐	☐
Lower Limb Nerve Blocks (LLNB):			
– Femoral Nerve Block (FNB)	☐	☐	☐
– Fascia Iliaca Block (FIB)	☐	☐	☐
– Lumbar Plexus (Psoas Compartment) Block (LPB/PCB)	☐	☐	☐
– Lateral Femoral Cutaneous Nerve Block (LFCNB)	☐	☐	☐
– Adductor Canal Block (AB)	☐	☐	☐
– Popliteal Sciatic Nerve Block (PSNB)	☐	☐	☐
Truncal Blocks:			
– Transversus Abdominis Plane (TAP) Block	☐	☐	☐
– Ilio-inguinal / Ilio-hypogastric Nerve Block (IIIH-NB)	☐	☐	☐
Scalp Block	☐	☐	☐

11. What is your preferred approach to peripheral nerve blocks? ☐ Landmark Technique ☐ Paresthesia Technique ☐ Nerve Stimulator ☐ Ultrasound-Guided ☐ Not Competent
12. How often do you have access to the following equipment for performing regional anaesthesia in your centre?

Equipment	Frequency of Access				
Spinal Anaesthesia Kit	☐ Always	☐ Frequently	☐ Occasionally	☐ Rarely	☐ Never
Epidural Anaesthesia Kit	☐ Always	☐ Frequently	☐ Occasionally	☐ Rarely	☐ Never
Nerve Stimulator	☐ Always	☐ Frequently	☐ Occasionally	☐ Rarely	☐ Never
Ultrasound machine for Regional Anaesthesia	☐ Always	☐ Frequently	☐ Occasionally	☐ Rarely	☐ Never

13. Have you received training on ultrasound-guided regional blocks? ☐ Yes ☐ No

Section 3: Training and Mentorship

14. Do you have access to mentors for regional anaesthesia training?
    ☐ Yes ☐ No ☐ Sometimes
15. How often are you supervised during regional anaesthesia procedures?
    ☐ Always ☐ Frequently ☐ Occasionally ☐ Rarely ☐ Never
16. What types of training have you received in regional anaesthesia?
    ☐ Didactic Lectures ☐ Live Demonstrations ☐ Hands-on Practice ☐ Simulation Training ☐ Ultrasound Workshops
17. Do you feel adequately prepared to perform regional anaesthesia independently?
    ☐ Yes ☐ No ☐ Maybe
18. How confident are you in performing regional anaesthesia procedures?
    ☐ Very Confident ☐ Confident ☐ Neutral ☐ Not Confident ☐ Very Insecure
19. Have you ever performed ultrasound-guided nerve blocks independently?
    ☐ Yes ☐ No
20. If *Yes*, please specify which block(s): _____
21. Do you wish to learn ultrasound-guided regional anaesthesia?
    ☐ Yes ☐ No

Section 4: Barriers to Training

22. What are the major barriers to regional anaesthesia training in your centre? (Select all that apply)
    - ☐ Lack of Ultrasound Machines
    - ☐ Limited Patient Load
    - ☐ Inadequate Number of Supervisors
    - ☐ Insufficient Hands-on Training Opportunities
    - ☐ Lack of Simulation Models
    - ☐ Inadequate Educational Resources
    - ☐ Others (Please specify): _____

Section 5: Suggestions and Comments

23. What suggestions do you have to improve regional anaesthesia training in Nigeria?
    _____

CASE REPORT

Graded Epidural Anaesthesia for Abdominal Hysterectomy in an Adult with Congenital Heart Disease: A Case Report

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ABSTRACT **Background:** Congenital heart anomalies pose challenges during anaesthesia with its associated morbidities; Cor-triatriatum dexter may be associated with other heart anomalies which subject the patient to increased risks.

Case Presentation: We here-in report the case of a 30 yr old woman that had cor-triatriatum dexter with associated multiple atrial septal defects, rheumatic valvular heart disease, pulmonary hypertension and associated ventricular dysfunction that had total abdominal hysterectomy under graded epidural anaesthesia.

Conclusion: High risk patients with multiple congenital anomalies may undergo anaesthesia with careful choice of anaesthesia technique.

Keywords: Cor-triatriatum dexter, Congenital heart anomaly, Graded epidural anaesthesia.

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INTRODUCTION

Cor-triatriatum dexter (CTD) is a rare condition where a fibromuscular band separates the right atrium into two chambers due to persistence of the right valve of the embryonic sinus venosus making the heart triatrial.[1] It has a prevalence of 0.025% among all congenital heart diseases.[1]

CTD rarely exists in isolation as it is often associated with other cardiac abnormalities such as ventricular septal defect, atrial septal defect, mitral regurgitation, tricuspid valve abnormalities and pulmonary artery stenosis or atresia.[2] Its clinical presentation depends on the size of communication between the subdivided compartments and the presence of associated anomalies. The condition is associated with right sided heart abnormalities such as hypoplasia or atresia of the tricuspid valve and/or pulmonary artery orifice. When it coexists with an ASD, features of right to left shunting could be so subtle that its diagnosis could be missed.[1]

Congenital heart diseases may range from serious conditions that are diagnosed at birth, to milder forms which could be missed at birth and later diagnosed in adulthood. Among congenital heart conditions, lesions with high pulmonary vascular resistance have been characterized as having the highest risks during anaesthesia.[3] Before the advancement of echocardiography, this condition was either diagnosed during cardiac surgery, or post-mortem.[4] Knowing and anticipating the cardiovascular effects of anaesthetic agents on these patients' cardiovascular parameters is of utmost importance.

We report the case of a patient with cor-triatrium dexter with associated multiple atrial septal defects, rheumatic heart disease (severe mitral incompetence), pulmonary hypertension, left ventricular dysfunction and pericardial effusion that underwent anaesthesia for total abdominal hysterectomy.

CASE PRESENTATION

The patient is a 30 year old woman who presented to the gynaecology clinic of Aminu Kano Teaching Hospital with complaints of cyclical lower abdominal pain and primary amenorrhea. On evaluation, a diagnosis of transverse vaginal septum with coexisting uterine

fibroids was made and she was planned for exploratory laparotomy with examination under anaesthesia.

Preanaesthesia review revealed a young woman who was small for age, she had no known comorbid conditions, examination of the cardiovascular and respiratory systems were all normal. The available investigations, full blood count and differentials, urea, electrolyte and creatinine were all within acceptable ranges. She was then scheduled for surgery.

Following induction of general anaesthesia with 150mg of propofol, and endotracheal intubation, she was noticed to develop an arrhythmias; tachycardia (250b/min) with an irregular rhythm, she then suddenly began to desaturate despite being mechanically ventilated with 100% oxygen, and immediately thereafter suffered a witnessed cardiac arrest. The inhalational agent was swithed off and high quality CPR was commenced, and 1mg adrenaline administered intravenously. Return of spontaneous circulation (ROSC) was achieved within 3 minutes of cardiac arrest. The surgery was abandoned, and patient transferred to the intensive care unit for continued post cardiac arrest care. She was reviewed by the cardiologist while in the ICU, a bedside echocardiography revealed a left ventricular ejection fraction of 45%, dilated left atrium and left ventricle, thickened mitral and aortic valves with moderate mitral regurgitation and cor-triatriatum dexter. She was placed on carvedilol, digoxin, spironolactone, torsemide, and monthly penicillin and was discharged from the ICU following recovery after 24hrs.

Six months thereafter, she was rebooked for surgery (myomectomy/total abdominal hysterectomy and vaginoplasty). On preanaesthesia review, a thorough cardiovascular examination revealed a displaced apex beat and pansystolic murmur. Repeat echocardiography revealed a decline in her cardiovascular function with severe mitral incompetence, multiple atrial septal defects with cor-triatriatum dexter, moderate pulmonary hypertension, mild pericardial effusion, and a further decline in ejection fraction to 31%. A high-risk consent was obtained.

Upon her arrival at the theatre, a multiparameter monitor showed baseline vitals to be a pulse rate of 90b/min, blood pressure of 132/90mmHg, and a saturation of 96% on room air. A 16G intravenous cannula was secured, and a size 7.5 Fr central line was inserted, baseline central venous pressure (CVP) was 15mmHg. An epidural catheter was placed at the L3/L4 space, with a test dose of 2mls of 2% lidocaine with adrenaline administered. Graded epidural with low dose plain bupivacaine with fentanyl as adjuvant to enhance anaesthesia, alongside some sedation was the anaesthetic technique of choice; 5mls of 0.1% bupivacaine with fentanyl 4mcg/ml was administered, this was followed by another 5mls of the same mixture after 5 minutes, 5mls of 0.125% bupivacaine with fentanyl after another 5 mins was again given, following which surgical anaesthesia was achieved, the dermatomal level of block was T6. She was also sedated with boluses of midazolam 2mg and ketamine 10mg Her haemodynamics remained stable with pulse rate ranging from 90–120b/min, mean arterial pressure (MAP) ranging from 94-106mmHg and oxygen saturation ranging from 97-100% throughout the surgery period, with surgery lasting for about 2 hours. She received a total of 1.5L of 0.9% saline, and urine output was 600mls. There was an estimated blood loss of 1liter, and 1 pint of blood was transfused. Continuous central venous pressure monitoring continued throughout the intraoperative period with CVP ranging from 10mmHg to 16mmHg (Appendix I).

After surgery, the patient was transferred to the Intensive Care Unit where she was observed for 24 hours and subsequently discharged to the ward.

DISCUSSION

Cor-triatriatum, a rare condition typically produces symptoms by causing pulmonary venous obstruction and pressure overloading on the right side of the heart. The most frequent initial symptoms in infants are respiratory distress, cyanosis, recurrent respiratory tract infections, and feeding difficulties; while older patients present with syncope, dyspnea, and hemoptysis.[5,6] Pulmonary hypertension worsens the workload on the right chamber; this patient had pulmonary artery pressure of 40mmHg. The most dangerous intraoperative complication from a pulmonary hypertension exacerbation is right ventricular failure causing persistent systemic hypotension.[7]

Hypercarbia should be avoided to prevent a pulmonary hypertensive crisis. In patients with pulmonary hypertension, regional anaesthesia is preferred where applicable. General anaesthesia is challenging as mechanical ventilation may reduce venous return and worsen right sided heart function, and direct laryngoscopy may result in increased sympathetic outflow leading to increased pulmonary vascular resistance.[8] Furthermore, hypoxia, acidosis, sudden haemodynamic changes, tachycardia should be avoided. The use of graded epidural further ensured stability in hemodynamics, alongside CVP monitoring which ensured adequacy of fluid therapy.

