



REVISTA BRASILEIRA DE ANESTESIOLOGIA

Publicação Oficial da Sociedade Brasileira de Anestesiologia
www.sba.com.br



CLINICAL INFORMATION

Gastroschisis repair under caudal anesthesia: a series of three cases



Neha Kasat*, Nandini Dave, Harick Shah, Swapnil Mahajan

Seth G.S. Medical College & K.E.M. Hospital, Department of Anesthesia, Mumbai, India

Received 5 May 2016; accepted 22 July 2016

Available online 31 August 2016

KEYWORDS

Gastroschisis;
Anesthesia, caudal;
Infant, newborn

PALAVRAS-CHAVE

Gastrosquise;
Anestesia caudal;
Lactentes,
recém-nascido

Abstract Gastroschisis is a congenital anomaly characterized by a defect in the anterior abdominal wall with protrusion of abdominal viscera. Perioperative mortality is very high in these patients. Traditionally gastroschisis repair has been performed under general anesthesia with endotracheal intubation, requiring postoperative intensive care admission and mechanical ventilation. Caudalblock is an attractive alternative to general anesthesia. We present a series of three neonates with gastroschisis, repaired solely under caudal anesthesia.

© 2016 Sociedade Brasileira de Anestesiologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Correção de gastrosquise sob anestesia caudal: uma série de três casos

Resumo Gastrosquise é uma anomalia congênita caracterizada por um defeito da parede abdominal anterior com protrusão de vísceras abdominais. A mortalidade no período perioperatório é muito elevada nesses pacientes. Tradicionalmente, a correção de gastrosquise tem sido realizada sob anestesia geral com intubação orotraqueal, o que requer internação em unidade de terapia intensiva e ventilação mecânica no pós-operatório. O bloqueio caudal é uma alternativa atraente à anestesia geral. Apresentamos uma série de três casos de recém-nascidos com gastrosquise corrigida unicamente sob anestesia caudal.

© 2016 Sociedade Brasileira de Anestesiologia. Publicado por Elsevier Editora Ltda. Este é um artigo Open Access sob uma licença CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Gastroschisis is a congenital defect in the anterior abdominal wall with protrusion of viscera outside abdominal cavity. The incidence is 2–4.9 per 10,000 live births, with male

* Corresponding author.

E-mails: kasat.neha21@gmail.com, shahharick@gmail.com
(N. Kasat).

preponderance.¹ Administration of general anesthesia to these neonates increases the likelihood of postoperative apnea and need for mechanical ventilation. To overcome these problems, central neuraxial blocks are looked upon as an alternative. We report a series of three neonates with gastroschisis, where surgery was performed solely under caudal anesthesia.

Case series

Neonate one

Day 2 premature neonate born at 34 weeks, weighing 1.5 kg was posted for silo bag application for gastroschisis. On examination patient's small intestine was protruding outside the abdominal wall. Neonate was active with good cry. Patient's pulse rate was 130 min^{-1} and respiratory rate 35 min^{-1} . Preoperative assessment did not reveal any systemic abnormalities. Laboratory investigations were within normal limits. 10% dextrose at $120 \text{ mL.kg}^{-1}.\text{day}^{-1}$ was administered for 2 days.

Neonate two

Day 4 premature neonate born at 34 weeks, weighing 2 kg was posted for silo bag application for gastroschisis. Small bowel and part of stomach were lying outside the abdominal cavity. Preoperative pulse rate was 145 min and respiratory rate 40 min. Cardiorespiratory assessment and biochemical investigations were within normal limits. Multiple electrolyte solution was administered at $150 \text{ mL.kg}^{-1}.\text{day}^{-1}$.

Neonate three

A 12 hour old newborn, born at 36 weeks, weighing 2.1 kg was posted for complete reduction for gastroschisis. Part of small bowel and large bowel were protruding outside the abdomen. Neonate was active with good cry. Pulse was 144 min with respiratory rate 45 min. All investigations were within normal limits. Dextrose 10% was given at $100 \text{ mL.kg}^{-1}.\text{day}^{-1}$.

Anesthesia management

Intraoperative monitors included cardioscope, pre and post ductal pulse-oximeters, temperature probe and non invasive blood pressure.

