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Anaesthetic implications of Kawasaki disease in paediatric Population: A case report

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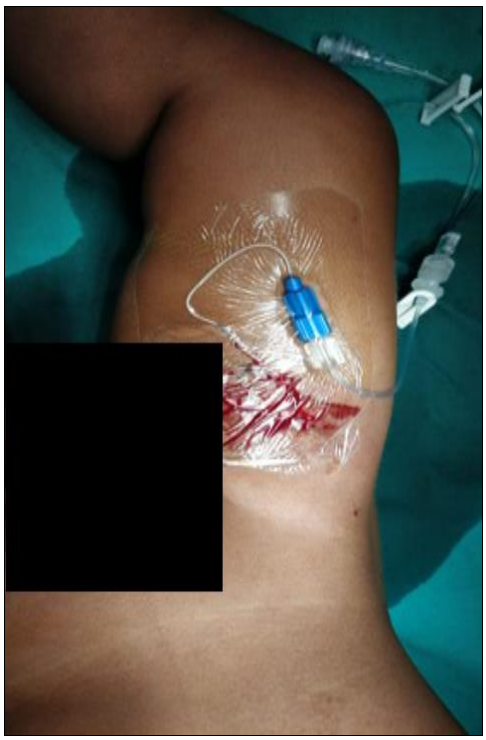
Abstract
Kawasaki disease (KD) is a pediatric vasculitis of uncertain etiology, predominantly affecting children. Although the exact etiology of Kawasaki disease remains unknown, it is believed to result from an abnormal immune response to certain triggers. Anesthetizing patients with a history of Kawasaki disease or those with active KD poses significant challenges. These patients require personalized anesthetic care and meticulous attention to detail to guarantee their safety and optimal outcomes. We present anesthetic management of a 1-year-old Kawasaki Disease male child who was posted for an emergency procedure.

Keywords: Kawasaki disease, general anaesthesia, paediatric, surgical procedure

Introduction
Kawasaki disease is an acute vasculitis of unknown etiology seen most commonly in childhood and characterized by fever, bilateral conjunctivitis, erythema of the lips and oral mucosa, cervical lymphadenopathy, and desquamation of the skin on the hands and feet. Although initially thought to be a rare condition, KD has surpassed acute rheumatic fever as the leading cause of acquired heart disease in children in the United States [1]. Originally described in Japan, the disease occurs worldwide in both endemic and community-wide epidemic forms in America, Europe, and Asia, and children of all races [2]. More than 4,000 hospitalizations were associated with KD in the United States in 2000, with a median patient age of 2 years [3]. KD is most commonly seen in Americans of Asian and Pacific Island descent but has also been documented in African Americans, Hispanics, and Caucasians.[4]. KD is a self-limiting disease in most children, with symptoms evolving over the initial 10 days of illness and spontaneously resolving. They can have myocarditis, arrhythmias, and pericardial effusions during the acute phase; while myocardial ischemia and increased mortality are noted during the first year after the acute phase as well as in older children and young adults (6-10) [4]. However, coronary artery aneurysm or ectasia can develop in 15%-20% of untreated children [5].
The etiology of this syndrome is still unclear but it is presumed to be an immune response to various stimuli [6]. There is no specific laboratory test to confirm the diagnosis. Many children have likely had KD, but not been correctly diagnosed - often being mistaken as having nonspecific viral or common bacterial infections. The differential diagnosis may include such diverse entities as measles, toxic shock syndrome, Stevens-Johnson syndrome, and acute rheumatic fever. Children may not present with all the classic symptoms, which results in an 'incomplete' KD; yet they will still be at risk for coronary artery aneurysm. Surgery on patients with a history of KD or on patients with a current onset of KD presents anesthesia challenges.

