Pediatric Anesthesia and Critical Care Journal 2025;13(2):92-96
doi:10.14587/paccj.2025.16

PACCJ

Anesthesia for non-cardiac surgery in obese Congolese children and adolescents. A forgotten risk: perspective

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Keypoints

Pediatric obesity in the DRC constitutes a dual vulnerability: intrinsic physiologic risk and systemic healthcare limitations.

Abstract

Pediatric obesity in sub-Saharan Africa, once considered rare, has emerged as a significant clinical and public health challenge. In the Democratic Republic of Congo (DRC), where surgical and anesthetic resources are limited, caring for obese children undergoing non-cardiac surgery introduces complex and often underrecognized risks. Physiologic, respiratory, and metabolic vulnerabilities inherent to obesity interact with limited resources, creating a disproportionately high risk of perioperative complications. This narrative review examines these challenges considering both international and African data, proposes practical strategies for perioperative assessment and management, and emphasizes the ethical imperative of adapting anesthetic practice in the DRC.

Keywords

Pediatric obesity, anesthesia, non-cardiac surgery, sub-Saharan Africa, Democratic Republic of Congo, perioperative risk, difficult airway, pharmacology.

Introduction: the silent amplifier

Congolese operating rooms are already sites of adversity: irregular oxygen supply, limited monitoring, restricted drug availability, and insufficient specialized personnel. In this context, the obese pediatric patient introduces an additional, often underappreciated vulnerability. Obese children, who now constitute approximately 8–10% of urban school-aged populations in the DRC [1,2], may appear healthy (ASA I or II) but frequently harbor silent comorbidities, including asthma, obstructive sleep apnea (OSA), hypertension, and insulin resistance [3–6]. This discrepancy between outward health and underly-

ing risk transforms every anesthetic encounter into a complex exercise of assessment and adaptation.

International and regional studies characterize pediatric obesity as a "silent amplifier" of anesthetic risk. Nafiu et al. [7] demonstrated that elevated BMI independently increases the risk of perioperative respiratory and cardiovascular complications, even in well-resourced hospitals. Tait et al. [8] showed that obesity doubles the incidence of perioperative respiratory events in children. In sub-Saharan Africa, Choukem et al. [9] highlighted the growing prevalence of obesity-related cardiovascular risk factors in children and adolescents, emphasizing the scale of an emerging and neglected challenge.

Airway and Respiratory Challenges: A Fragile Balance

Airway management is the critical bottleneck in pediatric obesity. Data indicate that mask ventilation is two to three times more difficult in obese children than in their normal-weight peers [10]. Factors contributing to this difficulty include submental fat infiltration, limited cervical mobility, and pharyngeal narrowing due to cervical and visceral fat deposits [11,12]. Reduced functional residual capacity and increased oxygen consumption mean that desaturation may occur within seconds rather than minutes [13].

In the DRC, where videolaryngoscopes and rescue devices are frequently unavailable, these scenarios are not hypothetical but predictable. The Southern African Journal of Anaesthesia and Analgesia has emphasized that proactive airway planning and training in alternative rescue strategies are essential to reduce morbidity and mortality [14].

Metabolic and Cardiovascular Comorbidities: Persistent Shadows

Obese children frequently present with metabolic and cardiovascular conditions previously considered adult diseases. Hypertension, dyslipidemia, insulin resistance, and early ventricular remodeling are common and often undetected preoperatively [9]. These conditions increase the risk of intraoperative hypotension, arrhythmia, and ischemic events.

In sub-Saharan Africa, detection is limited by the lack of laboratories, screening tests, and specialized cardiovascular evaluation. Choukem et al. report that up to 20% of obese adolescents exhibit markers of metabolic syndrome, often asymptomatic, placing each anesthetic at elevated risk [9]. These findings underscore the urgency of systematic screening even in low-resource settings.

Pharmacology: When Equations Fail

Drug dosing in obese children is not a simple linear calculation. Lipophilic agents, such as propofol and benzodiazepines, distribute widely in adipose tissue, prolonging sedation and delaying emergence. Hydrophilic agents, including neuromuscular blockers and opioids, should be dosed according to ideal or lean body weight to avoid overdose and respiratory depression.

In the DRC, the lack of anesthesia depth monitoring and neuromuscular surveillance complicates titration. Clinicians often rely on clinical signs, which are notoriously unreliable in obese children, increasing the likelihood of adverse events. Clinical Advisor highlights that these pharmacologic complexities are exacerbated in settings where pediatric obesity is not yet integrated into standard protocols.

