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Enteric Duplication Cyst: A Rare Entity

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Abstract

Enteric duplication cyst is a rare congenital anomaly which usually presents as an acute distended abdomen. Rapid sequence induction in such neonates becomes necessary to avoid the deleterious effects of regurgitation and aspiration of gastric contents. 'Controlled' RSI, with careful mask ventilation, may decrease the risks associated with the classical approach. Multidisciplinary team working with preoperative optimization and good communication between surgeon and anaesthetist ensures best possible outcome in such neonates. We report an 8 day old neonate weighing 1.8 kg with grossly distended abdomen posted for exploratory laparotomy.

Keywords: Enteric duplication cyst, rapid sequence induction, aspiration, analgesia

Introduction

Enteric duplication cyst is a rare congenital anomaly where there is an abnormal portion of intestine attached to or intrinsic with the normal bowel and can involve any part of gastrointestinal tract from the mouth to the anus.[1] This condition may be associated with other abnormalities, such as complete colonic duplication, gastric diverticulum, and neurenteric cysts. The anaesthetic handling of neonates undergoing major abdominal surgical procedures is one of the most demanding tasks that can confront an anaesthetist. It requires excellent technical skills and also specific knowledge about the differences of neonatal physiology and pharmacology.[2] Rapid sequence induction is infrequently performed in neonates despite evidence that it is safe and effective. It has shown to facilitate better intubation conditions including no movement from the infant and better visualization of the airway.

Case Report

We report an 8 day old neonate with a grossly distended abdomen who was scheduled for emergent exploratory laparotomy. The neonate had been delivered at term by a normal vaginal delivery at our hospital with a birth weight of 2kg and APGAR score

of 8. Baby was NPO since birth and was passing urine and stools regularly. No other obvious congenital anomaly was observed. On antenatal scan, at 36 weeks, dilated bowel loops were seen in abdomen- 20 mm likely colonic. Fetal echo was normal. On day 2 of life, abdominal radiograph showed signs of dilated bowel loops. NCCT abdomen showed a cystic mass lesion (5.9 x 13.5 x 9.4 cm) showing gut signature in walls, without any evidence of communication with bowel, likely enteric duplication cyst. On the day of surgery, ringer lactate and 1% D was started @12 ml/hr. We planned to do a controlled rapid sequence induction in view of dilated bowel loops. Baby was laid supine on OT table, shoulder roll inserted. NG tube was put on continuous aspiration. In order to prevent hypothermia, neonate was wrapped with cotton wraps and supplemented with oxygen via face mask. All monitors were attached. Baby was premedicated with Inj fentanyl 2mcg iv and preoxygenated with 100% O_2 via Jackson and Ree's circuit in 20 degrees head up position. Induction was done with Inj thiopentone 10mg iv and Inj atracurium 2mg iv. Gentle bag and mask ventilation was done. After 3 min baby was intubated with Miller No 1 blade and ETT 2.5mm internal diameter. Anaesthesia was maintained on O_2/air 50/50, sevoflurane and atracurium topups. Post intubation, caudal block was performed with 2ml 0.25% Bupivacaine and 4mcg fentanyl. Enteric cyst measuring 17x10 cm, weighing 800g was removed from the abdomen. Baby was extubated on table after adequate reversal of neuromuscular blocker. Surgery lasted for 90min. At present (postop 2 months), baby is doing well as followed up in paediatric surgery OPD.

Discussion

Enteric duplication cyst is an infrequent congenital anomaly that mainly affects the small intestine related to the development of the gastrointestinal tract. This condition had incidence of two or three cases per year in pediatric referral centers with estimated incidence thought to be 1 in 4500 births which represent its rarity, with slight male predominance They are mainly located in the ileum (40%), but they have been encountered in the esophagus, colon, jejunum, stomach, duodenum and rectum. Its presentation is usually cystic (90%) but may be also tubular (10%), single or multiple in up to 15% of the cases. Other malformations may be associated with it as spinal defects, intestinal malrotation, intestinal atresia and other abnormalities of the urinary tract.A perioperative plan must be formulated by the anaesthetist based on airway management, prevention of hypothermia, fluid balance, acid base balance , blood loss and analgesia. Main aims are to prevent aspiration of gastric contents during induction, maintain temperature and fluid balance and provide adequate analgesia. Neonates with abdominal emergency often have distended abdomen which mandates rapid control of airway while minimizing the risk of regurgitation and aspiration of gastric contents during induction. The development of the Rapid Sequence Induction technique is based upon adult practice. In children a 'classical' RSI may not always be the correct choice because of psychological, anatomical, and physiological differences. A survey of UK anaesthetists found that only around 50% would routinely perform an RSI for a child with a presumed full stomach despite having comparable aspiration risk as an adult.[3] Passive regurgitation occurs mainly because of a distended or incompetent lower oesophageal sphincter. Common causes for this are attributable to gastric distension during bag mask ventilation or after accidental oesophageal intubation. Other important causes of abdominal distension include intestinal obstruction,

