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Anaesthetic Management Of Left Chest Wall Hemangioma In A 8 Year Old With Lidoketofol : A Case Report

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Abstract

Hemangioma, a benign neoplastic lesion, the most common benign soft-tissue tumor diagnosed in children, are frequently found on the face and neck, with the chest wall being a rare location. Ketofol, the combination of Ketamine and Propofol in various concentrations, is recently being used as infusions for surgeries. The authors present here a case report of an 8year old male child being operated for hemangioma excision over chest wall under general anaesthesia, with the combination of the Lidoketofol thus reducing the requirement for opioid, inhalaled anaesthetic and muscle relaxant intraoperatively, stable hemodynamics and for a smoother extubation

Keywords: paediatric anaesthesia, hemangioma, propofol infusion, ketofol, lidocaine

Introduction

Hemangioma, a benign neoplastic lesion, the most common benign soft-tissue tumor diagnosed in children, are frequently found on the face and neck, with the chest wall being a rare location. (1, 2)

Ketofol, the combination of Ketamine and Propofol in various concentrations, is recently being used as infusions for surgeries. Propofol blunts the emetogenic and psycho-cognitive effects of ketamine whereas ketamine adds an analgesic effect not provided by propofol (3). The addition of ketamine to propofol for procedural anaesthesia in children has reduced propofol and fentanyl consumption with improved haemodynamics (4). In addition to this, Lidocaine decreases inhalational anaesthetic requirement, minimize the need for opioids, decrease postoperative nausea and vomiting and shorten the extubation time when used perioperatively.

Lidoketofol is a combination of ketofol and lidocaine, which causes a significantly shorter extubating time, as compared to administration of ketofol alone. In addition to this, Fentanyl and propofol consumptions per kg are significantly lower in patients with admixture of ketofol and lidocaine with perioperative hemodynamic stability and lower post operative pain scores. (5).

In the anaesthetic management of a 8year old male child, operated for hemangioma excision under general anaesthesia, Lidoketofol was used in order to reduce the requirement for opioid, inhalaled anaesthetic and muscle relaxant intraoperatively, stable hemodynamics and a smoother extubation

Case Report

A 8 year old, 20kg, male child came to MGM Medical College & Hospital, Kamothe OPD with chief complaints of a swelling over left chest wall, insidious in onset, progressive in nature, not associated with pain or swelling.

The child was the first born child, full term normal vaginal delivery, with no h/o pneumonia or NICU admission at birth. The child was immunized till date. The child was admitted for further evaluation and management. Digital Subtraction Angiography

(DSA) was suggestive of no major feeding vessel of the hemangioma.

After a detailed history, clinical examination and physical evaluation, the patient was electively posted for Hemangioma excision under General anaesthesia.

Prior to surgery, pre-anaesthetic check up revealed pulse rate of 100/min, BP 100/54mmHg in right arm in supine position, respiratory rate of 28/min, SpO2 of 100% on room air. Airway examination revealed adequate mouth opening, intact dentition, Mallampatti Score I, with air entry bilaterally equal on auscultation. Routine hemogram showed Hemoglobin 11.2gm%, Platelets 1.19 Lacs and other investigations were well within normal limits. The child was kept in a fasting state for 6 hours for solid food.

Airway trolley was prepared with all the paediatric airway equipment. Forced air warming and fluid warmer were used so as to maintain intraoperative normothermia.

Patient presented to the preoperative area a with pulse rate of 124/min, BP 90/58mmHg in right arm in supine position, respiratory rate of 30/min, SpO2 of 100% on room air, active and crying. A 20G intravenous access IV was secured in the right arm.

