Case Report

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Abdominal compartment syndrome following repair of large myelomeningocele: A rare complication

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ABSTRACT

Anaesthetic challenges in meningomyelocele include securing a definitive airway with proper positioning of child during intubation as well as during surgery. Other challenges include maintaining normothermia, fluid management and proper estimation of the blood loss. Here, we report a child posted for excision of a large lumbosacral meningomyelocele with tethered cord and diastematomyelia. The child developed abdomen distension and fall in urine output postoperatively which raised a strong suspicion regarding development of abdominal compartment syndrome. The case highlights the difficulties we encountered in the post-operative period and the course of events that followed.

Key words: Abdominal distension, diastematomyelia, lumbosacral meningomyelocele (MMC)

INTRODUCTION

Neural tube defects present as common congenital anomaly in children. Meningo-myelocoeles are preferably corrected during the early days of life to prevent further damage to the neural tissue[1,2]. Anaesthetic challenges include maintaining a proper positioning of the child during induction and intubation as an error in the positioning can lead to rupture of the swelling and leakage of the Cerebrospinal Fluid (CSF)[3]. Most patients show a diminished response to hypoxia, and may be more susceptible to post-operative apneic episodes[4]. Other considerations include securing a definitive airway, maintaining intraoperative normothermia, fluid resuscitation and all considerations regarding the management of a paediatric patient. These children also have an increased risk of latex allergy, although it is rarely encountered in Indian context[5]. Here, we report a case of a month old child with a large lumbosacral meningo-myelocoele posted for repair who developed abdominal compartment syndrome in the post-operative period.

CASE REPORT

A 28 day old female child, weighing 2.8 kg presented to the department of paediatric surgery with a large mass in the lumbosacral region. (Figure 1). The parents also gave history of urinary incontinence and bilateral lower limb weakness since birth. She was diagnosed as having a lumbosacral meningo-myelocoele and posted for excision. A detailed pre-anaesthetic checkup was done. The child was born of a full term normal vaginal delivery. Her developmental milestones were delayed. However she did not have any problem with feeding. There was also no history of chest infections in the recent past. On examination, heart rate was 130 beats per minute and a blood pressure of 82/30 mm Hg. On auscultation, no added sounds were heard in the chest. There was no murmur heard. Preoperative investigations showed a haemoglobin level of 10 gm/dl. All other investigations including the total leukocyte count, platelets, electrolytes and coagulation profile were within normal limits. Radiological investigations confirmed the clinical diagnosis of meningomyelocoele.

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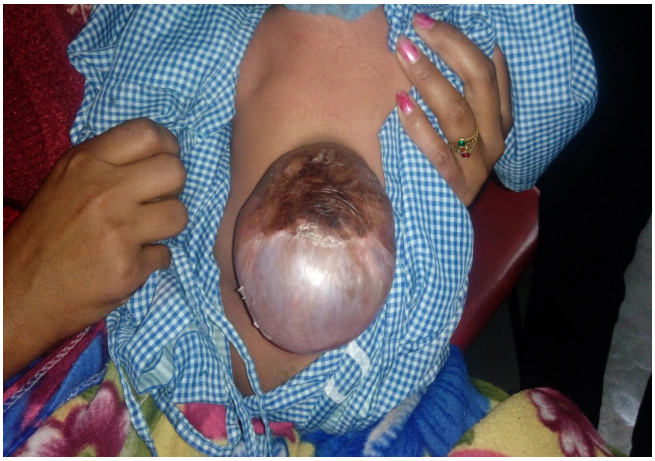

Figure 1. The child with a large lumbosacral meningo-myelocoele.

The child was taken up for surgery after obtaining informed consent and ensuring institutional fasting protocols which was 4 hours for breast milk.

