Caudal Anaesthesia with Levobupivacaine for Inguinal Hernia Surgery in Children with Severe Congenital Anomaly: A Three-Case Report

Ciddi Konjenital Anomalisi olan Çocuklarda İnguinal Herni Cerrahisi için Levobupivakain ile Kaudal Anestezi: Üç Olgunun Sunumu

Şükran Geze, Bahanur Çekiç, Engin Ertürk

Department of Anesthesiology and Reanimation, Faculty of Medicine, Karadeniz Teknik University, Trabzon, Turkey

ABSTRACT

Airway management is particularly difficult in children with severe congenital anomalies. Such patients are extremely sensitive to the respiratory depressant effects of anaesthetic agents. We describe the successful and safe application of caudal anaesthesia for inguinal hernia repair in three cases with severe congenital anomalies (Joubert syndrome, I-cell syndrome). The three patients concerned had congenital anomalies including serious facial deformity, respiratory failure and cardiovascular defects. They were administered a single dose of caudal epidural anaesthesia for inguinal hernia surgery in order to avoid complications associated with general anaesthesia. Caudal block was performed and 1 mL/kg levobupivacaine 0.25% administered. We conclude that caudal epidural anaesthesia can be an effective, suitable and safe anaesthetic technique for inguinal herniotomy without the need for general anaesthesia or endotracheal intubation in children with severe congenital anomalies. *(Gazi Med J 2012; 23: 145-7)*

Key Words: Caudal anaesthesia, children, congenital anomaly

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ÖZET

Havayolu yönetimi, ciddi konjenital anomalileri olan çocuklarda özellikle zordur. Bu tür hastalar anestezik ilaçların solunum depresan etkilerine karşı aşırı derecede duyarlıdır. Kaudal anestezinin inguinal herni onarımındaki başarılı ve güvenli uygulaması konjenital anomalileri (Joubert sendromu, I-cell hastalığı) olan üç olguda gösterilmiştir. İlgili üç çocuk hastada, ciddi yüz deformitesi, solunum yetmezliği ve kardiyovasküler bozukluk dahil konjenital bozukluklar vardı. Genel anesteziyle ilişkili komplikasyonları önlemek için inguinal herni cerrahisinde tek doz kaudal epidural anestezi uygulandı. Kaudal anestezide %0.25 levobupivakain 1 mL/kg kullanıldı. Kaudal epidural anestezinin, ciddi konjenital bozuklukları olan çocuklarda inguinal herni onarımı açısından genel anesteziye veya endotrakeal entübasyona gerek duyulmadan etkili, uygun ve güvenli bir alternatif anestezi tekniği olabileceği sonucuna varıldı. *(Gazi Med J 2012; 23: 145-7)*

Anahtar Sözcükler: Kaudal anestezi, çocuk, konjenital bozukluk

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INTRODUCTION

Airway management is particularly difficult in children with severe congenital anomalies . Such patients are extremely sensitive to the respiratory depressant effects of anaesthetic agents. Caudal block is usually performed after the induction of general anaesthesia and is used to provide intraoperative anaesthesia as well as postoperative analgesia in children undergoing various lower abdominal surgical procedures (1, 2). Inguinal hernias are particularly common in infants, and early surgical repair is frequently indicated, due to

Address for Correspondence / Yazışma Adresi: Dr. Şükran Geze, Department of Anesthesiology and Reanimation, Faculty of Medicine, Karadeniz Teknik University, Trabzon, Turkey Phone: +90 462 377 59 09 E-mail: drgezes@yahoo.com

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the risk of bowel incarceration. Awake regional anaesthesia provides safe and effective operating conditions for inguinal herniotomy in children. We describe the successful and safe application of single dose caudal anaesthesia for inguinal hernia repair in three cases with severe congenital anomalies.

