CASE REPORT

Post-Epidural Unilateral Paralysis of Intercostal Muscles in Child

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ABSTRACT

Morbidity after paediatric epidural anaesthesia is unusual. We report a case of transient motor nerve root block in an eleven years old girl receiving epidural analgesia postoperatively following anterior instrumented spinal fusion for scoliosis. The epidural catheter was placed within the T8-T9 inter-space under general anaesthesia. Postoperatively the child developed unilateral paradoxical chest wall movement which was felt to be due to transient motor nerve roots blockade from the epidural analgesia, resulting from migration of catheter though uncommon, the complication needs to be considered in the differential of respiratory compromise postoperatively.

Key words: *Epidural. Motor blockade. Analgesia. Spinal. Anaesthesia. Unilateral paralysis. Intercostal muscles. Catheter migration.*

INTRODUCTION

Epidural technique is a well known form of post-operative analgesia for various surgical procedures. The technique is frequently used for various spinal operations like scoliosis with favourable outcomes.

Epidural catheter migration has been known to cause transient motor nerve roots blockade.[1] We present a case of unilateral epidural catheter migration resulting in transient unilateral paralysis of intercostal muscles.

CASE REPORT

An eleven years old girl was diagnosed with adolescent idiopathic scoliosis. Pre-operatively, the patient was fully investigated. The patient had normal cardiac anatomy assessed by echocardiography and normal respiratory function assessed clinically as well as by respiratory function tests that were within the normal predicted range. She underwent an anterior instrumented spinal fusion from T5-T12 under general anaesthesia for correction of the spinal deformity.

For postoperative analgesia a thoracic epidural catheter was placed at T8-T9 level through midline approach using a 16G Touhy's needle. A right sided chest drain was placed *in-situ* intraoperatively which is a routine as the approach is via thoracic cavity. After an initial bolus of local anaesthetic of 0.25% bupivacaine 10 mls, a continuous epidural infusion of 0.1% bupivacaine and 2 μg/ml of fentanyl was started. The rate of infusion varied from 3 to 12 mls per hour. Visual analogue scale (VAS) was used to assess the pain severity.

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Postoperatively on the same day the patient started complaining of mild numbness of the right hand. As there were no other symptoms and there was no motor deficit, the local anaesthetic in the epidural solution was considered to be an etiological factor. Due to the recent major surgery that the patient had undergone, it was decided to continue with the epidural analgesia.

By the third day the patient was noticed to have a paradoxical chest movement with decreased chest expansion on the right side. She was comfortable and not complaining of any pain due to the chest drain and had oxygen saturation of 98% on 2 litres of O_2. Percussion was resonant throughout and on auscultation there was reduced air entry throughout the right lung field. CXR showed no evidence of pneumothorax, pleural effusion or collapse. An ultrasound of the chest was also performed that did not reveal any abnormality.

As all other causes were excluded, it was felt that unilateral migration of the epidural catheter resulting in a unilateral blockade of the intercostal nerves may be the cause. As her pain was now well controlled on alternative analgesics, the epidural infusion was discontinued.

Over the next few hours, there was a significant improvement in chest movement and air entry and numbness in her right hand also resolved.

DISCUSSION

The safety and efficacy of analgesic therapy has improved in the recent years to allow better understanding of their pharmacokinetics and dynamics in children. In complex cases a multidisciplinary approach with paediatric expertise is the key. A pragmatic and individualized pain management plan is important for each child, based on assessment of the child's pain using appropriate tools, with due importance given to rapid control of breakthrough pain, and treatment of adverse effects appropriately.

Epidural anaesthesia is commonly used for surgical procedures involving the spine, lower limbs, pelvis, perineum and abdomen. The advantage of epidural over spinal anaesthesia is the ability to maintain continuous anaesthesia after placement of an epidural catheter. This feature also enables the use of this technique in the postoperative period for analgesia, using lower concentrations of local anaesthetic drugs often in combination with opioid analgesics.[2,3]

Sensory loss or paraesthesia of high thoracic or cervical nerve roots is a well recognised side effect of epidural analgesia.[4] However, unilateral thoracic motor nerve block is uncommon with thoracic epidural. These motor and sensory changes are attributed to the concentration and volume of local anaesthetic administered.

As opioids are also administered along with local anaesthetics in the epidural space, in severe cases, opioids may lead to respiratory depression. The incidence is 1.2% (0.4% requiring naloxone).[5] This opioid-related side effect of epidural fentanyl/ bupivacaine may be reduced by decreasing the fentanyl concentrations in these mixtures.[6]

The diagnosis of motor-sensory blockade due to epidural catheter migration was supported by the fact that the patient had numbness of her right arm and later she developed unilateral reduced movement of the right hemithorax, which improved on cessation of the epidural analgesia.

Epidural analgesia can be used safely and effectively to control postoperative pain after anterior instrumentation and spinal fusion for adolescent scoliosis.[7-10] Unilateral motor nerve block is uncommon with thoracic epidural however, this needs to be a part of differential diagnosis in a child with respiratory compromise. In severe cases this may require ventilatory support. Though this phenomenon may be familiar to the anaesthetists; paediatricians should also be aware of the possibility of motor nerve block in a postoperative child with on epidural analgesia.

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