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INTRAOPERATIVE MANAGEMENT OF CRANIOSYNOSTOSIS IN A PEDIATRIC PATIENT UNDERGOING ORBITOFRONTAL ADVANCEMENT: A CASE REPORT

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ABSTRACT:

Introduction: Craniosynostosis presents challenges in pediatric anesthesia, particularly during cranial vault reconstruction.

Case Presentation: We report a 1-year-old female with craniosynostosis scheduled for orbitofrontal advancement. Anesthesia induction included ketamine, midazolam, and propofol, with atracurium for muscle relaxation. A hybrid intubation technique using C-MAC and fiberoptic bronchoscope was employed due to anticipated difficult airway. Dexmedetomidine infusion maintained hemodynamic stability. Meticulous intraoperative fluid management and blood loss calculation were performed.

Discussion: Thorough airway assessment and multidisciplinary collaboration were crucial. The main takeaway emphasizes tailored approaches to optimize outcomes and minimize complications in pediatric craniosynostosis surgery.

Conclusion: Pediatric patients with craniosynostosis undergoing cranial vault reconstruction require individualized anesthesia management. A comprehensive approach guided by multidisciplinary collaboration is essential for successful outcomes.

Keywords: Craniosynostosis, pediatric anesthesia, cranial vault reconstruction, orbitofrontal advancement

Introduction:

The hallmark of craniosynostosis, characterized by premature fusion of cranial sutures, necessitates early intervention to prevent severe complications affecting neurodevelopment and craniofacial morphology (1). Surgical procedures like craniotomies and cranioplasties, though crucial, pose challenges due to scalp and periosteum manipulation, impacting postoperative pain management (2). Disagreements persist regarding optimal perioperative pain control strategies, exacerbated by the inability of young children to express discomfort verbally (3). Various techniques, including local nerve blocks and opioid analgesia, have been explored, yet consensus remains elusive. Intriguingly, in paediatric intensive care units, dexmedetomidine is increasingly replacing morphine, although its utilization in craniosynostosis surgery remains limited (4-7). These disparities highlight the need for further research to inform standardized pain management protocols in craniosynostosis patients undergoing surgical intervention. The purpose of this study is to evaluate the perioperative management and outcomes in pediatric craniosynostosis patients undergoing cranial vault reconstruction, focusing on anesthesia strategies for addressing airway difficulties, fluid balance, and hemodynamic stability. Through analysis of a specific case, the study aims to inform optimal perioperative care practices and emphasize the importance of multidisciplinary collaboration in enhancing patient safety and surgical success.

CASE PRESENTATION:

The case involves a 1-year-old female with craniosynostosis undergoing orbitofrontal advancement surgery, complicated by an anticipated difficult airway. Preoperative fluid and blood loss calculations were meticulously performed to guide intraoperative management. Sedation was initiated with Inj. Ketamine and Inj. Midazolam, while intubation was achieved using a hybrid technique involving the C-MAC and fiberoptic bronchoscope with a 3.5 size flexometallic tube. Subsequently, induction with 2mg/kg of propofol and 0.5mg/kg of atracurium was followed by the administration of Inj. Dexmedetomidine infusion at 1mcg/kg for the first hour, reduced to 0.5mcg/kg thereafter. To maintain anesthesia, Inj. Atracurium and Inj. Fentanyl were administered intermittently. Fluid management involved administering 700ml of Ringer's Lactate (RL), with blood loss recorded at 250ml and urine output at 150ml. Transfusion of 200ml of blood was performed after cross-matching. Intraoperative hypotension prompted initiation of Inj. Noradrenaline at 0.05mg/kg/min, effectively stabilizing blood pressure at 100/60mmHg.



