



POST-OPERATIVE ANALGESIA USING EXTERNAL OBLIQUE INTERCOSTAL FASCIAL PLANE BLOCK IN UPPER ABDOMINAL SURGERIES USING 0.2 % ROPIVACAINE

Anaesthesiology

Dr Yousha Muneeb Gillani

Senior Resident Anaesthesiology, Government Medical College Srinagar.

Dr Shaheena Parveen

Professor Anaesthesiology, Government Medical College Srinagar.

Dr Duha Qari*

Senior Resident Obstetrics and Gynecology, SKIMS Soura Srinagar. *Corresponding Author

Dr Syed Faheem Maqbool

Junior Specialist Doctor, Higher University Hospital Birmingham.

Dr Ronuma Barooj Qari

Speciality Trainee (Year 1), Royal Derby Hospital.

ABSTRACT

Background: The anterior abdominal wall is innervated by nerves that run below the external oblique muscle, and the EOIFP block is targeted towards these nerves for analgesia following upper abdominal surgeries. **Aim:** To determine time duration for the analgesic effect of 0.2% Ropivacaine used for USG guided EOIFP block in upper abdominal surgeries. **Material And Methods:** Seventy-five patients were given EOIFP block with 0.2% Ropivacaine 20 ml under USG, the patients were then assessed using NRS at 6-hour interval post operatively, were a score 5 or more on NRS marked the end point of the analgesic effect of the block. **Results:** Out of the total 75 patients, 80% (60) of patients had NRS less than 3 at the 6th hour, 75% (55) at 12th hour, 32% (24) and 20% (15) at 18th and 24 hours respectively following the procedure. Six patients reported a pain score of 5 or more 6 hours post the block, fifteen marked a score of NRS >5 at 18th hour mark, and 49 reported pain of 5 or more on NRS at 24 hours. Twenty four percent (18) had complication due to the fascial plane block in the post operative period and two reported complications due to block itself. **Conclusion:** EOIFP block has been observed to be an effective method of controlling pain in the post-operative period by providing adequate analgesia during the first post-operative day, especially in the first 12 hours of the upper abdominal surgery.

KEYWORDS

External Oblique Intercostal Nerve, USG Guided, Abdominal Surgeries, Analgesia, Post-Operative Period

INTRODUCTION

Epidural analgesia is typically the mainstay of regional anaesthesia for the trunk and abdominal wall. But as minimally invasive laparoscopic procedures become more common, the necessity of early ambulation and postoperative anticoagulation regimens has changed the way analgesia is chosen.

Abdominal wall blocks have been incredibly popular in the last few years. This has been achieved as ultrasound (US) imaging is being used on a wider scale, and the blocks like the transversus abdominis plane (TAP) block have been quite effective in providing pain relief in post-operative period.^[1] Using abdominal wall blocks requires a solid understanding of abdominal innervation. The anterior abdominal wall is innervated by the thoracoabdominal nerves and the ilioinguinal and iliohypogastric nerves. The thoracoabdominal nerves originate from the anterior rami of the T6-T12 nerves. These each give off a lateral cutaneous branch in the midaxillary line.^[2] External oblique intercostal plane block is a new technique which is considered as a modification of the fascial plane block involving the upper lateral abdominal walls.^[3,4] In comparison to other blocks for abdominal surgeries (QLB & ESPB) it has the benefits of being performed in supine position and providing greater analgesia throughout the midline of the abdomen.^[5] The ultrasound probe is positioned in paramedian sagittal orientation at the T7-T8 level during the EOIFP block procedure, and the external oblique and intercostal muscles are observed. Under the external oblique muscle, local anesthetics are injected which block the anterior and lateral cutaneous nerves.

AIMS AND OBJECTIVES

To determine time duration for the analgesic effect of using 0.2% Ropivacaine for USG guided EOIFP block in upper abdominal surgeries.

MATERIALS AND METHODS

The study was undertaken in GMC Srinagar and associated hospitals over a period of 1 year from January 2023 to August 2023, and, seventy-five (75) patients were enrolled in the study during the said period. The patients of upper abdominal surgeries were selected as per the criteria laid down, and, prior to extubation, the patients were given

an External Oblique Intercostal Fascia Plane block with 20 ml of 0.2 % Ropivacaine on the ipsilateral side of the incision. The patient was kept supine and the linear transducer probe of the USG machine was placed on the chest of the patient on the ipsilateral side along the anterior axillary line with the marker in the cranial direction at the level of 7th intercostal space after counting the ribs from 2nd intercostal space in a downward direction. The anatomy of the anterior chest wall was identified, with carefully marking the subcutaneous tissue, the ribs, intercostal spaces, the pleura, the lung, the external oblique muscle and the intercostal muscles. A 22 G needle was used to pierce the structures under USG guidance and the needle tip end point was the tissue plane between the external oblique and intercostal muscles at the caudal end of the sixth rib and between the sixth and seventh ribs. Twenty millilitres (20 ml) of 0.2 % ropivacaine was deposited in the plane after careful hydro dissection. The patient's pain score was assessed at each 6-hours interval following the procedure using NRS, and, score of 5 or more on NRS was marked as the end point of the analgesic effect of the block.