As seen on echocardiography, this patient had multiple ASDs: this signifies significant blood shunting between the atria and hence increased work load on the right heart, changes in systemic vascular resistance (SVR) should be avoided, a high SVR worsens the left-to-right shunt, increasing the volume of blood going to the lungs, while low SVR can cause the shunt to reverse, leading to right-to-left shunting and hypoxia. A reversed shunt can lead to hypoxia and increase the risk of stroke from paradoxical emboli intraoperatively.[9]

The patient was also diagnosed with rheumatic heart disease with echocardiography showing severe mitral incompetence, this implies that increased pressure is required to pump blood from the chambers most especially the left resulting in progressive chamber enlargement with a consequent risk of heart failure. Sudden changes in heart rate and blood pressure should be avoided as this may worsen the mitral regurgitation

and consequently reduce the cardiac output. Intra-arterial blood pressure monitoring would be ideal for this patient in order to monitor the beat to beat changes in blood pressure, this was however not done due to logistic reasons. Graded epidural method of anaesthesia with low concentration of bupivacaine however ensured blood pressure stability, as opposed to subarachnoid block. Our patient had left ventricular dysfunction with an ejection fraction of 31%, global chamber hypokinesia and associated chamber enlargement suggesting a dilated cardiomyopathy. Ventricular dysfunction and chamber dilatation makes the myocardium very sensitive to negative inotropic agents such as inhalational anaesthetic agents hence increasing the risk of arrythmias and heart failure.[10]

Lee et al[6] similarly reported the successful anaesthesia for laparoscopic resection of ovarian tumour in a 45 yr old patient with cortriatrium. General anaesthesia was employed with cardiostable drugs utilised, such as etomidate, remifentanyl, sevoflurane. Their patient however had no additional cardiac anomalies, this was unlike our patient that had cor-triatriatum dexter, multiple atrial septal defects and valvular disease. Our choice of graded epidural anaesthesia using low dose bupivacaine with fentanyl as adjuvant enabled avoidance of myocardial depression.

CONCLUSION

Patients with multiple heart anomalies undergoing surgery may be an anaesthetic challenge. Graded epidural with low dose bupivacaine offers appropriate conditions for a successful hysterectomy procedure.

Financial support and sponsorship: None

Conflicts of interest: There are no conflicts of interest.

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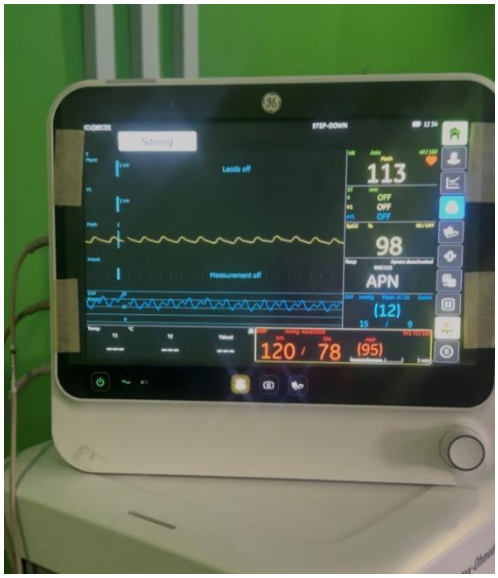
Appendix I: Multiparameter monitor showing intraoperative hemodynamics and CVP at 12mmHg.



CASE REPORT

Spinal Anaesthesia for Posterior Spinal Decompression in a Patient with Intracoronary Stent: A Case Report

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ABSTRACT **Background:** Anaesthesia for posterior spinal decompression poses significant challenge for the anaesthetist because of awkward patient prone position, and this challenge becomes complex when the patient has a pre-existing cardiac dysfunction. This report shows the complexity of managing a middle aged man with intracoronary stent for posterior spinal decompression under spinal anaesthesia.

Case Presentation: A 52year old businessman with intracoronary stent who was managed for L5 region spinal canal mass with chronic cauda equina syndrome on the background of L3/L4 disc disease. Multidisciplinary Pre–operative assessment and preparation was done with a clear plan for the management of double anti-platelet therapy. He had posterior spinal decompression with uneventful intraoperative and postoperative period.

Conclusion: Multidisciplinary preoperative preparation, intraoperative precautions and monitoring as well as adequate postoperative management is needed to navigate the complexity of anaesthesia for intracoronary stent for posterior spinal decompression.

Keywords: Posterior Spinal decompression, Spinal Anaesthesia, Intracoronary stent, Middle aged, Decompression under spinal anaesthesia.

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INTRODUCTION

Spinal cord injury is a devastating condition, particularly when neurologically complete, affecting patients, families, and healthcare teams. It predominantly affects men aged 31–45 years, often from motor vehicle accidents or falls.[1] Lumbar spinal stenosis is the most common degenerative spinal disease.[2] The global incidence of spinal degenerative disease is estimated at 3.68%, with Europe recording the highest (5.7%) and Africa the lowest (2.4%). Low-income countries bear a disproportionately higher burden, up to four times that of high-income nations.[3] Posterior Spinal decompression through laminectomy remains the standard surgical treatment.[2]

Anaesthetic options for spinal surgery include general, regional, and local techniques.[4] However, in patients with significant cardiac co-morbidities, the prone position and anaesthetic stress increase perioperative risk.[4]as well as the challenge of providing optimal surgical condition, monitoring and adequate oxygenation of the brain and spinal cord.[5] We report a successful posterior decompression performed under spinal anaesthesia in a patient with an intracoronary stent.

CASE PRESENTATION

A 52-year-old businessman presented with recurrent low-back pain for 15 years and right lower-limb weakness for two years. He had undergone coronary

angioplasty and intracoronary stent placement four years earlier for ischaemic heart disease and was on aspirin, metoprolol, and atorvastatin.

Preoperative assessment involved a multidisciplinary team comprising the orthopaedic spine surgeon, cardiologist, and anaesthetist. Cardiac evaluation showed a left ventricular ejection fraction of 65% and old anterior/lateral wall infarct.

MRI revealed L3/L4 degeneration with foraminal stenosis and a circumscribed extradural mass posterior to L5 causing severe canal stenosis and cauda equina compression. He was diagnosed with L5 spinal canal mass with chronic cauda equina syndrome on a background of L3/L4 disc disease. Aspirin was discontinued seven days before surgery to allow platelet regeneration and reduce the risk of epidural haematoma, as even minimal bleeding in the spinal canal can cause neural compression. Bridging with enoxaparin was used to attenuate the risk of stent thrombosis, and was discontinued more than 12 hours before surgery. Metoprolol, atorvastatin, pregabalin, and tizanidine were continued, however Metoprolol was skipped on the morning of surgery to prevent exacerbation spinal-induced hypotension. Laboratory results were within normal limits (PT 13.9 s, INR 1.22, platelets 223 × 10^9/L).
Spinal anaesthesia was selected to minimise myocardial stress and avoid the sympathetic surge associated with induction and intubation under general anaesthesia, which could trigger stent thrombosis. It also permits spontaneous ventilation and better haemodynamic stability.
After preloading with 10 mL/kg of normal saline, spinal anaesthesia was administered at L4/L5 with 15 mg heavy bupivacaine and 25 µg fentanyl. On achieving a block height T5, the patient was placed on prone position from a trolley on standard bolsters. Intraoperative vitals were stable: blood pressure ranged from 90/52–128/79 mmHg, pulse 62–79 bpm, and SpO_2 93–99% on 2 L/min oxygen. Blood loss was 300 mL, urine output 500 mL, and 3 L of normal saline was infused. Intraoperative findings showed thickened ligamentum flavum (L4–S1) without definite mass. The procedure lasted 2 hours 50 minutes and was uneventful. Recovery from anaesthesia was smooth. On postoperative day one, the patient was stable (BP 112/70 mmHg, pulse 78 bpm). Physiotherapy and ambulation with a Zimmer frame began on day three, and by day six, he was walking unaided with a lumbosacral corset. He was discharged on day 13 in good condition.

DISCUSSION

Spinal degenerative disease predominantly affects individuals aged 30–69 years, with a male-to-female ratio of 64.8%:35.2%,[6] consistent with our 52-year-old male patient.

A major anaesthetic challenge in patients with intracoronary stents is determining the optimal timing for non-cardiac surgery to minimize cardiac complications. Matteau et al [7] reported that surgeries performed within 45 days of stent implantation—whether bare-metal (BMS) or drug-eluting (DES)—carry a high risk of adverse cardiac events. Current recommendations suggest delaying non-cardiac surgery for at least six weeks after BMS and one year after DES implantation. Our patient underwent stent placement five years earlier, which likely contributed to his uneventful perioperative course.

Perioperative management of antiplatelet therapy presents another significant challenge, as interruption increases the risk of stent thrombosis, while continuation may cause excessive bleeding. Although dual antiplatelet therapy (DAPT) is usually maintained for 1–6 months after BMS and 12 months after DES, it can be extended in high-risk patients. For elective non-cardiac surgery, aspirin may be continued while reintroducing thienopyridine as soon as feasible postoperatively.[8,9]

Our patient was on aspirin 300 mg daily, with normal coagulation parameters (INR 1.22; platelets 223 × 10^9/L) and no high bleeding risk. Aspirin was withheld seven days preoperatively to allow platelet regeneration and minimise the risk of epidural haematoma. Bridging with low-molecular-weight heparin (LMWH) was implemented to mitigate the risk of stent thrombosis, and was discontinued 12 hours before surgery, then resumed 24 hours postoperatively before transitioning back to aspirin. Estimated intraoperative blood loss was 300 mL, aided by meticulous haemostasis with bipolar diathermy. Stable haemodynamics and absence of cardiovascular complications suggest that the perioperative anti-thrombotic strategy was effective. Although bridging therapy for DAPT remains controversial, LMWH is considered safer than unfractionated heparin (UFH) as it induces less platelet activation.[7,9]

Another concern was the potential risk of spinal epidural haematoma following central neuraxial blockade. Evidence indicates that this risk is higher with epidural than spinal anaesthesia.[10,11] The American Society of Regional Anaesthesia and Pain Medicine (ASRA) recommends confirming adequate platelet recovery before performing neuraxial blocks.[9,12] In this patient, spinal anaesthesia was chosen due to its lower risk profile, coupled with strict precautions: use of a 27G pencil-point needle, single-shot procedure by an experienced anaesthetist, and verified platelet adequacy. These measures likely minimized haematoma risk.

