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Anaesthetic management of bladder exostrophy in a three month old baby

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Abstract--Exostrophy of bladder and cloaca are the defects in the ventral abdominal wall caused due to failure of mesodermal invasion of cloacal membrane at 4-5 weeks of gestation. These congenital defects require multistaged repair and surgeries can last longer therefore causing repeated exposure of the baby to anaesthesia and can cause electrolyte imbalance, infection, hypothermia, coagulopathies and even mortality. We report a case of exostrophy of bladder with epispadias in a three month old child which was done under general anaesthesia and continuous caudal catheter infusion of bupivacaine in intraoperative and postoperative period which helped in providing opioid free analgesia thus avoiding their respiratory depressant effects and aided in the early recovery of the baby.

Keywords---anaesthetic, bladder exostrophy, old baby.

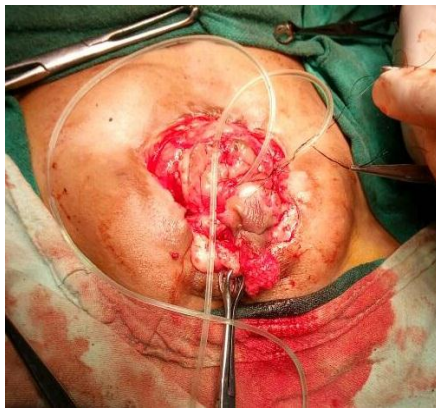
Introduction

Exostrophy of bladder, is a complex defect in the anterior abdominal wall. It is a congenital defect but there is no genetic component. It affects 1 in 50,000 live births¹. This condition requires staged surgical repair to achieve satisfactory functional and cosmetic results which in turn leads to multiple exposures of the baby to anaesthesia and surgical stress. The collaborative efforts of surgeons, anesthetists, pediatricians, intensivists and nursing staff are required². These procedures are generally long and require efficient anaesthetic technique intraoperatively and good analgesia post operatively to aid in the early recovery and better surgical outcomes. Here we report a case of 3months old male child,

with exostrophy of bladder and epispadias who underwent surgical repair, which was managed well under general anaesthesia with caudal catheter.

Anaesthesia

An informed and written consent for anaesthesia and surgery was obtained from the parents. Routine laboratory investigations were within normal range. The weight of child was 4kg. The anaesthetic technique planned was general anaesthesia with caudal catheter. After shifting the patient to operation theatre, the ECG, non-invasive blood pressure and oxygen saturation were monitored. Peripheral venous catheter was checked for patency and injection atropine 0.01 ug/kg was given intravenously. The patient was induced with injection ketamine 2mg/kg and sevoflurane. After giving intubating dose of scoline 2mg/kg, the child was intubated and airway was secured with uncuffed endotracheal tube of 3.5mm internal diameter. The child was positioned left lateral. After disinfecting the caudal area with povidine iodine and draping it, 18G needle was inserted in the caudal space. The position of needle in caudal space was confirmed using swoosh test. 18G epidural catheter was threaded with the tip of catheter at the level of T-12. Using infusion pump, infusion of 0.25% bupivacaine at the rate of 0.2mg/kg/hour was continued throughout the procedure and also in the post operative period at a concentration of 0.0625% of bupivacaine for two post operative days. The surgery lasted for 75 minutes. During this period, the child was maintained with sevoflurane, injection ketamine 1mg/kg and injection fentanyl 2mg/kg. During the surgery, patient received 30 ml D10, 30 ml NS, 15ml colloid and 15ml of blood. After return of spontaneous efforts, the reversal was done using injection neostigmine 0.05mg/kg and injection glycopyrrolate 0.01mg/kg. As there was not adequate return of muscle tone, so the decision of not extubating the child was taken. Trail of T-piece was given. The child was maintaining an oxygen saturation of 99% with T-piece. So the patient was shifted with T-piece to PICU. The patient was accessed every half hourly. The respiration was regular, adequate and patient was actively moving his limbs. The patient was extubated uneventfully after 3 hours.



Discussion

The exostrophy of bladder is a congenital defect in the anterior abdominal wall. Although No syndrome is found associated with it but the etiology is still unknown. The most common association with exostrophy is epispadias with fewer cases associated with pubic symphysis diastasis, imperforate anus and other hind gut anomalies. The embryological defect occurs at 4-5 weeks of gestation due to failure of invasion of cloacal membrane by mesodermal cells leading to defect in ventral abdominal wall. These defects require multistaged surgical repair with multiple exposures to anaesthesia also which in turn can lead to the risk of infection, electrolyte abnormalities, airway instrumentation and associated trauma, hypothermia, coagulopathies and even mortality³. Parents of these patients also suffer both physical and mental stress. The aim of these reconstructive procedures is to achieve permissible urinary continence and adequate cosmetic repair. Anaesthetic concerns in these patients are those arising due to the age of the infant and to provide effective post operative analgesia. The immature physiology of various organ systems, transitional circulation as well as anatomical differences in infants requires adequate knowledge, vigilance, identification and prompt interventions⁴. Infants tolerate hypoxia poorly because of very low cardiopulmonary reserve. So preoxygenating and maintaining proper oxygenation in the perioperative period is very important. The belief that persisted till 1980 that neonates and infants feel no pain or little pain was proven false by studies describing their response to noxious stimulus⁵. Thus making the analgesia an important aspect of pediatric anaesthesia. Surgeries for the repair of exostrophy of bladder and cloaca can last longer and require good analgesia in the post operative period for early recovery and for better outcomes. Maintaining effective postoperative analgesia in infants can be challenging owing to their more susceptibility to the respiratory depression to parental opioids. Regional anaesthesia like single shot caudal block, epidural catheter and caudal catheters can be good alternatives as they don't affect the respiration and achieve good pain relief. In this patient, we proceeded with caudal catheter. Infusion of 0.25% bupivacaine was continued throughout the surgery and in postoperative period 0.0625% bupivacaine was infused at the rate of 0.2ml/kg/hour for 48hours. It minimized the need of other systemic analgesics and aided in the early recovery. However, as there are risks of catheter site infection in these type of surgeries we removed the catheter after two days.

Small body size can make vascular access difficult in neonates and infants. Large head, large tongue, high up larynx and floppy epiglottis can pose difficulty in securing airway. Tongue fall owing to its large size can lead to airway obstruction in the perioperative period. Hypothermia should be prevented by prewarming the operation theatre to 27.C and covering all exposed parts with warm sheets and using warm I.V. and irrigating fluids³. The computerized Allon thermoregulatory system with circulating water in the garments used to cover baby can be newer available options to prevent hypothermia⁶. Both overhydration and underhydration should be avoided so is to avoid the hyper and hypoglycemia⁷. The maintenance fluid can be calculated using Holliday-Segar formula. APA guidelines recommend the use of isotonic fluids with 1-1.5% dextrose content intraoperatively⁸. The third space losses in abdominal surgeries should be replaced at the rate of 5-10ml/kg/h, 4-7ml/kg/h for thoracotomy and 1-2

ml/kg/h for superficial procedures. Other concerns like presence of comorbidities, congenital anomalies, immaturity of hepatic and renal systems should be kept in mind while providing anaesthesia to infants.

Conclusion

Providing anaesthesia in infants requires vigilance, attention, detection and prompt intervention to prevent any mishaps. Regional anaesthetic techniques are becoming more and more popular in providing anaesthesia and analgesia to the pediatric patients with beneficial effects of no or reduced opioid requirement. This in turn avoids their respiratory depressant effects and aids in rapid recovery.

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