All cases were conducted under caudal block only. Inhalation induction using sevoflurane with face mask was performed to maintain immobility of neonates while giving caudal. After giving left lateral position and under all aseptic precautions, a combination of 0.5% bupivacaine (2 mg.kg^{-1}) and 2% lignocaine with adrenaline (1:200000) 7 mg.kg^{-1} was given. Total drug volume administered in all cases was 1.25 mL.kg^{-1} ; the local anesthetic drug combination was diluted with Normal Saline (NS) to make up the calculated volume. No other drug was given. Oxygen was supplemented through nasal prongs at 1 L.min^{-1} and continuous end tidal CO_2 monitoring was performed. Analgesia

was supplemented with Inj. Paracetamol 7.5 mg.kg^{-1} . Perioperative fluids consisted of 10 mL.kg^{-1} of 10% dextrose for maintenance and 15 mL.kg^{-1} of NS used as replacement fluid. Vitals remained stable perioperatively. The neonates were spontaneously breathing throughout. Silo bag application was performed in first two cases whereas primary closure was performed in third case. The procedure lasted for 60 min, 75 min and 90 min respectively. Blood loss was minimal in all cases. All three neonates were shifted to NICU breathing spontaneously without any need for intubation or ventilator support, and were observed for respiratory depression, apnea and signs of development of compartment syndrome.

Discussion

Major abdominal surgeries in neonates are mostly performed under general anesthesia with endotracheal intubation, or general anesthesia with regional blockade. However, general anesthesia increases the likelihood of complications like requirement for prolonged mechanical ventilation and morbidity associated with prolonged ventilation, especially in high-risk premature neonates.²

Regional anesthesia has been advocated for high risk newborns that are required to breathe spontaneously following surgery. It can be considered as an effective anesthetic technique in awake or sedated neonates and infants as an alternative to general anesthesia for gastrointestinal surgery. In this series of three cases, single shot caudal anesthesia was given successfully for gastroschisis repair.

Caudal anesthesia is associated with minimal cardiorespiratory alteration, and offers hemodynamic stability with good muscle relaxation. It decreases the need for perioperative opioid analgesics and the associated respiratory depression. Other advantages include reduction of surgical stress response and decreased incidence of post operative hypoxemia and bradycardia. Also a spontaneously breathing neonate allows surgeon to decide on the feasibility of primary closure. Respiratory distress due to increased intra-abdominal pressure can thus be recognized early.³ The lower limb pulse oximeter helps surgeons to guide the extent of bowel reposition into the abdomen which will be tolerated by the neonate without compromising circulation in the lower limb.

Spinal anesthesia can also be used as an anesthesia modality for gastroschisis repair.^{3,4} Its disadvantage is that it is difficult to judge the spinal level in neonates and its short duration of action. Repositioning of abdominal contents increases intra-abdominal pressure, thereby increasing the chance of high or total spinal leading to respiratory distress. Caudal anesthesia further helps in avoiding these complications.

Combined spinal epidural has also been reported as a safe anesthesia technique for gastroschisis repair. But this approach is time consuming, and has other problems like technical difficulties, failure to thread epidural catheters and accidental dislodgement of catheters.⁵

To conclude, we report safe administration of caudal anesthesia for gastroschisis repair, especially in developing countries where resources are limited or restricted.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Klein MD. Congenital defects of the abdominal wall. In: Grosfeld JL, O'Neill JA Jr, Coran AG, Fonkalsrud EW, Caldamone AA, editors. *Textbook of paediatric surgery*. 6th ed. Philadelphia: Mosby Elsevier; 2006. p. 1157–71 [Chapter 73].
2. Steward DJ. Preterm infants are more prone to complications following surgery than term infants. *Anesthesiology*. 1982;56:304–6.
3. Vane DW, Abajian JC, Hong AR. Spinal anaesthesia for primary repair of gastroschisis: a new and safe technique for selected patients. *J Paediatr Surg*. 1994;29:1234–5.
4. Tobias JD. Spinal anaesthesia in infants and children. *Paediatr Anaesth*. 2000;10:5–16.
5. Somri M, Tome R, Yanovski B, et al. Combined spinal-epidural anaesthesia in major abdominal surgery in high-risk neonates and infants. *Paediatr Anaesth*. 2007;17:1059–65.