Although some studies suggest that neuraxial blockade is not associated with an increased incidence of spinal haematoma in patients with intracoronary stents on DAPT [13,14] however, careful patient selection and multidisciplinary coordination remain crucial.

CONCLUSION

This case demonstrates that, with judicious perioperative planning and adherence to evidence-based protocols, spinal anaesthesia can be safely and effectively administered in high-risk cardiac patients undergoing spine surgery.

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Conflicts of interest: There are no conflicts of interest.

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SOAN 2025 CONFERENCE ABSTRACT PROCEEDINGS

Abstracts of the 12th Annual Scientific Conference of the Society of Obstetric Anaesthetists of Nigeria
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Spinal Anaesthesia for Caesarean Delivery in a Parturient with Kypho-Scoliosis: A Case Report

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Background: Kypho-scoliosis is a spinal abnormality characterized with anterior and lateral deformities as well as cardiopulmonary compromise. These abnormalities, coupled with the physiological changes in pregnancy make the obstetric anaesthetic management of a parturient with kypho-scoliosis a challenging, yet a unique condition. Use of general anaesthesia poses risks of difficulties in positioning, airway management and cardio-pulmonary depression, while instituting a neuraxial block remains technically difficult.
Case Report: A 24-year-old, booked primiparous woman with severe kypho-scoliosis and twin gestation in her third pregnancy who underwent caesarean delivery under spinal anaesthesia, following a multidisciplinary management.
The patient, weighing 50kg, with a height of 135cm, booked her pregnancy at 12 weeks estimated gestational age (EGA). Due to the multiple obstetric and anaesthetic risks, the managing team planned a caesarean delivery for 36 weeks EGA. The pregnancy was relatively uneventful and at 36 weeks, she was booked for caesarean delivery under spinal anaesthesia. Preoperatively, she remained stable and had anaesthesia instituted with 10mg heavy bupivacaine. After a sensory blockade up to T8, the surgery commenced and she was delivered of a twin girl and boy with APGAR score 8^1,9^5, birthweight 1.9kg and 7^1 8^5, birthweight 2.0kg respectively. The intra-operative and post-operative periods were uneventful and she was discharged home after two weeks.
Conclusion: Anaesthetic management of parturient with kyphoscoliosis for caesarean delivery is challenging. However, with proper planning, spinal anaesthesia can be a safer alternative option.
Keywords: Submental intubation, Difficult airway, Mandibular fracture, Intermaxillary fixation, Kypho-scoliosis.

Spinal Anaesthesia for Emergency Ceasarean Section in a Paturient with Thyroid Storm

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Background: Thyroid storm is a rare, life-threatening endocrine emergency that can complicate pregnancy and significantly increase maternal and foetal risk. It presents unique anaesthetic challenges, particularly in emergency obstetric surgery, where optimization time is limited. The aim of this report was to describe the anaesthetic management of a parturient in thyroid storm undergoing Caesarean section under subarachnoid block and mild sedation.
Method: The patient was preloaded with 650 ml of normal saline and subarachnoid block was achieved using 10mg of hyperbaric bupivacaine. Sedation was instituted using 40 mg of Propofol. Non-invasive blood pressure, SpO_2, pulse rate, electrocardiogram and temperature were monitored intraoperatively.
Result: The surgery lasted 75 minutes and was successful with stable vital signs. The neonate had APGAR scores of 5, 7 and 9 in the 1st, 5th and 10th minutes, respectively. She was then transferred to the intensive care unit. Her postoperative recovery was uneventful.
Conclusion: This case highlights the feasibility of spinal anaesthesia in thyroid storm patients undergoing emergency Caesarean delivery when general anaesthesia poses higher risks. The role of perioperative multidisciplinary approach, preoperative optimization, vigilant intraoperative monitoring and postoperative care in a critical care setting cannot be overemphasized.
Keywords: Thyroid storm, Emergency Caesarean section, Subarachnoid block.

Haemorrhagic Obstetric Cases under Sab – Between the Devil and the Deep Blue Sea

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Background: Subarachnoid block (SAB) has remained the preferred anaesthetic technique for lower abdominal surgeries including Caesarean sections. SAB being easier and safer in the hands of most anaesthetists, compared to General Anaesthesia, especially in parturients. It is however contraindicated in potentially haemorrhagic/haemorrhagic cases. This is due to the fear of worsening SAB induced hypotension with acute hypovolaemia. However, full general anaesthesia could be a daunting task in the face of oxygen scarcity.
Aim: The aim is to report series of cases in favour of the possibility and safety of intrathecal block for Caesarean deliveries in potentially haemorrhagic/haemorrhagic pregnancies in the face of scarcity of oxygen.
Methods: Three parturients booked for Caesarean sections on account of abruption placenta and placenta praevia Type IV had their surgeries carried out under SAB in a tertiary facility during a period of oxygen scarcity. Pre-anaesthetic assessment, optimization, choice of anaesthetic technique, intraoperative monitoring, fluid therapy, loses, replacement, maternal and neonatal outcomes were recorded and reviewed.
Results: The 3 cases were carried out under SAB. One of them required deep sedation due to an extended period of surgery, for hysterectomy following atony. Fluid co-loading and vasopressors were used to maintain the haemodynamics. All 3 had blood transfused intra/postop. Oxygen consumption was minimal.
Conclusion: SAB is a feasible, oxygen conserving technique for Caesarean section in potentially haemorrhagic/haemorrhagic parturients, especially in resource constraint setting.
Keywords: Haemorrhagic, Caesarean section, Subarachnoid block, Oxygen scarcity.

Undiagnosed Abdominal Pregnancy at Term: A Case Report

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Background: Abdominal pregnancy is defined as pregnancy occurring anywhere within the peritoneal cavity, exclusive of tubal, ovarian or broad ligament locations. It is a rare form of ectopic pregnancy with high morbidity and mortality for both the mother and the foetus.
Case Report: A 36-year-old woman with gestational age 37 weeks + 2 days was referred from a peripheral hospital, with complaints of abdominal pain of 3 hours prior to presentation. Patient had previous Caesarean section done 4 years ago.
Examination findings revealed generalized abdominal tenderness with difficulty assessing foetal poles. Foetal heart rate was 109 beats/minute. A diagnosis of foetal distress with suspected uterine rupture was made. Exploratory laparotomy

performed revealed abdominal pregnancy with massive haemoperitoneum and a fresh still birth neonate.
Conclusion: Abdominal pregnancy remains inadequately diagnosed in developing countries. It is necessary to increase awareness among pregnant women on the importance of high-quality antenatal care, including early obstetric ultrasound scan as well as training and retraining of health care professionals.
***Keywords**:* Abdominal pregnancy, Post-partum haemorrhage, Ectopic pregnancy.

Inadvertent Intrathecal Catheterization during a Blind CSE: A Case Report

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Background: Neuraxial block is used for majority of Caesarean sections. Combined spinal epidural (CSE) anaesthesia gives the advantage of the quick onset of the spinal component and extended duration of anaesthesia with the epidural, especially, in anticipated prolonged surgical exposure and adequate postoperative pain management. We report a case of inadvertent catheterization during a CSE for Caesarean section, its recognition and management.
Case Presentation: A 38yr old G2P1 was booked for repeat Caesarean section and hernioplasty of a giant incisional hernia containing the growing uterus. Patient had been on bed rest for 3 months prior due to ulceration of the herniated abdominal wall. A CSE was performed for the surgery and postoperative pain management. Following catheterisation of the epidural space, about 2-3 drops of clear fluid was noted to flow back in the catheter. However, catheter aspiration and test dose were negative. A high spinal block up to dermatomal level T5 was observed and this increased the suspicion of intrathecal catheterization. This test dose was sufficient for the surgery. Postoperatively, catheter was removed and patient was managed with parenteral and suppository analgesics. No further sequel was observed.
Conclusion: High index of suspicion and precautions can help avoid serious complications in cases of inadvertent catheterization of the intrathecal space during CSE.
Keywords: Inadvertent, Intrathecal, Catheterization, High spinal block.

Prevalence of the Aversion for Caesarean Sections by Antenatal Clinic Attendees: A Study in one Teaching Hospital in Nigeria

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Background: Caesarean section (C-Section) is a critical life-saving surgical procedure for maternal and neonatal complications. Despite its medical importance, there is a significant and well-documented aversion to it in many low- and middle-income countries, including Nigeria. This study was to determine the aversion for Caesarean section by antennal clinic attendees at the Rivers State University Teaching Hospital (RSUTH).
Method: This was a prospective cross-sectional study conducted over six (6) months period at the RSUTH. All consecutive subjects were recruited for the study. Patients gave informed consent for the study. Using SPSS version 25, the drivers for the aversion were entered into a spreadsheet and the prevalence was calculated chi-square tests and logistic regression analyses used to identify the key determinants (e.g., education level, parity, income, cultural beliefs and other factors) most strongly associated with the aversion.
Results: A total of 386 subjects were recruited. The booked respondents were 208 (53.9%) and 178 (46.1%) were un-booked. The mean age was 31±3.5years. The modal parity was 2. Out of a total of the number of women studied, 5 (1.3%) had no formal education, 12 (3.1%) primary education, 176 (45.6%) secondary education, 193 (50.0%) had a tertiary education. One hundred and fourteen (29.6%) of the subjects had aversion for Caesarean sections, of which 77 (20%) were un-registered patients while 37 women had regular antenatal care. The reasons for aversion were socio-cultural stigma 50 (43.9%), fear of anaesthesia 34 (29.8%) religious 16 (14.0%), and economy 14 (12.3%).
Conclusion: The aversion to Caesarean sections among antenatal attendees in Rivers State is a significant public health issue with deep socio-cultural and economic roots, and fear of anaesthesia. Its prevalence is very high and acts as a barrier to accepting essential obstetric care. A further systematic study to quantify this aversion and understand its drivers needs to be done.
Keywords: Prevalence, Aversion, Caesarean section, Antenatal clinic.