CASE REPORTS

Single dose caudal epidural anaesthesia was performed in three children with congenital anomalies, including serious facial deformity, respiratory failure and cardiovascular defects, for inguinal hernia surgery. Informed consent was obtained from the parents of all the children. Atropine was administered intramuscularly at a dosage of 0.01 mg/kg for premedication 30 minutes pre-surgery. Pulse oxymetry, non-invasive blood pressure, electrocardiogram and capnography were monitored in the operating room. After intravenous access had been secured, the patient was sedated with intravenous 0.1 mg/kg midazolam and 0.5 mg/kg ketamine. The caudal and surgical areas were anesthetized with lidocaine cream. Caudal block was performed, and 1 mL/kg levobupivacaine 0.25% was injected into the epidural space using a 22 G Epican Paed (Braun, Melsungen, Germany) caudal needle. Sensory block level was assessed using skin prick response and was established at T5-6. Skin incision was initiated 20 min following local anaesthetic injection; no patients required intraoperative supplemental analgesia. All children received oxygen during the procedure and surgery. Postoperative course was uneventful. No urinary retention was observed. Time to discharge varied because of additional problems.

Case 1

He was a 6.5-month-old boy, weighing 7 kg, with Joubert syndrome. Physical findings included micrognathia (Figure 1), ataxia (lack of muscle control) and hypotonia (low muscle tone), as well as hyperpnoea (an abnormal breathing pattern), apnoea (cessation of breathing) and abnormal eye and tongue. Echocardiography revealed left ventricular hypertrophy and patent foramen ovale. Cranial tomography revealed periventricular leukomalacia.

Case 2

She was a 6-month-old girl, weighing 4 kg. Physical findings included micrognathia, cleft palate and cleft lip. Echocardiography revealed mitral failure and atrial septal defect. We also determined severe respiratory findings due to chronic pulmonary aspiration.

Case 3

She was a 3-year-old girl, weighing 13 kg, with I-Cell syndrome (Figure 2). Physical findings included macroglossia, abnormal skeletal development, coarse facial features and restricted joint movement. Echocardiography revealed mitral failure, atrial septal defect and ventricular septal defect. Severe respiratory findings were also noted at physical examination.

DISCUSSION

We described the use of single dose awake caudal anaesthesia, with levobupivacaine as the sole anaesthetic management agent, for inguinal hernia surgery in three children with severe congenital anomaly for inguinal hernia surgery.

