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ANALGESIC EFFICACY OF ULTRASOUND GUIDED BILATERAL ERECTOR SPINAE PLANE BLOCK FOR LUMBAR SPINE SURGERIES – A CASE SERIES.

Anaesthesiology

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ABSTRACT

Background: Perioperative analgesia in patients undergoing lumbar spine surgeries is usually managed with multimodal approaches. Bilateral ultrasound guided erector spinae plane block is given as a part of multimodal analgesia. This case series is to analyze the analgesic efficacy of ultrasound guided bilateral erector spinae plane block in perioperative period and assess the total requirement of rescue analgesia in first 24 hours. **Methods:** In this case series ,15 patients posted for lumbar spine surgeries received bilateral ultrasound guided erector spinae block with 40 ml of 0.2% Ropivacaine with Dexmedetomidine 0.5mcg per kg body weight, after intubation and positioning. Intraoperative hemodynamics was monitored every 30minutes after incision. Post operative pain was assessed using VAS score every 2nd hourly for the first 24 hours in PACU. Intravenous Tramadol 100mg was given as rescue analgesia if VAS score ≥4 and total amount of rescue analgesia consumed in 24 hours was noted. **Results:** Intraoperative hemodynamic parameters (HR, SBP, DBP, MAP) were stable throughout the procedure. Post operative pain was mild in the initial 12 hours with VAS Score 2-3 and 4-5 in the next 12 hours. Mean total duration of analgesia among 15 patients was 505.7±57.6 min. Mean amount of rescue analgesic (Tramadol) consumed was 166.7 ± 72.4mg. **Conclusion:** ESPB, widely used as a part of multimodal analgesia, will provide stable intraoperative hemodynamics, effective for managing acute pain in post operative period and will reduce the requirement of analgesic doses. Helps in early ambulation and recovery.

KEYWORDS

Erector spinae plane block, Lumbar spine surgeries, Post operative Analgesia, Ropivacaine, Hemodynamics, Dexmedetomidine.

INTRODUCTION :

Patients undergoing lumbar spine surgeries experience severe perioperative pain[1,2] usually managed with multimodal analgesic strategy which includes systemic opioids & non-steroidal anti-inflammatory drugs (NSAIDS), epidural analgesia, local wound infiltration, plane blocks with local anesthetics[3,4].

Administration of parenteral analgesic agents often causes several adverse effects such as nausea, vomiting, respiratory depression, pruritis, drowsiness[5]. In order to minimize the requirement of systemic analgesics, erector spinae plane block (ESPB) is increasingly used as adjunct of multimodal analgesic approach. It provides effective perioperative analgesia for spine surgeries. Hence adequate pain control after surgery leads to early ambulation, early discharge, better functional outcome[5,6] and prevents development of chronic pain. Ultrasound guided ESPB has improved the accuracy of the block with lesser rate of complications.[7]

The main aim of this study is to assess the effect of ultrasound guided ESPB on intraoperative hemodynamics, postoperative pain and total amount of rescue analgesia in the first 24hrs in post anesthesia care unit (PACU).

METHODS:

After getting approval from the Institutional ethical committee, 15 patients posted for lumbar spinal surgery were included in this case series. Written informed consent was taken from all the participants. Patients aged between 20-75 years old belong to ASA I, II and III were included. Patient refusal, coagulopathy, allergy to local anesthetic drugs were excluded from the study.

All patients were kept, Nill per oral 6 hours prior to surgery. In operating room, patients were premedicated with Inj. glycopyrrolate 0.01mg/kg iv., Inj. midazolam 0.02mg/kg iv, Inj. butorphanol 1mcg/kg/iv & induced with Inj. propofol 2mg/kg iv. After giving Inj. vecuronium 0.1mg/kg iv, patients were intubated with appropriate sized cuffed flexometallic endotracheal tube. Patients kept on prone position & ventilatory settings were adjusted as per patient requirements. Anesthesia was maintained with O2 &N2O (2:1), sevoflurane with MAC-1.5.

Before incision under strict aseptic precautions bilateral ultrasound guided ESPB block was given using ultrasound with 5-13MHz linear transducer probe (SII u/s system FUJJIFICM Sono site, Inc 21919.30th Drive SE Bothell, WA98021 USA) was placed longitudinally 3cm lateral to L3 vertebrae transverse process. Erector spinae and psoas major muscle were identified. Using in-plane technique 21G,100mm (echoplex+) needle was inserted in a cephalo- caudal direction until transverse process was reached after slight retraction of needle, behind the erector spinae muscle 20ml of 0.2% ropivacaine with 0.5mcg per kg body weight of dexmedetomidine was injected and same procedure was repeated on the contralateral side[8,9].

Hemodynamic parameters were noted from baseline at 30mins interval till the end of surgery and at PACU. Intravenous paracetamol was administered to all the patients before extubation. In PACU post operative pain was assessed using visual analogue scale (VAS) with score ranging from 1 to10 every 2nd hourly for first 24 hours. Intravenous tramadol 100 mg was given as a rescue analgesia when VAS score≥ 4. Time of first rescue analgesia, duration of analgesia, total amount of rescue analgesia consumption for 24hours were noted. Side effects such as nausea, vomiting and shivering were recorded. Complications are noted.

Data was described in terms of Range, Mean± standard deviation (SD), relative frequencies(% percentage).