intra-abdominal tumours, and ascites. Active expulsion of gastric content occurs mainly because of instrumentation of the airway before adequate depth of anaesthesia is reached, leading to coughing and vomiting.[4]

There are several anatomical factors that predispose infants to gastro-oesophagealreflux (GOR). Infants have a shorter oesophagus, thereby the stomach is that much closer to the larynx. The angle of His (made by the oesophagus and the axis of the stomach) is obtuse in newborns but decreases as infants develop. Infants also have decreased gastric compliance, which is believed to lead to lower oesophageal sphincter relaxation at lower intra-gastric volumes. It was initially thought that infants have an immature lower oesphageal sphincter (LOS), which predisposes them to GOR, but it has now been shown that it is because of periods of transient lower oesophageal relaxation. Abdominal muscle contraction coinciding with an episode of LOS relaxation may increase the risk of aspiration.[4] Also time to complete preoxygenation is theoretically shorter in children because of a smaller lung volume and an increased respiratory rate. However, a non-compliant and sometimes combative child may make full denitrogenation and preoxygenation unobtainable whilst simultaneously increasing oxygen consumption. During apnoea in a term baby who is 1 month old, the rate of decline of PaO2 is three times more rapid than in an adult. Infants tolerate even very short periods of apnoea badly and can desaturate after <100 s despite adequate preoxygenation.[5] Failure to achieve full preoxygenation/denitrogenation because of noncompliance from the child compounds this risk. It is important to maintain the application of continuous positive airway pressure via a tight fitting mask, in order to reduce atelectasis. This is emphasized in children, as they are more prone to atelectasis and hypoxaemia on induction because of the combination of a reduced FRC, increased closing volume, and higher respiratory rate. There has been much controversy about the benefits and risks of cricoid pressure recently in the literature.A study examined CT scans of the neck of 120 children to assess the alignment.[6] In children <8 yr old, 45% had lateral displacement of the oesophagus at the level of cricoid cartilage as opposed to only 15% of children over the age of 8. This questions the efficacy of cricoid pressure in children, particularly in younger children. In children the cricoid cartilage is smaller and more cephalad in position, making it harder to identify. In addition, when the cricoid cartilage is depressed, it decreases the lower oesophageal sphincter tone, predisposing to aspiration. A recent survey showed that only 50% of anaesthetists would routinely apply cricoid pressure in paediatric patients aged 1–14 and only 40% if they were <1.11. Application of forces as low as 7.7 N may adequately compress a child ’s airway, and higher forces (typically 30 N) as recommended for use in adult practice may worsen or obscure the view of the larynx.[7] However, the use of cricoid pressure may prevent insufflation of the stomach during bag mask ventilation. Effectively applied cricoid pressure may prevent gastric insufflation upto a maximal pressure of 40cm H2O in children between 2weeks and 8yr old.[8]

RSI with a desaturating child can be a very stressful time for the personnel involved. There is emerging evidence that the use of a ‘controlled RSI (cRSI)’, without the use of cricoid pressure may offer an effective and potentially safer alternative. By utilizing this technique, it allows the operator optimal conditions, with ideal respiratory and haemodynamic

conditions.[9] Significant differences between RSI and cRSI include:

- Continuous aspiration of an NG tube if in situ. If no NG, then one should be inserted after the tracheal tube is secured.
- Patients in a 20° head up position during preoxygenation and induction.
- Titration of induction agent to produce hypnosis followed by administration of a non-depolarizing relaxant. Atracurium at 1mgkg−1 is traditionally described in cRSI but any neuromuscular blocking agent may be used as it is more important to guarantee optimal relaxation, guided by monitoring of neuromuscular block.
- Gentle bag mask ventilation (insufflation pressure <12 cm H2O) before intubation.
- Intubation only after there is no response to a train-of-four stimulus from a nerve stimulator, thus allowing time for a deep level of anaesthesia and complete muscle paralysis.[4]

We followed a controlled RSI technique to induce our patient which helped us to avoid any desaturation or regurgitation of gastric contents and successfully intubate in optimal conditions.