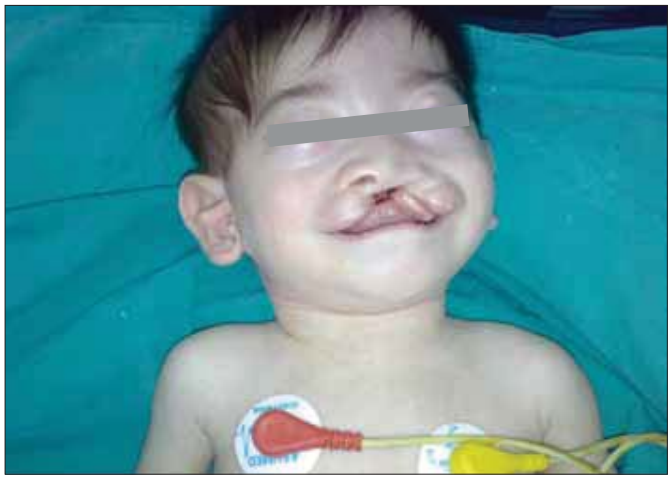

Figure 1. Infant with cleft palate and cleft lip

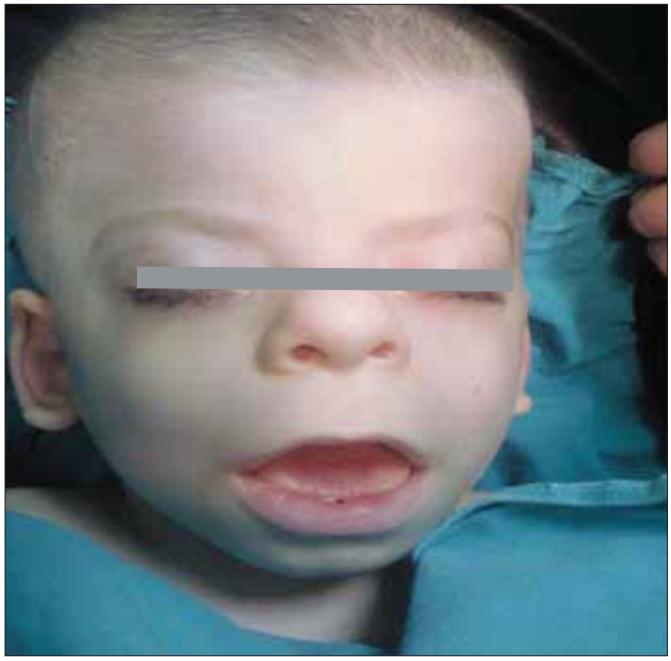

Figure 2. I-Cell Disease

Airway management during anaesthesia is difficult in children with congenital anomaly due to facial deformities such as micrognathia, cleft palate or glossoptosis.

In case 1, facial deformity represented a difficulty in obtaining a satisfactory mask. Cleft palate may also cause intubation difficulties. Children with Joubert syndrome have respiratory control abnormalities resulting in episodic tachypnoea and apnoea in the neonatal period (3). Respiratory rate may increase up to 200 breaths/min, alternating with bradypnoea and apnoea.

Apnoea may occur during inhalational induction even when nitrous oxide alone is used. Infants with I-Cell disease exhibit muscle hypotonia and coarse facial features. A large tongue, limited cervical movement and hypertrophy of nasal tissues, tonsils and adenoids all contribute to difficult intubation (4). General anaesthesia may therefore lead to several life threatening complications associated with airway control and perioperative anaesthetic complications.

Caudal epidural anaesthesia has been used in infants for inguinal hernia surgery (5-7). Caudal blockade with a stable cardiovascular profile in children may provide excellent analgesia without depressing respiration (8). In our three cases we therefore elected to employ caudal epidural anaesthesia.

Levobupivacaine is the S(-)-enantiomer of bupivacaine, was used as the alternative local anaesthetic in caudal block due to its reduced toxic effects. Levobupivacaine has been reported to be less toxic to the cardiovascular and central nervous system than an equal amount of bupivacaine (9, 10). We therefore decided to use levobupivacaine as the major local anaesthetic in all patients because of this lower toxicity.

We used a concentration of 0.250% levobupivacaine at a dose of 1 mL/kg and achieved adequate analgesia and sensory level. There were no clinical signs of cardiac or neurological toxicity.

All three cases were children with anomalies and, in particular, cardiac problems. Atropine was administered to avoid bradycardia during sedation or incision, since such children are inclined to bradycardia. Ketamine atropine was also used in order to decrease secretion in children with chronic aspiration.

In case 1 we excluded general anaesthesia due to facial deformity, especially cleft lip, cleft palate and chronic aspiration.

Galante et al. (11) reported the safe application of combined general and caudal anaesthesia for inguinal hernia repair in an 8-month-old male infant with Joubert syndrome. We performed only caudal anaesthesia with sedation and achieved adequate anaesthesia for hernia repair in our patients with Joubert syndrome.

Mahfouz et al. (12) reported diffucult intubation management in a child with I-cell disease.

Anaesthetic management in our cases involved a high risk of difficult intubation and the possible need for postoperative mechanical ventilation. We therefore elected to perform caudal anaesthesia for hernia repair in our patients with I-Cell syndrome.

Our three cases showed that caudal anaesthesia is an effective, suitable and safe anaesthetic technique for hernia surgery, especially in cases with severe facial deformity and anomalies.

CONCLUSION

We conclude that caudal epidural anaesthesia may be a suitable alternative to general anaesthesia for inguinal herniotomy without the need for endotracheal intubation in children with severe congenital anomalies.

Conflict of Interest
No conflict of interest was declared by the authors.

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