Postoperative Vulnerability: Where Risks Multiply

The period following surgery remains perilous. OSA increases the risk of opioid-induced respiratory depression [3,6]. Regional anesthesia may reduce opioid requirements but is technically challenging in obese children, and unpredictable drug spread is common. In most Congolese hospitals, ultrasound guidance is unavailable, increasing the risk of failure or complications.

Additionally, obese children often report higher postoperative pain scores, partially due to systemic inflammation. The lack of appropriate multimodal analgesia exposes patients to both unmanaged pain and the dangers of opioid overuse [14].

Risk Summary: A Pragmatic Synthesis

To illustrate these challenges, the following table (Table 1) summarizes the main categories of anesthetic risk in obese pediatric patients and recommended strategies for mitigation.

Category	Specific Risks	Recommendations
Airway & Respiratory	Difficult mask ventilation, difficult intubation, rapid desaturation	Proactive airway planning, training in rescue strategies, use of videolaryngoscopes if available [10–14]
Metabolic & Cardiovascular	Hypertension, dyslipidemia, insulin resistance, early ventricular remodeling	Systematic screening (Blood Pressure, glucose, questionnaires), enhanced intraoperative monitoring [9]
Pharmacology	Overdose of hydrophilic drugs, prolonged sedation with lipophilic drugs	Dose hydrophilic agents by ideal/lean body weight, lipophilic by total body weight; strict clinical monitoring
Postoperative Period	Respiratory depression (OSA), increased pain, regional anesthesia failure	Multimodal and regional analgesia, close postoperative monitoring, cautious opioid titration [3,6]
Systemic & Resource Limitations	Limited monitoring, lack of equipment (ultrasound, reliable monitors)	Advocate for essential equipment and staff training, adapt protocols pragmatically [14]

Table 1. Key anesthetic risks and recommendations for obese children in the DRC

Implications for the DRC and Sub-Saharan Africa

While some may argue that pediatric obesity is still rare, each obese child entering a Congolese operating room represents a systemic stress test. Perioperative risks, already elevated in low-resource settings, are amplified by the physiologic vulnerabilities inherent to obesity [7,8]. The Southern African Journal of Anaesthesia and Analgesia underscores that preoperative planning, airway preparation, and staff training are key to reducing morbidity and mortality [14]. Neglecting these vulnerabilities translates into a disproportionately high rate of avoidable complications.

Recommendations: From Awareness to Action

1. **Systematic Identification:** Apply WHO/IOTF criteria to identify overweight and obese children during pre-anesthetic assessment [4].
2. **Comorbidity Screening:** Utilize simple tools (OSA questionnaires, BP measurement, random glucose) even in the absence of advanced laboratories [5,9].
3. **Dosing Adjustments:** Hydrophilic drugs by ideal/lean weight, lipophilic by total weight, with rigorous clinical monitoring.
4. **Airway Preparation:** Anticipate difficulties, train staff, and provide videolaryngoscopes where possible [14].
5. **Optimized Analgesia:** Prioritize multimodal and regional anesthesia, minimize opioid use, closely monitor OSA patients [3,6].
6. **Resource and Training Enhancement:** Advocate for reliable monitors, ultrasound devices, and staff education tailored to pediatric obesity [14].
7. **Primary Prevention:** Promote public health interventions to curb childhood obesity as a long-term strategy for perioperative safety [9].

Conclusion

Pediatric obesity in the DRC constitutes a dual vulnerability: intrinsic physiologic risk and systemic healthcare limitations. Every anesthetic encounter is both a clinical and ethical challenge. Ignoring pediatric obesity equates to accepting preventable harm. Recognizing these risks, adapting anesthetic practice, and advocating for essen-

tial resources are fundamental to ensuring patient safety. Safe anesthesia is a universal right, not a privilege, regardless of body habitus.

Conflict of Interest

The authors declare no conflicts of interest related to the publication of this article.

Author Contributions

- E.M. : draft, pediatric perspective
- A.M.B. : supervision, coordination, revision
- W.M. : adolescent/obesity perspective, revision
- K.A. : discussion structure, literature review
- A. Mo. : contextual input, manuscript preparation
- D.M.B. : pediatric perspective, clinical insights
- J.N. : contextual input, Congolese practice
- M.B. : manuscript preparation, local challenges
- B.B. : orthopedic perspective, final revision

All authors have read and approved the publication of this manuscript.

Funding

This study received no specific funding from public, commercial, or non-profit sources.

Acknowledgments

The authors sincerely thank the medical and paramedical staff of the anesthesia, critical care, and surgery departments of Kinshasa University Clinics of the University of Kinshasa, in the Democratic Republic of Congo, for their support and collaboration.

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