Warming devices for both the neonate (e.g. under body forced air warmer) and infused fluids (e.g. co-axial fluid warmer) together with increasing the ambient theatre temperature will help minimize the inevitable heat loss that neonates suffer during a laparotomy.[9] We used a fluid warmer together with ambient OR temperature and temperature monitoring to avoid hypothermia.

Effective and safe pharmacotherapy is dependent upon an understanding of the clinical pharmacokinetic (PK) and pharmacodynamics (PD) properties of the drugs used. Besides age dependent differences in PK and PD, differences in adverse effects should also be considered. The minimal alveolar concentration for inhalation agents is lower in neonates than in infancy as is their tolerance to high concentrations. It is feasible to cause an already sick neonate to have cardiovascular decompensation with liberal quantities of sevoflurane. Thiopental can be used in conjunction with an opioid, for example, fentanyl to induce anaesthesia. However, the terminal half-life of thiopental is very long in premature and newborn babies and this can result in prolonged emergence from anaesthesia. This will only be relevant if extubation is planned. The PK profile of propofol has been outlined in infants and small children and is a useful alternative to thiopental in the neonate.[9]

Ongoing losses can be divided into insensible loss and blood loss. It is quite feasible for a neonate undergoing laparotomy to lose 8–10 ml kg^{-1} h^{-1} through evaporation and this should be replaced using warmed lactated Ringer's solution. Constant vigilance of cardiovascular status (HR, AP, cap refill, and core/ peripheral temperature) will guide this fluid administration

In the sick neonate, many will consider transfusion at 10% total blood loss depending on starting haemoglobin, co-morbidity, and the stage of the procedure. This may be only 15 ml or less in the smallest babies. Haematocrit may also be used as a guide but not be solely relied on. Our centre view suggests that haemoglobin of 12–14 gdl^{-1} serves as a useful target for transfusion. It is also imperative to remember that the haematocrit of the blood lost is only about half that of the packed cells being administrated so a rough formula would be to transfuse 1ml packed cells for every 2 ml blood loss with the difference made up by lactated Ringer's or blood products such as FFP and sometimes 4.5% albumin infusion in the intraoperative period.[10]

A multimodal approach to analgesia is required. Regional analgesia in the form of a caudal or lumbar epidural provides excellent intra- and postoperative analgesia. Opioids will be needed either as an i.v. infusion or bolus; i.v. paracetamol provides background analgesia and should be continued after operation. Care must be taken to reduce the total dose of local anaesthetics, opioids,and paracetamol as neonates lack mature liver enzymes for the efficient metabolism of drugs. We used iv fentanyl (1mcg/kg) , paracetamol (7.5mg/kg), and caudal anaesthesia (bupivacaine 0.25% 2mg/kg) to provide adequate analgesia which further reduced the requirement of inhalational agents and NDMRs. Surgical and anaesthetic care for neonates requiring laparotomy is best delivered in units which have the multidisciplinary support for these challenging patients and performs these operations on a regular basis. A logical approach to preoperative optimization, meticulous attention to detail with perioperative anaesthetic concerns, and postoperative nursing on an NICU, PICU, or occasionally on a highly skilled paediatric surgical ward will achieve the best results.