Inclusion Criteria

1. Patients above 18 years
2. Patients undergoing upper abdominal surgeries under general anaesthesia

Exclusion Criteria

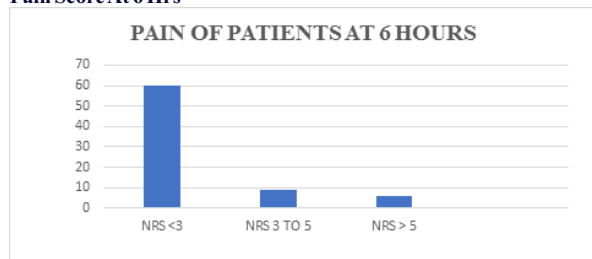
1. Pediatric population
2. Patient not giving consent for procedure
3. Chronic pain disorder patients
4. Epidural anaesthesia and Subarachnoid block.
5. Patients receiving long acting analgesics intraoperative

RESULTS

The majority 37 % (28/75) of the patients were aged between 40-60 years, followed by the age group in which patients were above 60 years. Younger patients (defined as age less than or equal to 25 years) constitute smallest subset of patients 16% (12/75). Males were about 60% (45) and females 40% (30) of the total patients. Maximum cases operated were of liver abscess 24% (18) followed by pancreatectomy 20% (15) and gastrectomy 20% (15). Least number of cases were open

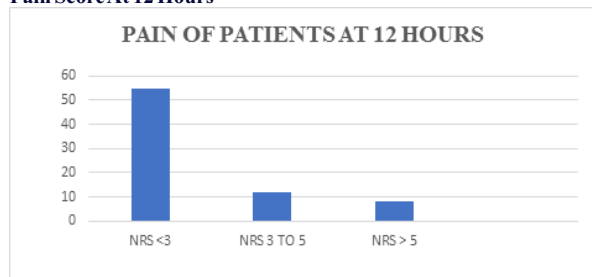
cholecystectomies 6.6% (5).

Pain Score At 6 Hrs



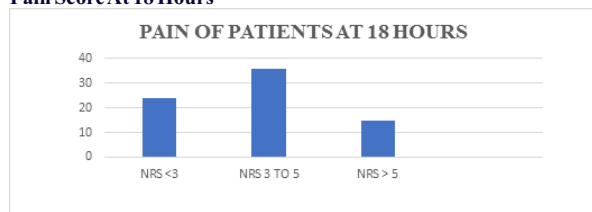
Six hours following the block, Sixty patients (80%) had pain score of less than 3, nine (12%) reported a score between 3 to 5 and only six (8%) had a pain score of more than 5 measured on NRS.

Pain Score At 12 Hours



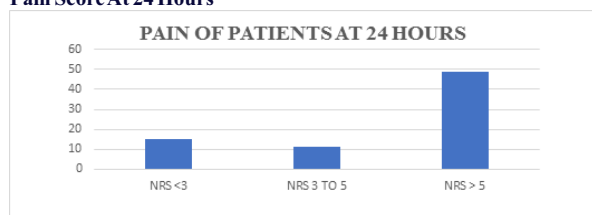
Fifty five patients (73%) had pain score of less than 3, twelve (16%) between 3 to 5 and eight (10%) of more than 5, twelve hours after the block.

Pain Score At 18 Hours



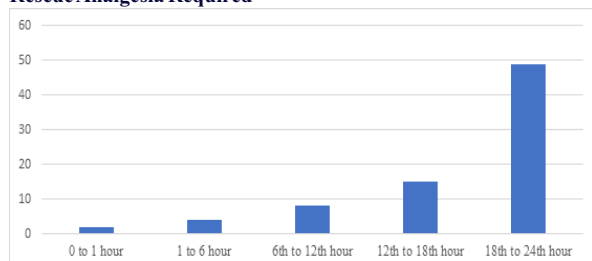
Out of the total 75 patients, twenty four (32%) marked NRS or less than 3 after 18 hour of the block, thirty six patients (48%) between 3 to 5, and, fifteen (20%) had pain that was more than 5 on NRS.

Pain Score At 24 Hours



At 24 hours post blockade, fifteen patients (20%) reported a pain score of less than 3, eleven (14%) patients registered the score between 3 to 5, and, forty nine (65%) had pain that was more than 5.