Fig 1 - Preoperative

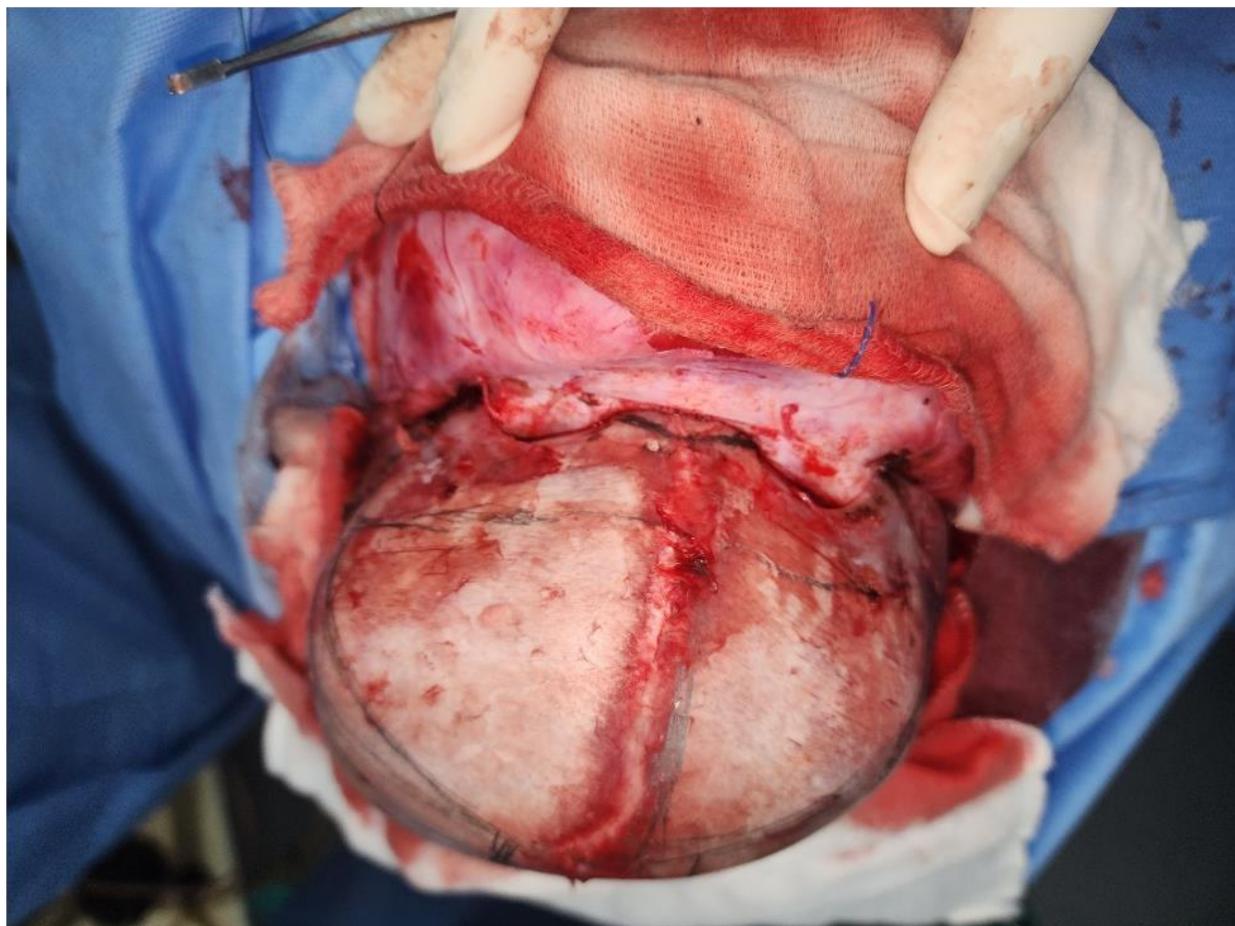


Fig 2 - intraoperative



Fig 3 - intraoperative



Fig 4 - intraop

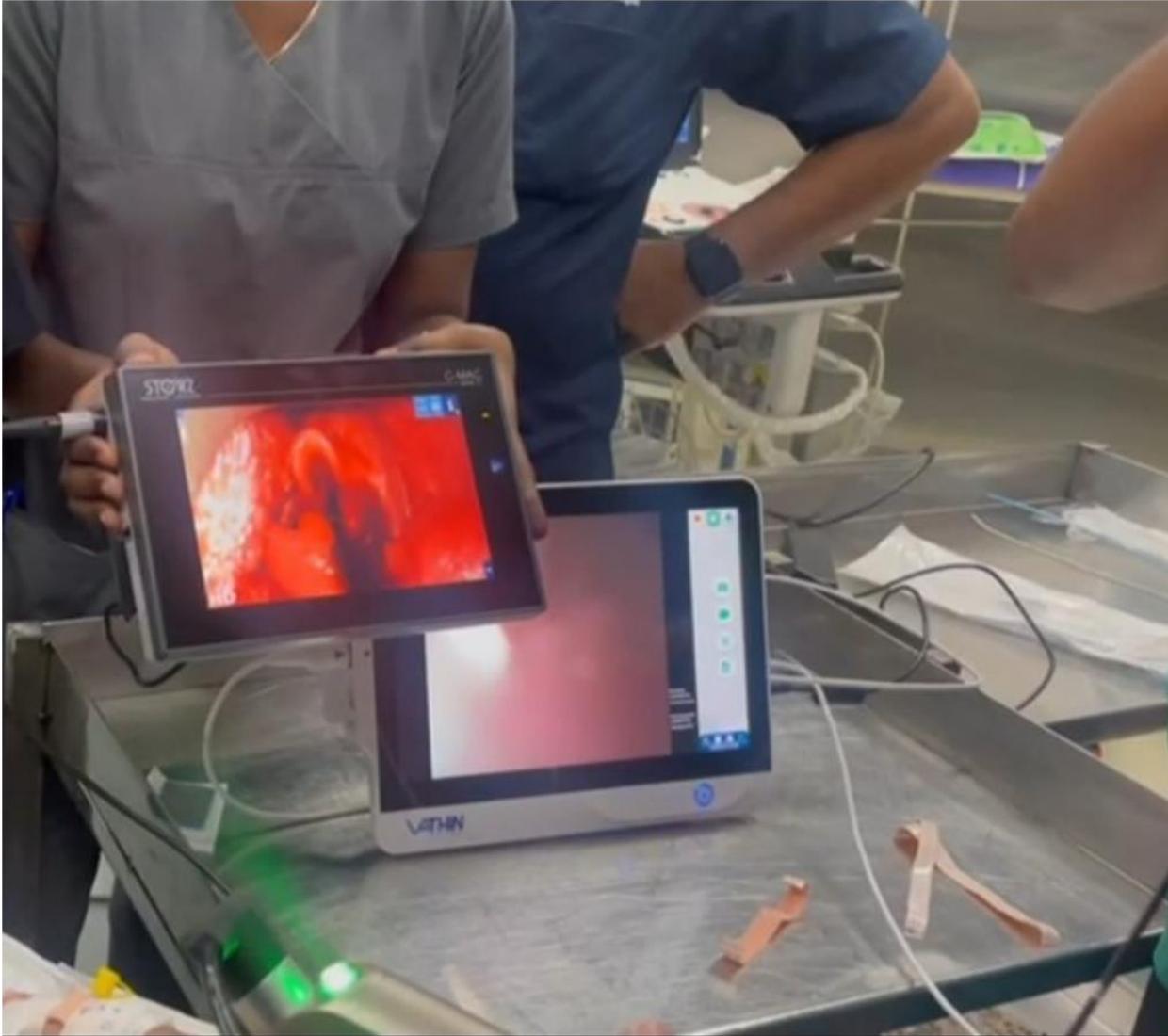


Fig 5 - Hybrid technique

DISCUSSION:

In this case, anticipation of a difficult airway due to cranial deformities prompted the utilization of a hybrid intubation technique combining C-MAC and fiberoptic bronchoscope. This approach underscored the importance of careful preoperative planning and airway assessment, ensuring secure airway management and minimizing the risk of perioperative complications. Craniosynostosis surgery in pediatric patients poses unique challenges, necessitating careful airway management and tailored anesthesia. A hybrid intubation technique addressed anticipated difficult airway issues. Anesthesia induction, including ketamine, midazolam, propofol, and dexmedetomidine, ensured hemodynamic stability. Meticulous intraoperative fluid management minimized risks, with transfusion and vasopressor support as needed. Multidisciplinary collaboration enhanced perioperative care. Minimally invasive techniques like endoscopic strip craniectomy reduce blood loss and hospital stay, supported by data showing shorter anesthesia

durations and ICU utilization [10]. Certain centers transition nonsyndromic patients directly to the postsurgical ward following endoscopic surgery.

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