Effect of three different Prophylactic Bolus Doses of Phenylephrine on Hypotension following Caesarean Section under Combined Spinal-Epidural Anaesthesia

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Background: Maternal hypotension is a frequent and potentially serious complication of spinal anaesthesia during Caesarean section. Phenylephrine is a commonly used vasopressor for prevention, but optimal dosing remains uncertain. This study was aimed at evaluating the effectiveness of three prophylactic bolus doses of phenylephrine in preventing spinal-induced maternal hypotension during elective Caesarean section under combined spinal–epidural anaesthesia.
Methodology: A prospective comparative study at the University of Port Harcourt Teaching Hospital included 136 parturients scheduled for elective Caesarean section. All received an admixture of intrathecal 10 mg of 0.5% hyperbaric bupivacaine and 25 µg fentanyl. Participants were randomly assigned to four groups: a control group receiving normal saline and three intervention groups receiving 50 µg, 60 µg, or 80 µg of phenylephrine. Haemodynamic parameters were monitored every five minutes. Total phenylephrine used and neonatal Apgar scores were recorded.
Results: Demographic characteristics were comparable across groups. The incidence of hypotension was highest in the saline group (85.5%) and lowest in the 80µg group (10.0%). Differences in hypotension rates were statistically significant between the 80 µg and saline group ($p < 0.0001$), and between other dose comparisons. Bradycardia was more frequent in the 80µg group (20.6%) ($p = 0.030$). Apgar scores were similar across groups, though umbilical cord venous pH was significantly lower in the saline group ($p < 0.0001$).
Conclusion: Prophylactic bolus doses of phenylephrine, particularly 80 µg, are effective in preventing spinal-induced maternal hypotension but with a relatively higher incidence of bradycardia during Caesarean section without adverse neonatal outcomes.
Keywords: Caesarean section, Hypotension, Phenylephrine, Combined spinal epidural block, Prophylactic.

Effect of Intrathecal Single Dose Clonidine-Bupivacaine-Fentanyl Admixture Versus Bupivacaine-Fentanyl only on Labour Pain

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Background: Labour pain is excruciating and analgesic intervention following single-dose intrathecal local anaesthetic is short-lived, necessitating search for suitable adjuvants. This study was undertaken to evaluate the effects of clonidine addition to single dose intrathecal bupivacaine-fentanyl admixture on labour pain.

Method: Following approval**,** 134 consenting randomized parturients received, intrathecally, either clonidine 25µg, bupivacaine 2.5mg and fentanyl 25µg (group A = 67) or bupivacaine 2.5mg and fentanyl 25µg (group B = 67). Maternal blood pressure, sensory/motor block, pain, duration of active phase, labour and neonatal outcome were recorded. P<0.05 was considered significant.
Results: Group A rather than B, had longer mean duration and faster onset of effective analgesia (170.0 (20.5) versus 108.7 (19.9) minutes; *P* = 0.001), and (3.6 (1.1) versus 4.9 (0.3) minutes; *P* = 0.001), respectively, and longer time to Bromage 6 (*P* = 0.001). APGAR scores at 1st and 5th minute (*P* = 0.16 and *P* = 0.405 respectively), mean umbilical arterial pH (*P* = 0.342), active labour duration (*P* = 0.905) and labour outcome (*P* = 0.052) were similar.
Conclusion: Compared to group B, group A achieved significantly faster onset, longer duration of effective analgesia and motor block; active labour duration, labour and neonatal outcomes were similar, with minimal side effects.
Keywords: Bupivacaine, Clonidine, Fentanyl, Intrathecal labour analgesia.

A Retrospective Cohort Study on the Impact of Oxytocin and Carbetocin on Trend of Blood Transfusion needs following Caesarean Delivery

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Background: The risk for significant blood loss from uterine atony, a leading cause of maternal mortality, is increased by Caesarean; therefore, a review of uterotonic efficacy is required. The aim of this study was to analyze the efficacy of carbetocin versus oxytocin in reducing postpartum blood loss and transfusion need of parturients undergoing Caesarean, in University of Port Harcourt Teaching Hospital (UPTH).
Method: Approval secured, a 10-year review of Caesarean deliveries was done from January 2015 to December 2024. Data of blood transfusions in parturients during or after Caesarean was obtained from the Obstetric theatre, Recovery, Postnatal Ward, Anaesthetic and Intensive Care Unit Registers in UPTH.
Results: Out of 5,684 Caesarean 3,427 had oxytocin and 2,257 received carbetocin. Mean blood loss (range: 699.2±207.7 - 706.9±218.1 versus 437.2±112.8 - 576.7±167.1), proportion (%) of parturients with blood loss >1000ml (range: 4.5 – 6.9 versus 0.0 – 3.6) and needed transfusion (range: 4.1 – 7.7 versus 1.1 – 2.9), including additional uterotonic use (42.95 versus 9.39) was greater with oxytocin. Similarly, bradycardia (2 versus 9) and hypotension (33 versus 550) occurred more with oxytocin.
Conclusion: Comparatively less postpartum blood loss, transfusion, additional uterotonic use, occurrence of bradycardia and hypotension, were observed with carbetocin administration than with oxytocin, during Caesarean.
Keywords: Blood loss, Caesarean section, Carbetocin, Oxytocin, Blood transfusion.

A 10-Year Retrospective Study of Caesarean Delivery Trend at a Tertiary Hospital in Tanzanian

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Background: Caesarean delivery also known as Caesarean section (CS) is an essential life-saving strategy for both women and newborns but its current overuse constitutes a global health problem. In 1985, the WHO set a maximum CS rate (CSR) of 10% to 15%, beyond which there is no justification for better maternal and neonatal outcomes. This may not be the case in a tertiary facility like Muhimbili National Hospital (MNH) where high risk patients are referred for experts' care.
Methodology: This was a 10-year retrospective study of Caesarean deliveries conducted at the Muhimbili National Hospital in Tanzania. Data of all women who underwent both CS and vaginal births between 2014 and 2023 were consecutively collected from patients' registries by using a pre-tested checklist and later analysed using an SPSS software version 20 (SPSS, Inc. USA). Caesarean deliveries were added to vaginal births to obtain total deliveries. CSR was obtained by dividing the number CS by the number of total deliveries.
Results: Between 2014 and 2023 there were 65,094 deliveries, of which 34,064 were by CS resulting into an institutional CS rate of 52.3%. CS rate increased from 46.3% in 2014 to 65.2% in 2023. Majority of women were in the age group 20-34 years (73%), compared to 23% advanced maternal age and 4.1% teenagers. About 68% of parturients were multiparous while 30% underwent primary caesarean sections. About two-third (68%) of the CS were done on emergency basis. 92% of CS were done under single shot spinal anaesthesia. Previous uterine scar was the most frequent indication for CS (44.4%), followed by prolonged labour (13.5%).
Conclusion: Caesarean delivery rate at MNH is very high, about four-fold the maximum figures recommended by the WHO. The high CS rate was largely contributed to by the high volume of emergency procedures performed for repeat CS.
Keywords: . Caesarean delivery, Caesarean section rate, Retrospective study.

Comparison of Normal Saline and Ringer's Lactate Preloading for Prevention of Maternal Hypotension during Spinal Anaesthesia for Caesarean Section: A Randomized Controlled Trial

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Background: Fluid preloading before spinal anesthesia is a standard practice in Caesarean section to prevent spinal-induced hypotension. Normal saline (NS) and Ringer's lactate (RL) are the most commonly used crystalloids, but their relative effectiveness remains debated. Recent evidence suggests that NS may provide more stable haemodynamics and better acid–base balance in specific clinical contexts. This study aimed to compare the effectiveness of NS and RL in preventing maternal hypotension during Caesarean sections under spinal anesthesia, with a focus on haemodynamic stability, vasopressor requirement, and neonatal outcomes.
Methods: In this prospective, randomized controlled trial, 120 ASA II parturients undergoing elective Caesarean section under spinal anaesthesia were enrolled. Participants were randomized into two groups of 60 each: the NS group received 15 mL/kg NS preloading, and the RL group received 15 mL/kg RL. Blood pressure and heart rate were recorded at baseline and at regular intervals up to 30 minutes post-spinal block. Hypotension was defined as a >20% decrease from baseline systolic blood pressure and treated with intravenous ephedrine. Apgar scores at 1 and 5 minutes and any maternal side effects were recorded.
Results: Incidence of hypotension was significantly lower in the NS group (15%) compared to the RL group (35%) ($p < 0.05$). Mean systolic and diastolic blood pressures were more stable in the NS group, with fewer vasopressor interventions required ($p < 0.01$). Apgar scores were comparable between groups, and no adverse neonatal outcomes were recorded. Maternal side effects were minimal and similar in both groups.
Conclusion: NS was superior to RL in reducing the incidence of spinal-induced hypotension during Caesarean section, maintaining more stable haemodynamics, and reducing vasopressor use without compromising neonatal outcomes. NS may be considered the preferred crystalloid for preloading in elective obstetric spinal anaesthesia, although further multicentre trials are warranted to confirm these findings.
Keywords: Normal saline, Ringer's lactate, Caesarean section, Spinal anaesthesia, Hypotension, Maternal haemodynamics.

Effect of Application of Lower Limb Venous Compression on Maternal Blood Pressure during Caesarean Section under Spinal Anaesthesia

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Background: Maternal hypotension from spinal anaesthesia poses significant risks warranting continued search for effective prophylaxis. The aim of this study was to determine the effects of knee- high (KH) versus thigh-high (TH) sequential compression stockings (SCS) application on maternal blood pressure during Caesarean under spinal anaesthesia.
Methods: Ethical approval secured, 150 consenting parturients aged 18 - 45 years, of American Society of Anesthesiologists class II, for elective Caesarean, randomized into KH, TH, and control (CT) groups, of 50 each, wore knee-high (group KH), thigh-high (group TH) SCS including sham stockings, and sham stockings only (group CT). Following SCS inflation to 30-40 mmHg bilaterally, and 15 ml/kg 0.9% normal saline pre-loading, parturients received 2ml hyperbaric bupivacaine 0.5% plus 25µg fentanyl, intrathecally; maternal heart rate and blood pressures were recorded. $P<0.05$ was considered significant.
Results: All 150 parturients completed the study. Hypotension occurred greatest [44 (37.9%)] in group CT, followed by group KH [40 (34.5%)] and least [32 (27.6%)] in group TH, $p < 0.001$, with significantly greatest ephedrine consumption in group CT, $p = 0.008$.
Conclusion: Knee-High and Thigh-High SCS application significantly reduced the occurrence of maternal hypotension during Caesarean under spinal anaesthesia, with superiority of TH to KH, and minimal side effects.
Keywords: Caesarean section, Hypotension, Sequential compression stockings, Spinal Anaesthesia.

