



Efficacy of Erector Spinae Plane Block in Postoperative Pain Control after Laparoscopic Cholecystectomy

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Abstract

Objective: To assess the efficacy of bilateral Erector Spinae plane (ESP) block in pain outcome after laparoscopic cholecystectomy.

Material & Methods: This descriptive study was conducted at Surgical Department Hayatabad Medical Complex Peshawar. A total of 52 patients were included, Female 39 (78%), Male 13 (22%). In the first post op day the NRS score were recorded as 1/10 during first hour while they stayed at <3 up to 18 hours in all patients and none of them received standard analgesia.

Conclusion: Bilateral ESP block is a useful technique to provide post op analgesia in the first 24 hours reducing the need for opioid analgesia.

Keywords: ESP block; Post op pain; Lap chole; Opioid analgesia

Introduction

Cholelithiasis is one of the major causes of morbidity worldwide with gross geographical variations. Asian countries have an estimated prevalence of 3-5%, as compared to European countries where the prevalence maybe as high as 10-15%. In Pakistan the number of patients affected by gall stones are increasing day by day [1]. Laparoscopic cholecystectomy is considered the gold standard treatment modality for the management of gallstones [2,3]. Despite being minimally invasive procedure, post-operative pain is a significant complication amongst many causing discomfort to the patient which is mostly controlled by the use of multimodal analgesic regimens [4]. However, due to its significant side effects newer modalities of treatment are being devised in order to enhance recovery [5,6].

Described for the first time by Forero et al., in 2016, Erector spine plane block (ESPB) is an ultrasound guided interfascial block to attain regional anesthesia/analgesia. Although initially it was utilized to manage acute thoracic neuropathic pain, it has since been indicated for effective pain control in various conditions such as post operative abdominal surgery patients, post op breast surgery patients, rib fractures, pelvic surgeries, burns patients as well as an anesthetic technique in minor surgical procedures [7].

ESPB has been used as a mean of postoperative analgesia in laparoscopic cholecystectomy in patients across the globe, and is still being researched upon and documented in multiple case series. However, this innovative technique has yet to be utilized in Pakistan [8-15]. Our team will be the first

to document the outcome of ESPB in the underdeveloped world and contribute to the pool of research work that is still being analyzed in order to determine its efficacy.

Material and Methods

This study was conducted in collaboration with Department of Surgery & Anesthesia, Hayatabad Medical Complex Peshawar during the period from 1st June 2019 to 30th May 2020. A total of 52 patients scheduled for elective cholecystectomy were included in the study after taking informed consent. Age limit was set at 20-75 yrs with no preference to male or female patients. The patients included had an ASA status I/II and a normal coagulation profile. Obese and patients who were allergic to any of the used drugs or had infections at the puncture site were excluded from the study. After approval from the ethical committee of the hospital all patients were counseled for the risk benefit ratio of the block prior to surgery.

On the day of surgery 18 G I/V line was passed to all the patients and infusion started. Preoperatively, patients were given anxiolytics and 10 mg Nalbuphine along with prophylactic antibiotics. Basic monitoring of the patients was started. The patient was then asked to sit and a preliminary scan was done using an ultrasound linear probe to define and mark the required level T6-T8. Both midline and bilateral points were marked. After identification of the desired level, the skin was anesthetized by 2ml of Lignocaine and a 22g spinal needle was introduced. The needle was viewed in an in-plane technique and when firm contact was made with the transverse process at the desired level, hydro dissection was done with normal saline. Spread of the fluid was visually confirmed both cranially and caudally. Single shot technique with no catheter insertion was applied. After negative aspiration, 20 ml of 0.25 % Bupivacaine was injected in increments of 5 ml.

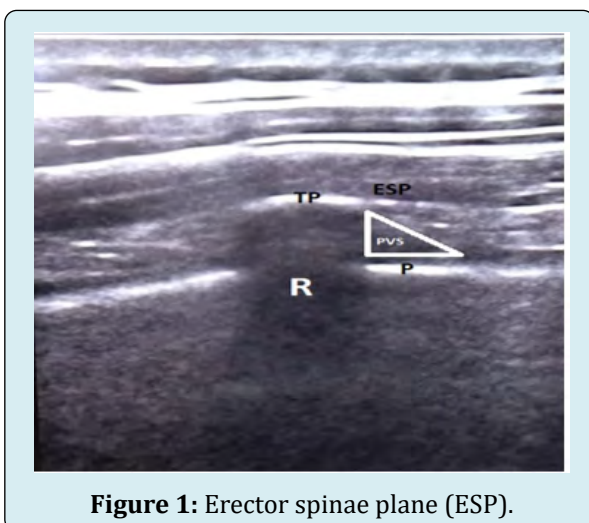


Figure 1: Erector spinae plane (ESP).

After the block was effective, the patient was induced with Propofol 150 mg and Atracurium 40mg; and maintained with oxygen, nitrous oxide and Isoflurane. At the end of the procedure reversal was done with Neopyrolate. Following extubation good ventilation and pressure support was ensured with normal blood pressure and respiratory pattern. Patient was put on diclofenac as standard analgesia and Tramadol as rescue analgesia. Patient's pain was assessed with the NRS at 0-30 min and 1, 3, 6, 12, 18 and 24 hours. Pent scale (none, mild, moderate and severe) was used for the assessment of postoperative nausea and vomiting (PONV).