In the preoperative area, the child was premedicated with Inj. Midazolam (0.05mg/kg), Inj. Glycopyrrolate (0.004mg/kg) and Inj. Ketamine (2mg/kg) IV. The patient was taken in to the OR by a female staff who had been with the child for the last half an hour and had developed a good rapport with the child. Pulse oximetry, NIBP and ECG leads were attached to the child and baseline vitals were recorded. He was preoxygenated with 100% FiO2, with induction of General anaesthesia by the administration of Inj. Fentanyl (2mcg/kg), Inj. Lidocaine (1.5mg/kg), Inj. Propofol (2mg/kg) with Sevoflurane in 6Litres of oxygen administered through Anatomical face mask 3, attached to Jackson Rees Circuit. Gentle positive pressure ventilation was carried out for 3 minutes. After confirming adequate ventilation, Inj. Atracurium (0.5mg/kg) was given. Endotracheal intubation was performed atraumatically using a Macintosh blade 2 and a cuffed Endotracheal tube 6.5. Following confirmation of bilateral breath sounds, sustained ETCO2 and adequate chest rise, the tube was secured and the child was mechanically ventilated. Considering the long duration of anticipated surgery, a foleys catheter was placed and urine output monitored. The patient was then given a right lateral position with adequate padding of pressure points.

The patient tolerated anaesthetic induction, endotracheal intubation and positioning without any adverse hemodynamic effects. The patient was started on an infusion of Inj. Ketamine 40mg with Inj. Propofol 240mg (Ketamine to Propofol in the ratio of approx. 1:6), with Inj. Lignocaine 30mg (1.5mg/kg), in a 50cc syringe started at 2ml/hour and tapered accordingly.

Hand ventilation was initiated for the case with an ETCO2 goal of 30-35mmHg. After anaesthetic induction and position, the patient was surgically prepared and draped in a typical sterile fashion and given antibiotic to prevent surgical site infection.

Intraoperatively, the patient was maintained on muscle relaxant Inj. Atracurium. Positive pressure ventilation was carried out throughout the procedure with JR Circuit with Nitrous oxide and oxygen in the ratio of 60:40 with Sevoflurane (0.5-1%) as the inhalational anaesthetic agent with Maintenance IV fluid.

At the start of skin closure, the intravenous infusion of Lido-Keto-Fol was switched off.

The anaesthetic course was uneventful, evidence by very little variation in the patient's hemodynamic status. Hemangioma excision required over 6 hours. The patient was transfused with one unit PRBC near the end of the case in view of continuous oozing at the surgical site and blood loss.

The patient was recovered from anaesthesia with Inj. Neostigmine (0.5mg/kg) and Inj. Glycopyrrolate (0.008mg/kg). Following satisfactory assessment of ventilatory and neuromuscular parameters, the trachea was extubated smoothly. The patient was kept in a left lateral position with oxygen by face mask at 6L/min and the transferred to the Pediatriac Intensive Care Unit (PICU), where there were no complications. The patient's vital signs were stable.

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Fig1: Post-operative Suture line.

Fig2: Lidoketofol infusion

Discussion

Hemangiomas are benign neoplastic lesions, originating from the proliferation of endothelial cells. They are typically seen in children and usually congenital. With age, they generally undergo a process of involution and sometimes disappear entirely (5). They are the most common benign soft-tissue tumour diagnosed in children (6). Frequently found on the face and neck, these are especially common in the periorificial areas. However, the chest wall is a rare location for a hemangioma. Hemangiomas can develop in any part of the body, but the majority (60%) are found on the face or neck; less common sites include the trunk (25%) and extremities (15%) (4). In some cases, more than one site may be involved (8). Hemangiomas are vascular tumours, solitary in most cases, that originate from the proliferation of epithelial cells. Colour Doppler ultrasonography is an excellent tool for rapid, reliable diagnosis of hemangioma. They are classified as capillary, cavernous, arteriovenous, venous, or mixed, on the basis of the predominant vascular component (3).

The increased trend of total intravenous anaesthesia owes to advantages such as a low incidence of post operative vomiting, smooth recovery from anaesthesia and improved quality of emergence from anaesthesia(2) .

Ketamine, a neuroleptic anaesthetic agent, acts on the thalamocortical and limbic N-methyl-D-aspartate (NMDA) receptors. It can be given through intravenous or intramuscular routes. Ketamine stimulates the cardiorespiratory system. A direct effect increases cardiac output, arterial blood pressure, heart rate and central venous pressure. Thus making it a valuable agent for hypotensive or hypovolemic patients. In addition, it produces minimal respiratory depression, thus casuing minimal effects on central respiratory drive (9).