On arrival to the operation theatre, careful positioning was done. The swelling was placed in the doughnut. Monitors were connected and baseline vitals noted. Electrocardiograph, non-invasive blood pressure, pulse-oximeter, capnograph and temperature were monitored using Drager Infinity Vista monitor (Model MS14750E5394) along with clinical monitoring with precordial stethoscope, urine output and surgical site. Inhalational induction was done using a Jackson Reese (JR) circuit with sevoflurane in 100% oxygen MAC 1.5 was achieved. Two intravenous access were secured with 24 gauge intravenous (i.v.) cannula. Injection fentanyl was given in the dose of 6µg. A dose of fentanyl 2 µg was repeated intraoperatively. After ensuring adequate ventilation, injection atracurium was given in a dose of 0.5 mg/kg. After ventilating the child for three minutes, a size 3.5 uncuffed endotracheal tube was inserted, fixed and connected to JR circuit after ensuring bilateral air entry being equal. A ryle's tube was inserted. Once induced, the child was placed in the prone position. The child was maintained on oxygen, nitrous oxide in a ratio of 40:60 with sevoflurane (1-3%), as per MAC readings on our monitor, manual ventilation and injection atracurium. Intraoperatively the blood loss was around 50-60 ml. Fluid administration (0.33% dextrose normal saline) was done at the rate of 10-12 ml/hour. The child developed hypotension twice intraoperatively (BP- 40/20 mm Hg) which was corrected by fluid boluses of 10 ml thrice. Urine output was monitored hourly and temperature monitoring was also done. Urine output intraoperatively was around 15 ml. The total operative time was around 5 hours and 30 minutes. At the end of the surgery the ryle's tube was taken out. The child was reversed with injection neostigmine 0.05 mg/kg and injection glycopyrrolate 0.01mg/kg body weight. After ensuring adequate reversal, the child was extubated. Around two hours after extubation in the post anaesthetic recovery room, the attending nurse noted slight abdominal distension. The child had tachycardia (heart rate –222/minute) and a temperature of 104 degrees Fahrenheit. Cold sponging was done and antipyretics were given to the child. Also antibiotics dosage was escalated. Her room air saturation was 92% on room air. She was put on oxygen at 6-8 litres/minute which was delivered via the oxygen hood. There was progressive increase in abdominal distension and the child started desaturating (SpO2 – 62%) and became tachypnoeic (rate – 40breaths/minute). Immediately the child was intubated and a ryle's tube insertion was done and 15ml of clear fluid was aspirated. The child was intubated using uncuffed endotracheal tube 3.5mm and put on ventilatorysupport. The tidal volume delivered was not adequate and peak pressures were high (25-26mm Hg). Child had some relief but again started deteriorating after few hours. Suspecting that the child had developed abdominal compartment syndrome; decision was taken to open the wound. The flap was relieved and aseptic dressing was done. Abdomen distension gradually started decreasing and the saturation started to improve. The parents even after vigorous counselling and assurance did not give consent for further management.

DISCUSSION

Neural tube defects are complex congenital spinal anomalies arising as a result of a defect in the neurulation process in the early weeks of gestation[6]. Neurological signs may develop because of abnormal tension on the spinal cord, especially during flexion and extension movement[7]. The symptoms of tethered cord in children may include foot deformities with weakness in legs, scoliosis and urinary abnormalities[8]. Preoperative evaluation of such children is of great importance as they may be a part of a syndrome presenting with anomalies of cardiac, gastrointestinal, genitourinary system. Also intraoperatively, issues such as maintaining an airway, positioning of the patient during surgery, fluid management, maintaining intraoperative haemodynamics are major concerns. Here, we had a 28 day old child posted for excision of a large lumbosacral meningo-myelocoele. The surgery took around five hours for completion and at the end of surgery, the child was extubated after ensuring adequate reversal. In the post-operative unit, the child started having abdominal distension with tachycardia and pyrexia and progressive increase in abdominal distension along with desaturation.

A similar case was reported by Chouhan et al. in 2015, where intraoperatively the child had developed abdominal compartment syndrome following repair of a meningo-myelocoele. The child had hypotension, bradycardia and decreasing saturation, decreased urine output and peak airway pressures[9]. Here, our child developed these symptoms in the post-operative period and gradually her condition worsened till she could not be resuscitated. Abdominal compartment syndrome is defined as sustained intra-abdominal pressure (IAP) >20 mmHg. No standardized definition of ACS specifically for infants and children is available. ACS in children may occuratlower IAP cutoff values of 12 and 15 mmHg[10]. This condition can be detrimental if not intervened properly. Diagnosis is mainly clinical. It decreases perfusion to intra-abdominal organs, reduces renal blood flow glomerular filtration rates leading to a decrease in urinary output. A diaphragmatic elevation increases intrathoracic pressure and therefore an increase in airway pressures is common. Here, probably our child had also developed abdominal compartment syndrome although gradually as suggested by the symptoms and signs displayed by the child. The reason for this could be the tight surgical flap closure as the defect was a large one and intraoperatively the surgeon also encountered difficulty in closing the defect. The catch was that the development of abdominal compartment syndrome was gradual so early intervention like opening of the surgical flap could not be done as clear cut diagnosis could not be established in the early phases.

CONCLUSION

To conclude, repair of a meningo-myelocoele can be challenging in paediatric patients especially if the defect is a large one. Due consideration should be given to adequate resuscitation of the child and management of intraoperative hemodynamics. Care should be extended to the postoperative period as the general condition of the child can worsen as happened in our case.

Source of Support:

Nil

Conflict of Interest:

None declared

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