Results

Post operatively only 2 (3.8%) patients had an NRS of 2/10 in 0-30 minutes after surgery, while all stayed at 3/10 for up to 12 hrs. At 18 hours 6 (11.5%) patients had an NRS of 5/10 and received rescue analgesia in the form of opioid analgesic. At 24 hours 10(19.2%) patients had an NRS of 5/10 requiring opioid analgesic. None of the patients having an NRS of 3/10 received additional analgesia.

Time	Nrs Score	No.of Pts
0-30 mints	2/10	2 (3.8%)
1 hr	1/10	52(100%)
3 hrs	3/10	52(100%)
6 hrs	3/10	52(100%)
12 hrs	3/10	52(100%)
18 hrs	5/10	6(11.5%)
24 hrs	5/10	10(19.2%)

Table 1: Nrs Score in First 24 Hours.

Post-operative nausea vomiting (PONV) were noted in 2(3.8%) patients which were treated with I/V ondenerstone.

Discussion

Post-operative pain and nausea vomiting (PONV) are some of the most common complications of Lap chole. Though significantly less as compared to open cholecystectomy still it continues to be a source of discomfort for the patient [16,17]. Visceral pain due to irritative effects of the insufflating gases and diaphragmatic stretching is the most common cause of post op pain in such patients, followed by port site pain and shoulder pain [16,18].

In order to lower the pain scores several regimens and blocks have been introduced with variable results. Multimodal analgesia, port site infiltration, low pressure pneumoperitoneum and pulmonary recruitment maneuvers are some that contribute significantly in reducing post op pain. Epidural catheter, paravertebral block, TAP block,

Rectus sheath block, quadrates lumborum blocks etc have all been attempted and stay quite successful in lowering the pain scores although with a significant risk [6,19].

ESPB is a novel technique in which local anesthesia is injected into the fascial plane deep to the erector spinae muscle anesthetizing not only the dorsal and ventral rami of the spinal nerves but also blocking the sympathetic nerves [7]. Its tendency to spread both cranially and caudally as demonstrated in cadavers and MR scans further enhances its utility and makes it a preferable mode of analgesia [7-10,12,20]. This technique is not only minimally invasive, but also simpler, safer and quicker to perform [8]. ESPB provides indirect access to the paravertebral space minimizing the potential risk of pneumothorax [21]. Unlike epidural block this technique can be useful in anti coagulated patients and can be performed prior to induction, under GA and even post operatively, as a single shot or via a continuous infusion using indwelling catheter [22]. The technique has been successfully performed in obese and high risk patients in whom other blocks are difficult to perform due to sonological non visualization [7,23]. Tulgar, et al in his study elaborated its utility in a patient undergoing laparoscopic cholecystectomy as well as hernia repair in a single session [7]. He was able to achieve appreciable analgesia with ESP Block only where otherwise the patient would have required two different blocks at two different location [24].

In our study 2(3.8%) patients reported an NRS of 2 in the immediate post op period which is comparable to a study performed by Aksu et al, where they reported an NRS of 2 in the first post op hour and 0 NRS at 24 hour postoperatively. A study by Tulgar et al estimating the efficacy of ESPB in comparison to OSTAP block and a control group who received no block, reported an NRS of 3 upto 18 hours postoperatively [5]. However at 24 hrs none of the patients in Tulgar's study had an NRS of >3 as compared to our study where 10 (19.2%) patients reported an NRS of 5 requiring opioids [25]. In a case series by Alessandro, et al. an NRS of 3 was documented in the first 8 hours [26].

Opioid requirements were significantly reduced in patients who received ESP block postoperatively. None of the patients required analgesia in the first 12 hours. At 18 hours 6(11.5%) patients needed opioids and at 24hrs 10(19.2%) patients needed opioids in our study. Tulgar, et al. reported an NRS of <3 in the ESPB group up to 24 hours postoperatively; 3 (16%) patients were administered opioid analgesic in the first 12hours while another 2(11.11%) patients in the next 12hours. In the same study where he compared ESPB to control group significantly higher rescue analgesics were required [25].

PONV which was observed in only 2 (3.8%) patient's postoperatively. Tulgar et al., reported PONV in 1(5.55%) patients in the ESPB group and 2(11.11%) patients in the control group. Kjartan et al., reported PONV in none of the patients who received ESPB [25]. We used 20ml of 2.5% Bupivacaine which was successful in providing analgesia upto 18 hrs [27]. Tulgar, et al. also used the same amount and was able to achieve analgesia in upto 24hrs in almost all patients. Luftig, et al. in their review article recommended a weight based dose i.e. 2 mg/kg for bupivacaine to be used in order to achieve adequate anesthesia [25,28].

As this technique is being evaluated for its beneficial aspects, there are still some unanswered questions e.g. dose of local anaesthesia required, its systemic toxicity etc which needs further studies. Comparative studies are required comparing it with other blocks.

Conclusion

We conclude that a bilateral ESP block using 20ml of bupivacaine is sufficient to provide analgesia in the first 24hrs reducing the need for opioids.

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