Determinant, Profile and Outcome of Obstetric Critical Care at Ile-Ife, Nigeria: A Five-Year Experience

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Background: Despite global advances in obstetric care, outcomes in LMICs remain poor. Profiling these cases is vital for guiding prevention and improving outcomes.
Method: This retrospective study analysed the obstetric cases requiring ICU admission at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria over a five-year, i.e., January 2020 to December 2024. Data were collected retrospectively from the ICU records, and patient folders. Descriptive statistics were used to analyse data.
Result: Out of 4,223 deliveries (57.2% CS, 42.8% SVD), 48 (1.2%) required ICU admission, comprising 32 (66.7%) CS and 16 (33.3%) SVD cases. The mean age was 30.8 ± 6.6 years. Indications were severe preeclampsia and eclampsia 28 (58.3%), sepsis 8 (16.7%), haemorrhage 5 (10.4%), sickle cell crises 4 (8.3%), and acute cardiac decompensation 1 (2.1%). The median ICU stay was 3 (IQR 2–6) days. Mechanical ventilation was indicated in 23 (47.9%), vasopressors 12 (25.0%) and blood transfusions in 14 (29.2%). There were 22 (45.8%) mortality. Acute cardiac decompensation and septic abortion had 100% mortality.
Conclusion: The high mortality noted demand improved preventive strategies and obstetric critical care capacity in Nigeria
Keywords: Obstetrics, Intensive care unit, Maternal morbidity, Maternal mortality.

Maternal and Neonatal Outcomes in IVF Pregnancies: Experience from a Private Obstetric Hospital in Port Harcourt

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Background: Pregnancies conceived through in vitro fertilization (IVF) are associated with higher risks of obstetric complications compared to spontaneous conceptions. Understanding maternal and neonatal outcomes is essential for optimising peripartum care in such cases. This study aimed at evaluating the maternal and neonatal outcomes of IVF pregnancies delivered in a private hospital in Port Harcourt.
Methods: A retrospective analysis of case records of IVF-conceived pregnancies delivered between 2020 and 2024. Data extracted included maternal age, parity, mode of delivery, obstetric complications, and neonatal outcomes.
Results: A total of 52 IVF pregnancies were reviewed. The mean maternal age was 36.2 ± 4.5 years. Caesarean section accounted for 86.5% of deliveries, while vaginal birth occurred in 13.5%. Maternal complications included intraoperative hypotension (18.3%), postpartum haemorrhage (9.6%), and wound sepsis (5.8%). Neonatal outcomes were generally favourable, with 87.5% of babies recording APGAR scores ≥7 at 5 minutes. Preterm delivery accounted for 12.5% of NICU admissions.
Conclusion: IVF pregnancies in this setting were characterised by advanced maternal age, high caesarean delivery rates, and notable maternal and neonatal complications. Strengthening multidisciplinary care and improving neonatal support services are essential to optimise outcomes.
Keywords: In-vitro fertilisation, Maternal outcomes, Neonatal outcomes, Caesarean section, Nigeria.

Anaesthetic Management and Perioperative Challenges in IVF Pregnancies: A Retrospective Review in Port Harcourt

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Background: IVF pregnancies present unique anaesthetic considerations, often complicated by advanced maternal age, multiple gestations, and pre-existing comorbidities. Careful anaesthetic planning is crucial for safe maternal and neonatal outcomes.
Aim: To review anaesthetic techniques, perioperative challenges, and outcomes in women with IVF pregnancies undergoing delivery in a private hospital in Port Harcourt.
Methods: Retrospective review of IVF pregnancies delivered between January 2019 and June 2024. Information obtained included anaesthetic technique, intraoperative complications, conversion rates, and perioperative outcomes.
Results: Sixty-four IVF-conceived pregnancies were analysed. Spinal anaesthesia was the predominant technique (79.7%), followed by general anaesthesia (12.5%) and combined spinal-epidural (7.8%). Intraoperative challenges included maternal hypotension (20.3%), difficult neuraxial placement (6.2%), and failed spinal block requiring conversion to general anaesthesia (3.1%). Difficult airway management occurred in 4.7% of cases. Neonatal outcomes were favourable in 91.0% of cases, with only 9.0% requiring NICU admission.
Conclusion: Anaesthetic care of IVF pregnancies is associated with specific challenges, including increased rates of neuraxial difficulty and perioperative hypotension. Adequate preparation, early anticipation of complications, and skilled anaesthetic support are critical to ensuring safe outcomes for both mother and neonate.
Keywords: Anaesthesia, In-vitro fertilisation pregnancies, Perioperative care, Obstetric anaesthesia, Port Harcourt.

PASoN 2025 CONFERENCE ABSTRACT PROCEEDINGS

Abstracts Presented at the 3rd Annual Scientific Conference of Paediatric Anaesthesia Society of Nigeria (PASoN) held Virtually from 17th to 18th September 2025.

Effect of Two Different Doses of Oral Midazolam Premedication on Separation Anxiety in Children Scheduled for Herniotomy

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Background: Perioperative separation anxiety in children entails adverse cognitive-behavioural outcome, necessitating anxiolytic intervention.
Aim: To assess the effects of two different doses of oral midazolam premedication on separation anxiety in paediatric patients scheduled for herniotomy.
Methods: Eighty-four children aged 1 - 6 years, of American Society of Anesthesiologists class I or II, scheduled for herniotomy, were randomized into two groups, A and B, of 42 each after ethical clearance and parental consent. Group A and Group B received, respectively, 0.5mg/kg and 0.75mg/kg oral midazolam flavoured with paracetamol syrup, and later separated from parents at 30minutes post-premedication. Separation anxiety was assessed using the Richmond Agitation Sedation Scale (RASS). Statistical significance was set at $p<0.05$.
Results: A greater proportion of children in Group B, relative to A ($p=0.0001$), showed higher sedation scores at 15 minutes (RASS 2: 61.9% versus 57.1%; RASS 3: 38.1% versus 0.0%) and at 30 minutes (RASS 2: 9.1% versus 47.6%; RASS 3: 80.9% versus 52.4%), post-premedication.
Discussion: Optimal sedation is critical to achieving zero agitation that is desirable in Paediatric Anaesthesia practice. Pharmacokinetically, enterally administered benzodiazepines undergo significant first-pass metabolism, hence, the demonstrated superiority of oral 0.75mg/kg midazolam to 0.5mg/kg is attributable to a dose-related superior compensation for hepatic metabolism, with net greater drug bioavailability.
Conclusion: Oral 0.5 mg/kg and 0.75mg/kg midazolam demonstrated comparable onset of sedation; however, the 0.75 mg/kg dose achieved significantly higher level of sedation in a greater proportion of the subjects.
Keywords: Midazolam, Oral premedication, Separation anxiety.

Challenges of Paediatric Anaesthesia in Low-Resource Settings: A Narrative Review

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Background: Paediatric anaesthesia presents unique physiological and pharmacological considerations that demand specialized expertise, equipment, and protocols. In low-resource settings, these requirements are often unmet, creating significant challenges for safe and effective perioperative care. Limited availability of trained personnel, inadequate infrastructure, and lack of essential drugs and monitoring devices further complicate anaesthetic management for children.
Aim: This review aims to highlight the key challenges faced in delivering safe paediatric anaesthesia in low-resource settings and to explore potential strategies for improvement.
Methods: A narrative review of literature was conducted using PubMed, Google Scholar, and relevant regional databases. Publications from the last 15 years focusing on paediatric anaesthesia in resource-limited environments were reviewed. Key themes identified included workforce capacity, training, equipment availability, pharmacological limitations, perioperative monitoring, and outcomes.
Results: The review revealed several recurring challenges:
Human resource constraints: Shortage of paediatric anaesthetists and inadequate training opportunities.
Infrastructure gaps: Limited access to paediatric-sized airway devices, ventilators, monitoring equipment, and recovery facilities.
Drug limitations: Restricted availability of essential anaesthetic agents, opioids, and resuscitation medications.
Perioperative risks: Higher incidence of critical events such as airway difficulties, hypoxia, and medication errors.
Systemic barriers: Lack of standardized protocols, poor referral systems, and weak perioperative data collection for quality improvement.
Conclusion: Paediatric anaesthesia in low-resource settings remains fraught with challenges that compromise safety and outcomes. Addressing these requires a multifaceted approach: investment in workforce training, development of context-specific guidelines, provision of essential equipment and drugs, and establishment of continuous audit and quality improvement programs. Strengthening collaborations between high- and low-resource centres can also support capacity building and knowledge sharing.
Keywords: Paediatric Anaesthesia, Low-Resource Settings, Challenges, Patient Safety, Global Health.

Effect of Two Regimen of Rectal Diclofenac on Post Adenotonsillectomy Pain in Children

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Background: Rectal diclofenac is a potent analgesic suitable for paediatric post adenotonsillectomy pain management, however, search for the optimal regimen continues.
Aim: To determine the post adenotonsillectomy analgesic effect of **s**ingle versus divided dose regimen of rectal diclofenac in children.
Methods: Following approval and parental consent, 50 children, belonging to American Society of Anesthesiologists class I and II, aged 1 – 6 years, randomized into groups A and B, of 25 each, had general anaesthesia induced with propofol and maintained with isoflurane in Oxygen, and received suppository diclofenac 2 - 3mg/kg rectally, either in two divided doses (Group I) 12hours apart (first dose at induction), or as single dose at induction (Group II). Postoperatively, analgesic was administered when FLACC (Face, Leg, Activity, Cry, Consolability) score was ≥ 4. P-value<0.05 was considered significant.
Results: Group I, compared to II, had significantly longer analgesic duration (7.82±1.18 versus 5.42±1.19, $P = 0.0081$), with significantly less 24-hour analgesic consumption, $P = 0.0044$, and 0.0003.
Discussion: A larger single rectal dose of suppository diclofenac, likely resulting in greater rate of drug absorption into the systemic circulation, attracting greater enzymatic drug degradation rate and consequent faster decline in bioavailability, in the event that timely repeat dosing did not occur, may underpin the observed difference between the two groups.
Conclusion: Suppository 2 - 3mg/kg diclofenac administered rectally in two divided doses, at induction and 12hours later, achieved significantly more prolonged postoperative analgesia compared to single equivalent dose.
Keywords: Different regimen, Rectal diclofenac.