Rescue Analgesia Required



Only 2 (2.6%) patients out of 75 required analgesia in the first hour, 8 (10%) were given analgesic in 6 to 12 hours period and only 15 (20%) patients in 12 to 18 hours after the fascial plane block.

Complication

S.NO	Complications	Patients (n)	Percentage (%)
1.	Injection site infection	1	1.33
2.	Local site hematoma	1	1.33

About 2.6%, 2 out of 75 patients in the study developed complications in the post-operative period.

DISCUSSION

External oblique intercostal fascial plane block (EOIFPB) has emerged as a novel technique in regional anaesthesia, we aimed on understanding the effectiveness of the block post-operative pain control in upper abdominal surgeries. The success of this block in the upper abdominal surgeries mainly lies in the anatomy of the external oblique muscle, which is mainly supplied by the lateral cutaneous branches of the thoracoabdominal nerves^[1,2] Hamilton and Manickam suggested in 2018 that administration of local anaesthetic to the thoracic fascial area may result in blockade of the lateral cutaneous branches of the T7-T11 spinal nerves.^[3] Over time they also succeeded in investigated drug diffusion after the external oblique fascial plane block with a cadaver study using dyes, strengthening their hypothesis. Elsharkawy et al (2021) presented EOIFPB as a block providing upper midline and lateral abdominal wall analgesia.^[4] They demonstrated the probable mechanism of the block with the dyeing of both the anterior and lateral branches of the intercostal nerves T7-T10. EOIFPB block also provides a dermatomal sensory block at the T6-T10 level in the anterior axillary region and the T6-T9 level in the midline.

Although, epidural analgesia remains the gold standard for major abdominal surgery it is associated with potential side effects, such as hypotension, urinary retention, and extended time to ambulation post-surgery.^[4] Epidural is also dependent on coagulation status. EOIFPB block is simple to use, is dependable, has a reduced side-effect profile, and is suitable for upper abdominal wall analgesia. It can safely be performed after general anaesthesia induction and is easily done in the supine position. Several fascial blocks have been employed for abdominal surgeries, but they exhibit certain drawbacks. While the transversus abdominis plane block offers analgesia for T10 to L1, it fails to cover the incision site.^[6] Anterior quadratus lumborum block provides effective analgesia for T7 to L1, but it is technically more challenging and deeper. Paravertebral and erector spinae blocks require the patient to be in a non-supine position.^[7] The EOIFPB block is a fascial plane block, with a similar safety profile to that of an erector spinae block.^[8] The EOIFPB plane is superficial and rapidly identifiable, even in the context of obesity.

Ting Li et al reported that upper abdominal surgeries are more painful postoperatively than lower abdominal surgeries and require more analgesics.^[9] Hence, postoperative pain management is more required in upper abdominal surgeries.

Our study on the external oblique intercostal block has shown us that the block was effective in decreasing the pain following upper abdominal surgery. This result was achieved after measuring the pain score of patients at regular intervals of time following the block. The results also demonstrated a significant decrease in the use of analgesics in the post-operative period, this result also correlates with the meta-analysis of TAP block in bariatric surgery performed by Tian et al^[10] which reported a significant decrease in pain and opioid consumption.

Although fascial plane blocks are effective in management of post-operative pain but its contribution to visceral analgesia is less effective than the somatic part.^[11] Like other fascial blocks, a limitation of EOIFPB is also the lack of visceral analgesic coverage. Combining EOIFPB with other regional anaesthesia techniques that also block the visceral component of pain, such as paravertebral block (PVB) and ESPB, may further reduce postoperative analgesic use and provide better pain relief.^[12] Future studies may focus on the combination of regional anaesthesia techniques where patients may need less additional analgesics.

The study also indicated that the complications using USG guided block in the post-operative period can also be reduced significantly.^[13] The EOIFPB can result in vascular injury, hematoma, and LA toxicity. Complications like pneumothorax may occur because of the closeness to the pleura of the needle.^[14] In our study only 2 patients suffered complications that was less than 3% of the study group.

Though the single short EOIFPB has shown its effectiveness in controlling the pain in the immediate and early post-operative period, but the duration of the drug and non-availability of repeat boluses does limit its effectiveness on 2nd post-operative day onwards.

CONCLUSION

EOIFPB using 0.2% Ropivacaine has been observed in our study to be a very effective method of controlling pain in the post-operative period in patients who have undergone upper abdominal surgeries. It has proven its effectiveness by providing adequate analgesia in the first post-operative day, especially in the first 12 hours following the surgery and also reducing the dependency on other opioid or non-opioid based analgesics.

Abbreviations

NRS: Numeric Rating Scale, EOIFPB: External Oblique Intercostal Facial Plain Block, EO: External Oblique Intercostal, QLB: Quadrates Lumborum Block, ESPB: Erector Spine Plane Block.

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