Case report
A 1-year-old male child, weighing 9.6kg, was admitted with a history of fever, cough, and cold of 3 days duration with non-exudative conjunctival congestion and bilateral lower limb edema and was posted for central venous catheter insertion as an emergency. He was febrile, that had not responded to antibiotics. The child was diagnosed with KD on day 4 after the onset of the illness and was started on IV Immunoglobulin. On examination, he was conscious with a heart rate of 138 bpm, SpO2 of 98% in room air, and a respiratory rate of 38. On auscultation, respiratory and cardiovascular systems were within normal. No preoperative ECG, echo, chest X-ray, or cardiology consultation was taken. Preoperatively, monitors were connected including pulse oximetry, Electrocardiogram (ECG), and end-tidal

CO_2. The gastric Ryle's tube was aspirated to empty the stomach. Preoxygenation with 100% oxygen was given for 3min. Inj. Fentanyl 15mcg was given as premedication. The child was induced with sevoflurane and oxygen on spontaneous respiration. The following induction, muscle relaxation was achieved by giving Inj. Succinylcholine 12.5mg IV and Laryngeal Mask Airway (LMA) of size 1.5 was introduced orally. Bilateral air entry confirmed and LMA fixed. The patient was maintained on O_2 + N_2O + Sevoflurane inhalational + spontaneous ventilation. The patient was ventilated with a pediatric bains circuit. Intraoperatively patient was normothermic and hemodynamically stable with adequate oxygenation. Right femoral vein catheterization was done. Paracetamol suppository 15mg/kg was given for post-op analgesia. On completion of the procedure, LMA was removed. Recovery was smooth and uneventful. The patient was shifted to the pediatric ICU for further monitoring and evaluation.



Discussion

The literature addressing KD anaesthetic issues consists mainly of single case reports. Most of the publications have been concerned more about cardiac manifestations such as coronary artery aneurysm, pericardial effusion, arrhythmias, and myocardial infarction. The first paper addressing the issue was published by Mcniece and krishna [7]. Ten years later Waldron [8] described the case of a 10-year-old child with KD who developed gangrene of the foot following cardiac catheterization and subsequently died 16 days later. A case of a 13-month-old child with KD and Beckwith Weidman syndrome, on warfarin for associated coronary aneurysm, was described by Thomas and McEwan [9].

The increasing number of children with a history of KD presents both surgical and anesthesia challenges. Anesthesiologists are encouraged to consider KD as a provisional diagnosis in patients with prolonged fever and rashes, especially in younger age groups, and should evaluate the potential for myocardial compromise, if patients show a rapid deterioration preoperatively [10]. Since diagnosis of KD in the younger age group is difficult, an echocardiographic examination is recommended to identify cardiac involvement in all possible cases. Children with KD and coronary involvement should be treated like adults with coronary artery aneurysms. Perioperatively, proper cardiac evaluation should be done to detect any cardiac abnormalities. The pre-anesthetic evaluation must include a 12-lead ECG and 2D echo to identify any coronary artery involvement. Both acute and chronic manifestations of KD should be considered while giving anesthesia. Intraoperative management should have standard American Society of Anesthesiologist monitoring including heart rate, end-tidal CO_2, pulse oximetry, blood pressure, ST segment analysis involving lead ii and v5, and if possible invasive arterial monitoring. Morrison *et al*. conducted a retrospective 15-year review of children with a discharge diagnosis of KD and suggested that KD patients undergoing anesthesia have the potential of associated higher morbidity and mortality [10]. A recent study done by Lisa *et al*. [11] provided the important perioperative considerations to be taken to minimize morbidity and mortality in KD Drugs with little effect on cardiac hemodynamics should be administered. Deeper planes of anesthesia should be continued throughout the procedure for hemodynamic stability. Postoperative adequate multimodal analgesia should be provided. Goals for successful anesthetic management in KD patients include risk stratification, cardiac status assessment, maintaining stable intraoperative hemodynamics, and proper balance of myocardial O_2 demand and myocardial O_2 supply.

Conclusion

Kawasaki disease is an acute systemic vasculitis disease of childhood, predominantly affecting coronary arteries. Multidisciplinary teamwork and tailored anesthetic strategies are crucial for achieving optimal outcomes in KD patients. Individualized anesthetic care and meticulous attention to detail are essential for ensuring the safety and well-being of KD patients.

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Conflict of interest

None

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