Sedative and Analgesic Effects of Midazolam with Fentanyl or Ketamine in Paediatric Day Case Orthopaedic Procedures

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Background: Fractures/ dislocation are common procedures managed in emergency department. Successful management requires adequate sedation/ analgesia for anxiety/pain control.
Aim: To compare the sedative and analgesic effect of fentanyl or ketamine with midazolam during pediatric day case orthopaedic procedures.
Methods: A prospective randomized trial involving 70 paediatric patients for day case orthopaedic procedures. Participants were randomized into two groups of 35. Each group received fentanyl or ketamine midazolam. The outcomes included distress and anxiety, sedation depth, pain scores, side effects and recovery time.
Results: More children in F/M group had severe pain 75.3% compared with 68.6% in K/M subjects Sedation depth were similar in both study groups. Pain score, recovery time, side effects and haemodynamics were comparable with a significantly lower level of OSBD-r scores in K/M subjects compared with F/M subjects.
Discussion: Most patients were male. More male patients had fractures injuries which were commoner in children aged 8-12 years. Sedation depth were comparable except at 30 minutes post - procedure when there was lower sedation depth in K/M subjects. Pain score and recovery time were comparable in both groups with significantly higher level of OSBD-r score in F/M group. Emergence agitation were comparable between both study groups compared to other studies. Success rate of procedure were similar in both groups with all fracture reduction done at first attempt.
Conclusion: K/M and F/M provided comparable sedation depth and analgesia with stable haemodynamics. Level of distress and anxiety was significantly lower in the K/M subjects.
Keywords: Paediatric sedation, Ketamine, Fentanyl.

Neonatal Anaesthesia for Colostomy in University of Calabar Teaching Hospital (UCTH): A Case Series and Review of Current Practices and Outcome

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Background: Colostomy is the creation of an opening in the large bowel to divert faeces & flatus to the exterior where it can be collected in an external appliance. This is a temporary measure pending when the definitive surgery {(Posterior Sagittal Anorectoplasty (PSARP)} is done. Neonates presenting for colostomy have unique anaesthetic risks due to immature organ systems, narrow cardiopulmonary reserve, thermolability, fluid/blood shifts, and high postoperative morbidity.
Aim: We seek to outline through this case series the current practice of anaesthetic care in our center and the outcome of such cases.
Case 1:3-day-old PTLBW male, BW 1.94kg, GA-33 weeks with ARM and urinary fistula. Had colostomy on the 4th day of life under GA with LMA He recovered well and was discharged on Day 10 post op .
Case 2:18-day-old term female, ARM and RVF. Had colostomy on the 25th day of life under GA with endotracheal intubation. She had another wound repair on day 7 post op following wound breakdown. She recovered well and was discharged on Day 16 post op.
Case 3:9-day-old term female, with ARM and perineal fistula. Had colostomy on the 15th day of life under GA with endotracheal intubation. She recovered well and was discharged on day 15 post-op.
Discussion: These neonates had an NGT insitu, were on NPO, had no other congenital anomaly, received IVF and antibiotics. Induction was with inhalational agent- halothane/sevoflurane, maintained with ketamine 0.5mg/kg, paracetamol 10mg/kg, fentanyl 2mcg/kg. They were manually ventilated. Surgeries lasted averagely for 75 minutes. They were extubated in the operating room post operatively. They were stable with no anaesthetic complications. Parents were all counselled and were all schedules to seen in clinic for follow up.
Conclusion: Prompt diagnosis and treatment is essential for improving outcomes in neonates with ARM. Availability of inhalational anaesthesia and multimodal analgesia contributes to good surgery outcome.
Keywords: Anorectal malformation, Colostomy, Neonatal anaesthesia.

Difficult Airway Management in a Child with Treacher Collins Syndrome and Cleft Palate: Experience from Lagos, Nigeria

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Background: Treacher-Collins syndrome (TCS) is a rare autosomal dominant disorder with an estimated incidence of 1 in 50,000 live births[1]. It is characterized by craniofacial malformations; micrognathia and retrognathia, small oral aperture, severe temporomandibular joint abnormalities. Up to 40% of patients present with congenital palatopharyngeal incompetence, and some have cardiovascular malformations. Anaesthesia for patients with Treacher Collins syndrome can be challenging due to their craniofacial abnormalities and potential difficult airway. Its association with cleft palate increases the difficulty in airway management.
Aim: We describe our successful airway management of a child with TCS employing advanced airway equipment.
Case Report: A 16-month-old male patient with TCS and bilateral cleft of palate presented for primary palatorrhaphy. Glycopyrrolate 0.07mg/kg was administered to dry secretions prior to induction. Anaesthesia was induced with sevoflurane 8% MAC and intravenous atracurium 0.5mg/kg. Oxygen was insufflated via nasal catheter at 3L/min during intubation. Initial fiber optic intubation (FOI) was unsuccessful as the flexible distal tip got lodged within the cleft, subsequent second attempt was successfully performed. The deployment of video assisted laryngoscopy and Mccoy laryngoscopy were both unsuccessful as Cormack and Lehane grade was IV. An improvised nasopharyngeal airway was inserted before extubation and prevented the development of post-operative airway obstruction.
Conclusion: Airway management of patients with TCS is challenging. Difficult airway management plan should be discussed by the team before the induction of anaesthesia. Proficiency in performing FOI can reduce the perioperative risk associated with their airway management. The use of a nasopharyngeal airway helped prevent post-operative airway obstruction.
Keywords: Treacher-Collins syndrome, Bilateral cleft palate, Pharyngeal hypoplasia, Difficult airway, Fiber optic bronchoscope.

Analgesic Effects of Caudal Versus Intravenous Dexamethasone on Bupivacaine Based Caudal Block for Paediatric Infraumbilical Surgeries

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Background: Single shot caudal block provides short-lived postoperative analgesia necessitating continued exploration for adjuvants.
Aim: To determine the analgesic efficacy of intravenous versus caudal dexamethasone on bupivacaine-based caudal block for paediatric infraumbilical surgeries.
Methods: Following Ethical clearance and parental consent, 69 children aged 1 - 6 years, of American Society of

Anesthesiologists classification I and II, randomized into groups A, B and C, of 23 each, underwent general anaesthesia induced with propofol and maintained with isoflurane in 100% oxygen, and had caudal block with 1ml/kg bupivacaine 0.25%. Additionally, groups B and C received caudal 0.1mg/kg and intravenous preinduction 0.25mg/kg dexamethasone, respectively. Postoperatively, analgesic was given when FLACC (Face, Leg, Activity, Cry, Consolability) score was ≥ 4. P < 0.05 was considered significant.

Results: The mean durations of analgesia (in minutes) recorded were 485.40±24.50 (Group B), 459.60±36.40 (group C), and 253.63±71.55 (group A), p = 0.001, 0.024 and 0.968 for A versus B, A versus C and B versus C, respectively, with greatest 24-hour pethidine consumption in Group A, p = 0.001 (A versus B) and p = 0.025 (A versus C).

Discussion: The observed prolongation of neuraxial analgesia by preoperatively administered dexamethasone is attributable to its anti-inflammatory actions, suppressing the development of hyperalgesic state in spinal pain transmission pathways, through antagonism of pro-inflammatory prostaglandin synthesis from arachidonic acid in damaged tissues.

Conclusion: Caudal 0.1mg/kg or intravenous 0.25mg/kg dexamethasone combined with bupivacaine demonstrated comparable analgesic profile that was superior to control, without adverse effects.

Keywords: Caudal block, Dexamethasone, Infraumbilical surgeries.

Anaesthetic Management of a Child with a Massive Retroperitoneal Mass: An Ordeal

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Background: Anaesthetic management of a patient with massive abdominal distention is associated with unique challenges. Careful preoperative planning and good team dynamics are required.[1,2]

Aim: We report a 10-year-old boy with massive intra-abdominal mass scheduled for exploratory laparotomy for a suspected malignancy.

Case Report: A 10-year-old boy with massive intra-abdominal mass was scheduled for exploratory laparotomy for a suspected malignancy Abdominal swelling started a year prior and progressively enlarged.

On examination, he appeared chronically ill, dehydrated, and pale with pedal oedema up to the sacrum. Abdomen was grossly distended with visible superficial veins. He could only tolerate the sitting position, was unable to lie supine. There was increased work of breathing with dyspnoea and tachypnoea (RR of 32cpm), reduced air entry in the lower lung zones posteriorly, oxygen saturation of 98% on a non-rebreather mask, pulse rate 120bpm and blood pressure 77/43mmHg.

Investigation results revealed HB:9.2g/dl, PCV:32%, WBC:13.7/mm^3, PLT:273/mm^3. Normal LFTs and clotting profile. Abdominal USS showed a cystic and solid mass. Preoperative team meeting was done.

In the theatre he was positioned sitting on the operating table. 20ml/kg of Ringer's lactate was administered, before preoxygenation and induction in the sitting position using ketofol and suxamethonium. The laryngoscopist stood behind and over the patient, using a short stool for elevation. A videolaryngoscope was used to achieve tracheal intubation. Anaesthesia was maintained with isoflurane 0.7-1%MAC, 50% oxygen/medical air and manual ventilation until the mass was removed.

During surgery, he was placed in the semi-recumbent position with lateral displacement of the abdomen., as attempts at supine or lateral positioning resulted in significant circulatory collapse and oxygen desaturation.

Surgery lasted 6 hours, blood loss 1.2L, transfusion of 5 units whole blood and one FFP, tranexamic acid administered. He received 6L Ringer's lactate, made 1.2L of urine. Analgesics were paracetamol, fentanyl and morphine, and he also received aliquots of ephedrine and adrenaline (1:100,000) as needed.

Table I - Intra operative vital signs

Vital sign	Value
Heart rate (b/min)	78 - 158
Blood pressure (mmHg)	51 – 148/ 31 - 101
SpO_2 (%)	88 -98
Random blood glucose (mg/dl)	135 - 162
Temperature (℃)	35.9 – 36.9

Postoperatively, he was successfully extubated and monitored in the intensive care unit for 48 hours and discharged home after a two-week hospital stay.

Discussion and Conclusion: This case highlights the importance of creating a plan, good communication and collaboration across teams during peculiar cases. Tracheal intubation in a sitting position is a valuable technique when supine position is associated with significant risks.