In contrast, Propofol, a sedative, hypnotic and anaesthetic agent, another NMDA antagonist, with a narrow therapeutic range and risks of cardiovascular depression, with rapid recovery.

Propofol blunts the emetogenic and psycho-cognitive effects of ketamine and ketamine adds an analgesic effect not provided by propofol (10). The addition of ketamine to propofol for procedural anaesthesia in children has reduced propofol and fentanyl consumption with improved haemodynamics(11). The fusion of propofol and ketamine is referred to as Ketofol. This combination is pharamacologically compatible, with several advantages like improved analgesia, resulting in immediate recovery with hemodynamic stability and minimal respiratory depression(12). It is commonly used for procedural sedation. Although generally well tolerated, occasional ketamine-related side-effects included

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vocalisation, grimacing, limb movements, bad dreams, excessive salivation and postoperative nausea and vomiting(13). These adverse effects may have been ameliorated by the addition of a low concentration of propofol. Ketofol has recently been growing interest over the recent years for sedation and analgesia in pediatric anaesthesia (2) .

Coulter et al. evaluated Ketofol in different ratios for general anaesthesia in paediatric patients. The study suggested the use of an optimal ratio of racemic ketamine to propofol of 1:3 for boluses during short procedures (5–20 minutes). A short ketofol infusion, ratio 1:4, is a suitable alternative to intermittent boluses. Ratios greater than 1:3 result in delayed recovery after 20 minutes. In this study, the optimal ketofol dosing in children (2–11 y) was 0.1 mL/kg initially followed by 0.05 mL/kg at 2 minutes and then 0.025 mL/kg for the subsequent doses. The adults (12–20 y) received 0.05 mL/kg of ketofol initially followed by 0.025 mL/kg for the subsequent doses. These regimens maintain a propofol antiemesis for 30 to 40 minutes after the last dose. A ketamine-to-propofol ratio of 1:3 was the best combination for intermittent dosing, achieving a rapid onset with a Sedation Scale score of less than 2 within 1 minute and a time to emergence of 9 to 19 minutes in all ages after a 10-minute sedation. The study also concluded that infusion of ketofol could prolong the recovery period if the infusion rate was not decreased. (14)

Lidocaine is a local anesthetic of the amide group, being the most commonly used local anesthetic of its group. It exerts its effects by inactivating voltage-dependent sodium channels, thus altering signal conduction in neurons. Lidocaine can be used in various pain managements, as topical anesthesia, local, regional anesthesia and for various blocks (15). The perioperative effects of lidocaine decrease inhalational anesthetic requirement, minimize the need for opioids, decrease postoperative nausea and vomiting and shorten the extubation time. In addition, perioperative effects of lidocaine are associated with a decrease in hospital stay (16, 17).

Lidoketofol is a combination of ketofol and lidocaine. In a study at the Department of Anesthesiology, University Hospital of Split, Split, Croatia, Nevešćanin Biliškov et al demonstrated that extubating time, as well as the anesthesia duration were significantly shorter when lidocaine was administrated together with ketofol, compared to administration of ketofol alone. Apart from the extubating time and length of stay in the PACU, fentanyl and propofol consumptions per kg were significantly lower in patients who received admixture of ketofol and lidocaine with perioperative hemodynamic stability and lower post operative pain scores (18).

The use of TIVA during pediatric general anaesthesia were stated by Lauder, such as reduction in laryngospasm, airway reactivity, postoperative analgesia and successful recovery for short operative pediatric procedures (18). Fang et al. supplied information supporting the use of ketamine and lidocaine mixture, which contributed to more stable vital signs, shorter onset and recovery time, elimination half life prolonged, decreased plasma clearance, dosage and adverse effects(19) .

Conclusion

The use of infusion Lidoketofol proved to be advantageous in this case owing to the reduced inhalational requirement intra-operatively. In addition to this, the muscle relaxant needed for maintenance perioperatively was also reduced. First rescue post operative analgesia was required after 8 hours (Inj. Paracetamol 400mg i/v).

The anaesthetic technique of applying intravenous infusion of lidoketofol proves to be efficacious in reducing the postoperative nausea and vomiting, along with decrease in the hospital stay.

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