References

1. Neazy A, Almatrfi A, Alharbi W, Abokrecha A. Two different presentations of intestinal duplication cyst in pediatric age group. Saudi Surg J 2018;6:100-3.
2. Lonnqvist PA. Major abdominal surgery of the neonate: anaesthetic considerations. Best Pract Res Clin Anaesthesiol 2004; 18: 321–42
3. Stedeford J, Stoddart P. RSI in paediatric anaesthesia – is it used by non-paediatric anaesthetists? A survey from southwest Endland. Pediatr Anesth 2007; 17: 235–42
4. Newton R, Hack H. Place of rapid sequence induction in paediatric anaesthesia. BJA Education, 16 (4): 120–123
5. Hardman JG, Wills JS. The development of hypoxaemia during apnoea in children:acomputational modeling investigation. Br J Anaesth 2006; 97: 564–70
6. Dotson K, Kiger J, Carpenter C et al. Alignment of cricoid cartilage and esophagus and it's potential influence in the effectiveness of Sellick maneuver in children. Pediatr Emerg Care 2010; 26: 722–5
7. WalkerRW,RaviR,HaylettK. Effect of cricoid force on airway calibre in children: a bronchoscopic assessment. Br J Anaesth 2010; 104: 71-4
8. Moynihan RJ, Brock-Utne JG, Archer JH, Field LH, Kreitzman TR. The effect of cricoid pressure on preventing gastric insufflation in infants and children. Anaesthesiology 1993; 78: 652–6
9. Chandrashekhar S, Davis L Challands J. Anaesthesia for neonatal laparotomy. BJA Education, 15 (4): 194–198
10. O'Brien F, Walker IA. Fluid haemostasis in the neonate. Paediatr Anaesth 2014; 24: 49

Legends Figure

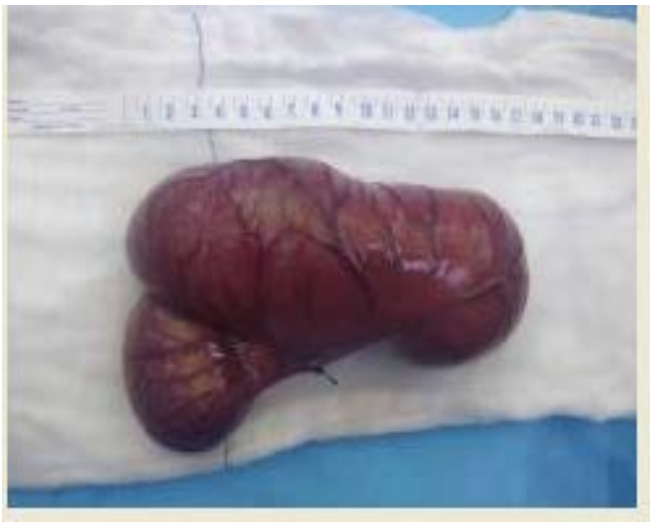

Figure 1

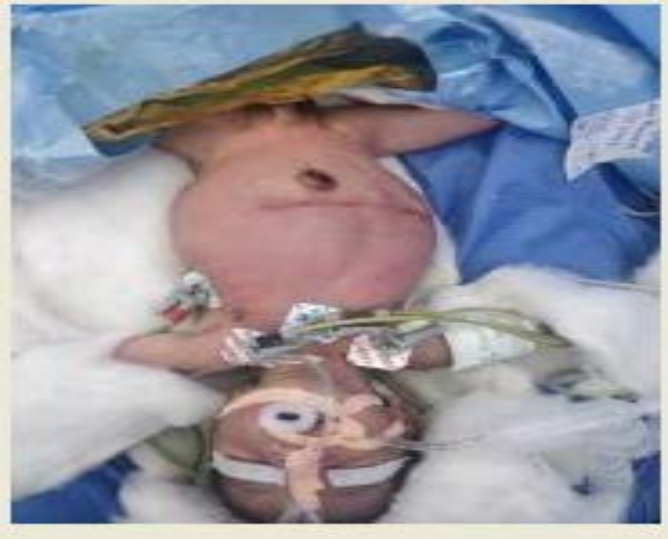

Figure 2

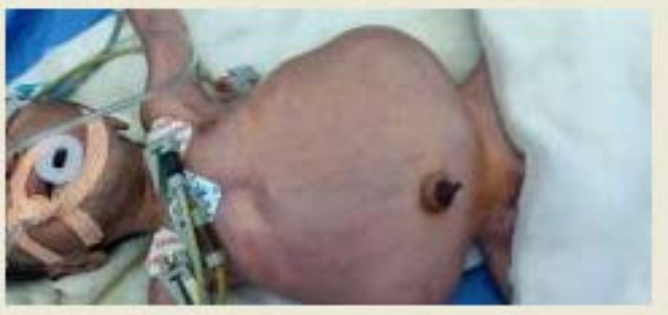

Figure 3