Keywords: Massive retroperitoneal mass, massive abdominal distention, Tracheal intubation, Sitting position, Video laryngoscopy.

From Operating Theatre to Intensive Care to Diaper: A Case of Spontaneous Foreign Body Passage in a Child

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Background: Foreign body ingestion is a common paediatric emergency, with the oesophagus being a frequent site of impaction. The management typically involves endoscopic or surgical retrieval, particularly when the object is sharp, large, or lodged. However, spontaneous passage remains a possible but unpredictable outcome.

Aim : We report a case of a 2-year old child with suspected oesophageal foreign body with spontaneous passage through the gastrointestinal tract.

Case Report: We report a case of a 2-year-old child who presented with suspected oesophageal foreign body ingestion. Clinical assessment and imaging suggested impaction, and the child was scheduled for operative removal. At induction of anaesthesia, there was difficulty in laryngoscopy, which necessitated multiple attempts and subsequently bronchospasm occurred. He was resuscitated for that with subcutaneous adrenaline, deepening of inhalational anaesthetics and suxamethonium. He remained stable and the surgery was deferred. The child was subsequently admitted into the intensive care unit (ICU) for stabilization and monitoring. During ICU stay, the child remained stable without signs of obstruction or perforation. Surprisingly, the foreign body was later discovered in the child's diaper, confirming spontaneous passage through the gastrointestinal tract without intervention.

Discussion: This case highlights the diagnostic and management challenges in paediatric foreign body ingestion. While urgent endoscopic or surgical retrieval is often warranted, there are instances where conservative management may result in spontaneous passage, avoiding invasive procedures. The occurrence also underscores the importance of individualized decision-making, close observation, and readiness to adapt management strategies in paediatric anaesthesia and critical care practice.

Conclusion: Spontaneous passage of an oesophageal foreign body, though uncommon, is possible. This case emphasizes the need for vigilance, multidisciplinary collaboration, and careful consideration before proceeding with invasive interventions in children with foreign body ingestion.

Keywords: Foreign body ingestion, Oesophagus, Child, Spontaneous passage.

Foreign Body Removal in a 2-year-old Male using General Anaesthesia with Endotracheal Intubation and Tracheostomy with Relaxant Technique: A Case Report

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Background: Foreign body aspiration is a critical emergency in paediatric patients that can cause significant respiratory distress. Timely and controlled removal is essential to prevent morbidity and mortality.
Aim: To report on the anaesthesia management of a child with inhaled foreign body.
Case Report: A 2-year-old male with respiratory distress following aspiration of a metallic chain underwent urgent bronchoscopy and foreign body extraction under general anesthesia. Controlled ventilation and optimal airway management were maintained throughout. The metallic chain was successfully removed without intraoperative complications. Postoperatively, the patient was stable with normal vital signs, transferred to the high dependency unit for monitoring and subsequently to ENT ward for tracheostomy care.
Discussion: Management of the paediatric airway poses some challenges which is further aggravated by airway compromise resulting from foreign body aspiration. Muscle relaxants in pediatric airway foreign body removal provide controlled ventilation and reduce airway reflexes, improving surgical conditions and patient safety.
Conclusion: Tracheostomy may be necessary to optimize access and airway security in difficult cases. Multidisciplinary coordination and perioperative planning are crucial for successful outcomes.
Keywords: Foreign body aspiration, Pediatric anesthesia, Tracheostomy, Muscle relaxant technique.

Anaesthetic Management of Paediatric Patients for Ophthamology Procedures - Chart Review

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Background: Anaesthesia for paediatric ophthalmology surgery involves careful management to ensure the safety and comfort of the child during the procedure.
Aims: To assess the extent of difficulty airway during induction of anaesthesia**,** evaluate intraoperative pain management strategies and determine the incidence of critical events.
Methods: This was a retrospective study of paediatric patients undergoing ophthalmic procedures under general anaesthesia at the University College Hospital Ibadan between January 2020 and December 2024.
Results: A total of 413 paediatric ophthalmology cases were done under general anaesthesia. There were 267 (64.6%) males and 146 (35.3%) females with highest age distribution in school age (29.7%), ASA I (75.3%), II 23.3%, III (1.5%). The weight distribution range 7.5kg to 35kg.
The Mallampati score I (53.3%) II (34.9%), III (2.4%) and Mallampati not done in 9.4% mostly among infants. The correlation of the laryngoscope grade 1 (57.4%), 2 (39.7%), 3 (2.7%), and 4 (0.24%- which was noted in a 3-year-old). The pain management strategies included Fentanyl-paracetamol 34.9%, Pentazocine-paracetamol 32.9%, morphine-paracetamol 17.2%, and paracetamol only 15%. There were no intraoperative critical events recorded. The commonest surgery was cataract surgery.
Conclusion: A balanced anaesthesia is essential for safe paediatric anaesthesia. Despite age related difficult airway during intubation, with good technique, a smooth intubation is achievable in paediatrics patients.
Keywords: Anaesthesia, Airway, Ophthalmology, Paediatrics.

An Overview of Anaesthetic Management of Tracheo-Oesophageal Fistula in Nigeria (AMTOF Study)

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Background: Congenital Tracheo-oesophageal Fistula (TOF) has a worldwide incidence of 1:3-4000 live births. Single centre studies in Nigeria demonstrated high mortality and intra-operative deaths[1,2].
Aim: We evaluated our current outcomes in a larger study population across Nigeria.
Methods: This on-going one-year observational study across the six geo-political zones of Nigeria commenced November 2024. Twenty-two centres who performed TOF repair by paediatric or cardiothoracic surgeons were invited to participate. After obtaining institutional ethical approval, each participating centre registered 1 - 2 consultant anaesthetists and 1 surgeon. A whatsapp group was created and regular updates were provided by the country Lead. Data collected using RedCap included demography, clinical assessment, surgery and peri-operative care. Primary outcome was mortality. Descriptive statistics were employed to analyse the data.
Results: Fifteen centres obtained ethics clearance and participated in the study with 29 anaesthetists. Eleven centres recruited 22 neonates for 23 procedures after parental consent. Majority were males (63.6%) and Type C TOF (86.4%). Primary repair was done in ten patients (45.45%). More neonates (78.3%) were extubated post-operatively. Nine (39.1%) were admitted to ICU, 56.5% to PACU then the ward and 4.3% died intraoperatively. ICU mortality was 55.5% and ward mortality 46.15%. Primary repair had higher mortality (80%) than staged repair (46.15%), (p=0.99). Overall mortality was 63.36%. Sepsis caused 53.8% of deaths.
Discussion: TOF repair still has a high mortality rate in Nigeria. Sepsis is a major cause of death in this study as demonstrated by other studies from L&MICs[1,2,3]. Postoperative management needs improvement.
Keywords: Nigeria; Trachea-oesophageal fistula; Anaesthesia; Outcome.

Awake Regional Anaesthesia in Paediatric Patients Undergoing Upper-Limb Surgeries

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Background: Regional anaesthesia has gained popularity among anaesthetists to facilitate awake surgery more especially in adult patients. However, it is rarely used as the sole anaesthetic technique in children. Its advantages include early detection of local anaesthetic toxicity, decreased risks associated with general anaesthesia and providing good postoperative pain relief.
Aim: We present our experience of awake regional anaesthesia in paediatric upper limb surgeries.
Methods: Children aged between 10 and 16 years who required upper limb surgery were selected. Peripheral regional anaesthesia with 0.5% ropivacaine was administered with ultrasound guidance. To reduce anxiety, patients were continuously counselled and reassured. A combination of midazolam 1-2mg and fentanyl 20-40µg was given only if necessary.
Results: A total of 42 patients participated in the study. 36 (85.7%) had a successful awake surgery with peripheral regional anaesthesia. With increasing age, the success rate rose from 14 (40%) in 10-12-year-olds to 22 (100%) in older patients, 13–16-year-olds. The administration of peripheral regional anaesthesia was difficult in 8 (19%) of the patients. No complications were recorded.
Conclusion: The use of regional anaesthesia as the sole anaesthetic technique in older children is feasible, safe, and beneficial.
Keywords: Awake, Regional Anaesthesia, Paediatrics, Ropivacaine.

Anaesthetic Challenges and Outcome of Posterior Sagittal Anorectoplasty (Psarp) for Anorectal Malformations: Our Experience in Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria

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Background: Posterior sagittal anorectoplasty (PSARP) is the preferred surgical technique for the repair of anorectal malformations (ARM) in children. Anaesthetic management in these patients is challenging due to factors such as associated congenital anomalies, difficult airway, neonatal physiology, hypothermia, and perioperative sepsis. In resource-limited settings, these challenges are further compounded by delayed presentation and inadequate perioperative facilities.
Aim: This study reviews our institutional experience in managing children with ARM undergoing PSARP.
Methods: We conducted a retrospective review of paediatric patients with ARM who underwent PSARP at the Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria, between January 2019 and December 2023. Data extracted included demographics, associated anomalies, anaesthetic techniques used, intraoperative challenges, postoperative complications, and outcomes.
Results: A total of 64 patients underwent PSARP during the study period. The mean age at surgery was 8.5 months (range: 2 months – 3 years). Associated anomalies were present in 28% of cases, with genitourinary anomalies being the most common. General anaesthesia with endotracheal intubation was employed in 95% of patients, while caudal analgesia was used in 60% for postoperative pain relief.
Major intraoperative challenges included difficult intravenous access (34%), intraoperative hypothermia (19%), and desaturation episodes (15%). Postoperative complications observed were wound infection (12%), respiratory complications (9%), and electrolyte imbalance (6%). Overall survival rate was 92%, with mortality observed in patients with severe associated anomalies and sepsis.
Conclusion: Anaesthetic management of PSARP in children with anorectal malformations is associated with significant challenges, particularly in resource-constrained settings. Early identification of associated anomalies, meticulous perioperative planning, and the use of regional analgesia techniques can improve outcomes. Strengthening paediatric anaesthesia capacity and perioperative care facilities in Nigeria is crucial for enhancing surgical safety and long-term prognosis in these patients.
Keywords: Anaesthestetic Challenges, Outcomes, Posterior Sagittal Anorectoplasty, Anorectal malformations.

