

Inter pleural catheter technique for perioperative pain management

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Summary:

Management of pain in surgical patient is very crucial. It is more so in thoracic and upper abdominal surgery. Lots of technique and drugs have been used to control postoperative pain including thoracic epidural analgesia. We describe a case in whom Intraoperative and Postoperative pain was managed by injecting 0.5% bupivacaine 20 ml in the interpleural space through the catheter, followed by continuous infusion of 0.1% bupivacaine 10 ml/ hour for 24 hours. The whole perioperative and postoperative period was uneventful. The first series of patients in whom this technique was used was described by Murphy in 1983, (1) who used it in patients with multiple fractured ribs and in postoperative patients after gallbladder and kidney surgery. One year later, Reiestad and Kvalheim published their results of continuous intercostal nerve block for postoperative pain relief and presented their modification of the technique, which is now termed interpleural analgesia.

Key words: Analgesic techniques, regional, interpleural.

Interpleural block can provide analgesia over the chest wall and upper abdomen and a single injection of local anaesthetics spreads to several intercostal nerves. Intrapleural and interpleural techniques have been used interchangeably but the latter is more appropriate. A single epidural catheter is most commonly inserted through a Tuohy needle at a level between T6 and T8, a point anywhere between 8 cm lateral to the posterior midline and posterior axillary line. A loss of resistance can be used to find the interpleural space. The catheter is placed 3-6 cm deep to the space and fixed. 20-25 ml of local anaesthetic (usually 0.25% bupivacaine) is then injected. The reported mean duration of analgesia is 2 to 18 hours (mean 7 hours). Continuous infusion dose is at a rate of 0.125 ml/kg/hour (2).

Case report

A 46 years female with cholelithiasis presented for open cholecystectomy. She belonged to ASA 1 and her airway assessment was MPT1. As there was no apparent contraindication she was planned for operation under general anaesthesia and interpleural analgesia for perioperative and postoperative pain relief.

The patient was assured and explained about the procedure. Interpleural block was performed in a sitting position. The landmark used was the right upper edge of the 8th rib, 8 cm away from the posterior midline. Initially 6 ml of xylocaine 1 %

was used for skin infiltration after which 18 g Tuohy needle was used to detect interpleural space by the loss of resistance technique. With aseptic preparation, epidural catheter was inserted through the needle into the interpleural space. All possible precautions to prevent pneumothorax were taken. After the procedure, the chest was auscultated bilaterally. This revealed equal breath sounds on both sides. Similarly other haemodynamics parameters were also stable. Inj. Bupivacaine 0.5% 10ml was administered at 1st via the catheter. After 5 minutes rest 10 ml was also added to it.

The patient was then allowed to lie supine and her trachea was intubated using conventional doses of Pethidine 30 mg, STP 250mg and Sux 75mg. Anaesthesia was maintained with Halothane 0.5%, O₂, IPPV and Pancuronium 4 mg. Intra operative period was uneventful with stable haemodynamics and SpO₂. At the end of operation i.e. after 55 minutes patient was reversed and extubated. Patient was conscious but there was no complain of pain.

Thereafter, postoperative pain was managed with 0.125% Bupivacaine at the rate of 10 ml/hr continuously through the infusion pump till the next day. X ray was done which was normal.

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The whole 24 hours period was pain free to her with stable haemodynamics not requiring any extra analgesics. The next morning local anaesthetic infusion was stopped and catheter removed. Throughout the procedure and perioperative period ECG, pulse, BP, and SpO₂ were monitored.

Discussion

Interpleural analgesia is an established technique for providing hemithoracic analgesia and sympathetic block and offers some advantage in the management of widespread chest wall pain by minimising the number of injections required compared with intercostal block. The technique appears to have a few recognised complications in addition to pneumothorax, including intravascular injection, chest wall haematomas and pleural effusion. (3, 4, 5)

Interpleural local anaesthetic administration is one of the different methods for providing perioperative analgesia in various upper abdominal surgeries like cholecystectomy, renal surgery v/l breast surgery. As well as providing analgesia for non surgical conditions like fractured ribs, cancer pain, herpes pain and pancreatic pain. (6)

Since the introduction of interpleural local analgesia in 1984 by Kvalheim and Reiestad, there have been numerous reports on the use and complications of the technique in the management of different types of pain. However, there have been few investigations into the mechanism of action, which remains conjectural. In the original abstract, Kvalheim and Reistad suggested a mechanism of reverse diffusion of local anaesthetic through the parietal pleura into the subpleural space. From there, as shown in 1980 by Nunn and Slavin, the fluid could pass between the flimsy fascicles of the intercostalis intimus muscle to the intercostal space(s) and nerve(s). This mechanism seems to be supported by the observation of Miserocchi and colleagues, using gamma camera imaging that a major distribution of fluid injected into the pleural cavity of anaesthetised dogs is in the paravertebral area, where the intercostal nerves are covered only by parietal pleura. Further support has come from studies on interpleural local anaesthetic in dogs, using somatosensory evoked potentials, and in patients using computed tomography. (6)

One of the great advantages of this technique is that analgesia can be extended beyond the operative

period. Some important complications following this procedure are getting pneumothorax Horner's syndrome, chest wall haematoma, L.A. toxicity and rarely LA spreading to epidural space.

The advantages of this technique are more difficult to prove in patients undergoing thoracotomy, perhaps because of technical problems relating to blood in the pleural space, chest tube drainage and pleural fibrosis. Some other C/I are pleural effusion, haemo-pneumothorax, bleeding disorder.

In our patient perioperative analgesia was excellent with this technique without any major complication. By using this technique frequent use of opioids and its complication can be avoided.

Conclusion

Interpleural local anaesthetic administration via catheter technique has been found excellent in various surgical procedures in the upper abdomen in selected patients. It carries both benefit of extending analgesia up to post operative period via catheter and risk of pneumothorax in each individual. With proper technique risks can be minimised a lot. (7)

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