Erector Spinae Block in a Patient Posted for Nephrectomy with History of Spine Surgery

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INTRODUCTION

Erector spinae block is a relatively new block which gives comparable analgesia but lesser side effects as compared to other techniques like epidural block, paravertebral block, intercostal or interpleural block. We hereby present a case of a patient posted for nephrectomy, in whom epidural block was deferred due to previous spine surgery and neurological deficits and in this patient erector spinae block proved to be very effective.

PRESENTATION OF CASE

A 35 years old male presented to us with a history of left staghorn calculus causing hydronephrosis along with eventual pyelohydronephrosis. He had Double-J (DJ) stent placed on an outpatient basis, but that did not help the patient. Due to further deterioration of kidney functions secondary to obstructive nephropathy and pus collection, he was planned for left nephrectomy.

Patient gave history of laminectomy at the level of T12-L1 and L1-L2 and L2-L3 for prolapsed intervertebral disc at these levels causing weakness and paraesthesia on left lower limb. Patient also gave history of fall from tree at the age of 3 years which caused fracture of multiple ribs on left side and change of posture.

CLINICAL DIAGNOSIS

Left staghorn calculus causing hydronephrosis along with eventual pyelohydronephrosis with DJ Stent in situ.

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DISCUSSION OF MANAGEMENT

On preanesthetic check-up, the patient was found to have no known comorbidities. He gave history of spine surgery 5 years back. Old documents showed that laminectomy was done at the level of T12-L1 and L1-L2 and L2-L3 for prolapsed intervertebral disc at these levels causing weakness and paraesthesia on left lower limb. On local examination a scar was seen from T10 to L5 level. Patient used to walk with the help of crutches because of residual left lower limb weakness with power of 4/5. Patient also gave a history of falling from a tree at the age of 3 years after which there was slight change in posturing and fracture of ribs.

Chest radiography showed deformity and synostosis of posterior ends of 4^{th} - 8^{th} ribs on left side and scoliosis-probable sequalae of previous trauma. Lung fields appeared normal. Chest X ray is shown in figure 1. Due to the scoliosis, absence of ribs and possibility of pulmonary dysfunction, pulmonologist reference was taken, and a Pulmonary Function Test done. His PFTs showed: FEV1 (Forced expiratory volume in 1 second)/FVC (Forced vital capacity)=82%, FEV1=78%, Total lung capacity (TLC)= 72%. Forced vital capacity = 74%. The PFT showed that the patient was having mild restrictive disease.

Figure 1.
X-Ray Chest of the Patient

ECG was within normal limits. Other investigations- Hb-11.2 gm%, Total Leucocyte Count- 8.56X 109/L, platelet count - 235,000/µL, S. Urea- 30 mg/dL, S. Creatinine- 0.70 mg/dL, serum electrolytes- sodium- 128 meq/dL, potassium-4.2 meq/dL, LFT- WNL, coagulation tests- PT-12.7 secs, INR- 0.95.

The patient was accepted for anaesthesia as ASA PS-2, and planned for general anaesthesia with an erector spinae block (ESP). Since the patient had history of spine surgery earlier, along with residual neurological deficit, we decided against central neuraxial blockade, and instead of an epidural catheter placement for post-operative analgesia, we choose ESP as chances of worsening neurological deficit and effect on respiratory function is less.

An informed consent was taken from the patient for the procedure and anaesthesia. The patient was taken inside the operation theatre, all monitors were attached, and baseline parameters were recorded. 18 G peripheral iv cannula were taken in both hands and ringer lactate drip was started. Patient was made to lie in supine position. Inj. midazolam 1 mg iv was given followed by inj. fentanyl 100 µg iv. After preoxygenation for three minutes, induction was done with inj. propofol 100 mg iv and inj. atracurium 25 mg after checking for ventilation. After three minutes of intermittent positive pressure ventilation, the patient's trachea was intubated with endotracheal tube 8 mm I.D. and fixed after checking $EtCO_2$ and bilateral air entry. Mechanical ventilation started on volume control mode, maintenance done with sevoflurane 1-2%, nitrous-oxygen 50% mixture, relaxant and opioid boluses as required. ECG, BP, HR, SpO_2, temperature, EtCO2 were monitored. For the surgery, the position was right lateral, and nephrectomy was done with a blood loss of around 500 ml. Intraoperatively EtCO2 was kept around 35-37 mm of Hg, hemodynamic stability achieved, and urine output was maintained >1 mL/kg/hour. Before extubation in the same position, ultrasound guided erector spinae block was given with the following technique:

Figure 2.
Sonoanatomy of Erector Spinae Block

Figure 3.
Entry Point of the Needle and Site of Local Anaesthetic Injection

Scanning

High frequency linear transducer probe was used. It was placed on the left side in parasagittal orientation about 3 cm lateral from the midline at T8 level. On keeping the probe at this position transverse processes were seen as flat, squared acoustic shadows. Block- After visualisation of transverse processes, 18G needle was used in an in-plane fashion from cranial to caudal direction. The needle was advanced under ultrasound visualisation till the tip of transverse process was touched deep to the fascial plane of erector spinae muscle. After confirming fluid spread by lifting of erector spinae muscle with injection of 1 ml of normal saline, catheter was introduced. Location of catheter was checked by 2 ml of normal saline bolus. After confirmation, 20 ml of 0.25% of bupivacaine was injected and spread of drug was seen in ultrasound screen. The catheter was then attached to an infusion pump. 0.2% ropivacaine was started as infusion at 6 mL/hr. Proper sterile transparent dressing of the catheter

insertion site was done. After placement of the catheter, patient was brought back to supine position and extubated after adequate reversal and fulfilment of extubation criteria.

Follow Up

The patient with catheter in situ was followed up for 48 hours for pain, respiratory concerns and any other side effects, after which catheter was removed. Visual Analogue Score (VAS) and rescue analgesia (one-gram intravenous paracetamol) noted. Regular dressing of the catheter insertion site was done. It was found that the VAS Score of the patient was 3 or less throughout in post-operative period. There was requirement of rescue analgesia (inj. Paracetamol 1 gm iv infusion) at 6 hours of post-operative period. After that patient was not given any rescue analgesia and there were no side effects. Overall, the analgesia provided by continuous catheter technique of Erector Spinae block was comparable to that provided by epidural block in other patients undergoing nephrectomy.

In nephrectomy, the dermatomes that require coverage with regional anaesthesia are dependent on which incision is used as shown in Table 1.[1]

Incision	Dermatomes
Flank	T9 - T11
Thoraco-abdominal	T7 - T12
Transabdominal	T6 - T10

Table 1

Patient had a history of spine surgery, a relative contraindication to epidural block. This made us think of other possible blocks which will give comparable analgesia with minimal side effects. In our case the incision was transabdominal (T6-T10). That is the reason why the erector spinae block was given at T8 level expecting the spread of drug above and below that level.

The erector spinae plane (ESP) block was described in 2016 as a novel technique of regional anaesthesia for acute and chronic thoracic pain at cervical, thoracic, and abdominal levels.[2,3] The erector spinae muscle (ESM) is a complex formed by the spinalis, longissimus thoracis, and iliocostalis muscles that run vertically in the back. It is supposed to work at the origin of spinal nerves, based on cadaveric and contrast studies.[4,5]

The ESP block is performed by depositing the local anaesthetic in the fascial plane deep to the erector spinae muscle at the tip of the transverse process of the vertebra as shown in the Figure 2 illustrating the sonoanatomy. Entry point of the needle and site of local anaesthetic injection is shown in Figure 3. Single-shot and continuous catheter techniques are used. The technique is easy to perform. Since the site of injection is away from the pleura, major blood vessels, and spinal cord, it is supposed to have a low rate of complications. Local Anaesthetic spread is in the cranio-caudal fascial plane and also it spreads anteriorly to the paravertebral and epidural spaces, and laterally to the intercostal space at several levels.[6,7,8]

We give many blocks in our day to day practice but erector spinae is considered comparatively safer as there is no risk of hypotension associated with epidural block, epidural spread and vascular complications associated with paravertebral block. These blocks also have their procedural complications as they are close to spinal cord and pleura as well as pneumothorax associated with intercostal nerve block and interpleural block.[9]

FINAL DIAGNOSIS

This was a case of Left staghorn calculus causing hydronephrosis along with eventual pyelohydronephrosis with DJ stent in situ posted for nephrectomy. The patient was operated under general anesthesia and post-operative analgesia was given by Erector Spinae block. Erector Spinae Block seems to be an effective and safe alternative when other methods of analgesia are relatively contraindicated in abdominal surgeries like nephrectomy.

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