A Case Series of Bilateral Herniotomy in 3-5yr olds Performed Under Caudal Block with Sedation: An Effective and Safe Anaesthetic Approach

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Background: Bilateral inguinal herniotomy in pediatric patients requires anesthesia that ensures effective analgesia and patient comfort. Regional techniques like caudal epidural block with sedation offer opioid-sparing benefits and reduced airway manipulation compared to general anesthesia.
Aim: To present our experience with caudal block and sedation for bilateral herniotomy in children.
Case Series: Four children, aged 3 - 5 years, underwent bilateral herniotomy under caudal epidural anesthesia combined with sedation. Continuous intraoperative monitoring of cardiovascular and respiratory parameters was performed. Postoperative pain control and complications were assessed. All cases were completed successfully without conversion to general anesthesia. Cardiovascular and respiratory stability were maintained throughout surgery. Effective and prolonged postoperative analgesia was achieved, minimizing opioid use. No adverse events such as local anesthetic toxicity, motor blockade, or neurological deficits were observed.
Conclusion: Caudal epidural block with sedation is a safe and effective anesthetic approach for bilateral herniotomy in young children, providing targeted analgesia and maintaining spontaneous ventilation. This technique reduces perioperative respiratory complications and opioid consumption, promoting smoother recovery. Skillful performance and vigilant monitoring remain essential for safety.
Keywords: Bilateral herniotomy, Caudal epidural block, Pediatric sedation.

Respiratory Effect of Repeated Doses Of Fentanyl in a Child Undergoing Adenotonsilectomy

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Background: Acute and chronic pains are treated with opioids such as fentanyl. Individuals may have variations in opioid induced side effects due to individual biological factors, drug interactions, and patient comorbidity. Respiratory depression following repeated doses of fentanyl is reversed using naloxone.
Aim: To emphasize the respiratory effect that may occur in children when repeated doses of fentanyl are used.
Case report: A 2-year-old child was booked for adenotonsillectomy following diagnosis of obstructive adenotonsillar disease. Preoperative review certified the child fit for surgery and anaesthesia. Induction was with intramuscular ketamine and atropine at the doses of 5mg/kg and 0.02mg/kg respectively in the preparation room. The child was taken to the theatre after 3 minutes. Oxygen was given via facemask and intravenous access was established. Intravenous fentanyl 3mcg/kg and muscle relaxant, suxamethonium, 2mg/kg were given before endotracheal intubation. Maintenance of anaesthesia was with isoflurane. Pancuronium, 0.08mg/kg, was given to maintain muscle relaxation. A repeat of similar dose fentanyl was made 35 minutes into the surgery. At the end of the surgery which lasted for 60 minutes, a reversal of the muscle relaxant was made using neostigmine with atropine. The child could not make any respiratory effort about 15 minutes after reversal in spite of all the manipulations. Suspected opioid respiratory effect was reversed with intravenous naloxone 2mcg/kg and the respiratory effort of the child was restored.
Conclusion: The absence of respiratory effort after the use of fentanyl intraoperatively requires opioid antagonist, naloxone, to reverse the respiratory side effect.
Keywords: Respiratory effect, Fentanyl, Adenotonsillectomy, Naloxone.

Determination of Skin-to-Epidural Distance in Nigerian Children

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Background: Determining the skin-to-epidural distance (SED) is crucial for safe and effective analgesia devoid of complications in children. Pre-determined formulas and ultrasonography measurements have been used, but their reliability in Nigerian children have not been fully validated.
Aim: To compare actual SED with formula-derived and ultrasound-derived measurements in Nigerian paediatric patients.
Methods: This on-going descriptive cross-sectional study recruited 12 children aged 1–15 years who required lumbar epidural analgesia. The actual SED was measured during epidural needle placement and compared with values obtained using a pre-determined weight-based formula (1mm/kg) and pre-procedural ultrasonography measurements. Data were analyzed for mean values, mean differences, and statistical significance.
Results: Twelve patients studied had mean values of age 74.00 ± 34.66 months, height 115.54 ± 22.63cm, and weight 20.96 ± 8.66 kg. The mean SED values were: USS 1.99 ± 0.62 cm,

formula-derived 2.25 ± 0.95 cm, and actual 2.07 ± 0.73 cm. The mean difference between USS and formula derived SED was -0.26 ± 0.47cm (p = 0.136), between USS and actual SED was -0.78 ± 0.20 cm (p = 0.274), and between formula-derived and actual SED was 0.063 ± 0.45 cm (p = 0.643). Five (55.6%) USS measurements exactly matched actual SED compared to 1 (8.3%) with formula (p = 0.177)

Conclusion: In Nigerian children, ultrasound provides a more reliable approximation of skin-to-epidural distance compared with the pre-determined weight-based formula of (1mm/kg) and may thus improve the safety of paediatric epidural procedures.

This study was funded by a TETfund research grant.

Keywords: Skin-to-epidural distance, Pre-determined formula, Ultrasonography, Actual measurement,Paediatric anaesthesia.

Management of an 18-Month-Old with Severe Obstructive Sleep Apnoea Complicated by Respiratory Arrest

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Background: Adenotonsillar hypertrophy is a major cause of pediatric obstructive sleep apnea (OSA). Severe cases may progress to pulmonary hypertension, malnutrition, growth impairment, and life-threatening airway obstruction. Airway management in such children poses significant risks, particularly in resource-limited settings. Multidisciplinary coordination is essential for preventing morbidity and mortality.

Aim : We present our management of a child with severe obstructive sleep apnoea scheduled for adenotonsillectomy.

Case Report: An 18-month-old female was admitted with adenotonsillar hypertrophy, OSA pulmonary hypertension, moderate chronic malnutrition, and a 2-month history of neonatal intensive care admission. During ENT evaluation, she developed severe laryngospasm with respiratory arrest. Initial intubation attempts by the ENT failed; the anesthesia team secured the airway with endotracheal intubation and commenced mechanical ventilation. Airway findings included grade 4 inflamed tonsils.

Subsequently, she was sedated with fentanyl and propofol. Later vecuronium was removed. Supportive care included antibiotics and dexamethasone. Oxygen requirements improved, FiO_2 reduced from 80% to 60% hepatomegaly decreased, and fever subsided within 24 hours. She was successfully extubated after 36 h and discharged 5 days later with no neurological deficit to ENT for follow-up.

Discussion: This case demonstrates the high risk of airway compromise in children with severe adenotonsillar hypertrophy and OSA. Laryngospasm during ENT examination is a known but life-threatening complication, especially in patients with pulmonary hypertension. Successful intubation by the anesthesia team was critical, highlighting the importance of multidisciplinary collaboration in paediatric airway emergencies. Sedation and mechanical ventilation strategies were carefully tailored to minimize further airway obstruction while maintaining adequate oxygenation and hemodynamic stability.

Conclusion: This case underscores the critical importance of multidisciplinary collaboration, early recognition and anesthesia involvement, timely pediatric intensive care interventions, and structured weaning strategies in management of pediatric patients with severe OSA in resource-limited hospitals to reduce morbidity and mortality.

Keywords: Obstructive sleep apnea, Adetonsillar hypertrophy, Paediatric airway.

Experience in Monitored Anaesthesia during Tracheostomy in an Infant with Oral Tumour

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Background: Extensive oral tumours in infant make airway assessment difficult for the anaesthetists and monitoring patient may be the only option left during tracheostomy as an alternative airway approach.

Aim: To demonstrate the experience in monitored anaesthesia during tracheostomy in an infant.

Case Report: A 9month old boy, brought to University of Nigeria Teaching Hospital (UNTH) Enugu, with extensive oral tumour. The oral tumour started around the 3rd month after birth. The nose almost completely obliterated by the tumour. Informed and high risk consents were obtained. The Ear Nose and Throat (ENT) surgeons were invited for tracheostomy. Arrangement for intensive care unit admission was made. Fasting guideline was followed. The patient was restless and filled with anxiety and could only be lulled by the mother. Intravenous access secured with the help of the mother. Aside intranasal oxygen, intravenous paracetamol and dexamethasone were also given as premeditations. Every necessary arrangement was made for quick commencement of general anaesthesia after tracheostomy. Vital signs were monitored. The mother was allowed to be with him in the theatre during anterior neck local infiltration for tracheostomy. She waited outside thereafter before the incision for tracheostomy. There was no form of sedation; instead, the presence of the mother, oxygenation, systemic analgesics and close monitoring were used during tracheostomy procedures.

Conclusion: Tracheostomy in infant with extensive oral tumor is difficult but can be facilitated by the presence of the mother to calm the child, oxygenation, systemic analgesics and close monitoring.

Keywords: Experience, Monitored anaesthesia, Tracheostomy, Oral tumour.

Comparison of Rectal Versus Oral Midazolam and Ketamine for Premedication in Children Undergoing Herniotomy

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Background: Preoperative anxiety is a common challenge in paediatric surgical patients and their caregivers. Sedative premedication is commonly used to reduce this anxiety in children, but the route of administration may affect both efficacy and acceptability.

Aim: This study compared the sedative and anxiolytic effects of a midazolam-ketamine combination administered orally versus rectally in children undergoing herniotomy, focusing on drug acceptance, sedation quality, and perioperative outcomes.

Methods: A prospective randomized controlled trial was conducted at the National Hospital Abuja with 60 ASA I or II children scheduled for herniotomy. Participants were randomly assigned to receive midazolam (0.5 mg/kg), ketamine (5 mg/kg), and atropine (0.02 mg/kg) via either the rectal (MKR) or oral (MKO) route. Drug acceptance was assessed using the Drug Acceptance Scale (DAS), sedation via the Modified Observer's Assessment of Alertness and Sedation (MOAA/S) scale, and behavior during parental separation and mask placement using the Parental Separation Anxiety Scale (PSAS) and Mask Acceptance Scale (MAS). Data was analyzed using SPSS v 26.0 with significance set at $P < 0.05$

.**Results:** Demographics were similar. MKR group showed better sedation at 30 minutes (P=0.018), with 20% reaching target score versus none in MKO (P=0.023). Mask acceptance was higher in MKR group (P=0.039), while drug acceptance and separation scores were comparable. MKR participants had shorter duration of anaesthesia and recovery time (P=0.0001, P=0.003). No adverse effects were noted.

Conclusion: Rectal midazolam-ketamine offers faster sedation onset, improved mask acceptance, and quicker recovery from

anaesthesia, making it a practical alternative to oral administration.
Keywords: Rectal premedication, Oral premedication, Paediatric anaesthesia, Midazolam, Ketamine.