RESULTS:

In our study, there were 9 males (60%) and 6 females (40%). The mean age of patients was 53.4±14.1year. Among fifteen patients ,60% belong to ASA I,53%-ASA II and 6%-ASA III. Mean duration of surgery was around 128.7±39.6 min, with minimum duration of 60 min and maximum of 180 min.

Table1: Demographic Details

Variable	Number	percentage
Age (years)	53.4±14.1	
Gender		
Male	6	40.0
Female	9	60.0
ASA grade		
I	5	53.3
II	9	60.0

III	1	6.70
Duration of surgery (min)	128.7±39.6	

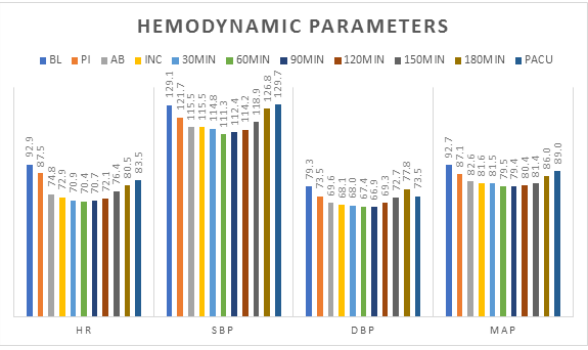

Figure 1:

Hemodynamics monitored at 30 mins throughout the procedure and at PACU were stable.

Hemodynamics (Heart rate-HR, Systolic Blood pressure-SBP, Diastolic Blood pressure-DBP, Mean arterial pressure-MAP)

[BL-baseline; PI-post Induction; AB-At the time of block; INC-at the time of Incision; PACU-Post anesthesia care unit]

Table 2: VAS scores at time interval:

Time of VAS evaluation (hour)	Mean
2	2
4	2
6	2
8	3
12	4
24	5

Pain severity was measured using VAS scores every 2nd hourly at PACU in the first 24 hours of post operative period. VAS was" ≤4" for about 12 hours indicating mild pain and VAS of" 5" indicates moderate pain in next 12 hours.

Table 3:

Parameters	Mean ± SD
Total duration of analgesia (in min)	505.7 ± 87.6
Total amount of rescue analgesia (mg)	166.7 ± 72.4

On evaluation, mean total duration of analgesia among 15 patients was 505.7±57.6 min. Minimum total duration of analgesia was 390min and maximum was 680min. Total mean amount of rescue analgesic consumed 166.7 ± 72.4mg.

DISCUSSION:

Lumbar spine surgeries will cause severe mechanical, thermal trauma which leads to muscle ischemia, damage to spinal nerves innervating paraspinal muscles.[6,10,11] Causing severe pain in post-operative period. Therefore, ultrasound guided ESPB has been widely administered to provide effective analgesia in post operative period.

In our study, ESPB given before incision helps to maintain stable intraoperative hemodynamics without any need of hypotensive techniques[12,13]. Our study well correlated with Goyal et al in which good analgesic efficacy and hemodynamic Stability[14]. Pain severity measured by VAS score in our study was significantly less (≤3) in the first 12 hours of post operative period in most of the patients indicating mild pain and in the next 12 hours it was ≤5 indicating moderate pain, requiring rescue analgesic.

Study conducted by Wang et al[10] post operative VAS scores were similar to our study results. In study done by Nalini et al[7] dexamethasone was used along with local anesthetics for ESPB, showed minimum pain scores in post operative period and the need for rescue analgesia in the first 24 hours of PACU stay is also less same as in our study population.

Dexmedetomidine used along with ropivacaine in our study for ESPB will prolong the duration of block because of its multiple mechanisms like delaying local anesthetic absorption by vasoconstriction, activating adrenergic receptors on peripheral neurons by maintaining hyperpolarization[15,16].These findings of our study collaborate with results of the study conducted by Jian et al[9] and Wahdan et al[17].

Limitations:

General anesthesia was given before performing block. So, the sensory perception of patients could not be assessed. Our study mainly focused on the first 24 hours of postoperative period; no data was collected about the effect of ESPB on reducing chronic pain.

CONCLUSION:

ESPB widely used as a part of multimodal analgesia will provide stable intraoperative hemodynamics, effective for managing acute pain in post operative period and will reduce the requirement of analgesic doses. Helps in early ambulation and recovery.

REFERENCES :

1. Bianconi M, Ferraro L, Ricci R, Zanoli G, Antonelli T, Giulia B, et al. The pharmacokinetics and efficacy of ropivacaine continuous wound instillation after spine fusion surgery. Anesth Analg. 2004; 98(1):166–172.
2. Gerbershagen HJ, Aduckathil S, Van Wijck AJM, et al.Pain intensity on the first day after surgery.Anesthesiology. 2013;118:934–944.
3. Siam ME, Abo Alia MD, Elmedany S, Abdelaa M E. Erector spinae plane block combined with general anaesthesia versus conventional general anaesthesia in lumbar spine surgery. Egyptian J Anaesthesia.2020; 36(1): 201-226.
4. Zorrilla-Vaca A, Healy RJ, Mirski MA. A Comparison ofregional versus general anesthesia for lumbar spine surgery. J Neurosurg Anesthesiol. 2017;29:415–425.
5. Bajwa SJS, Haldar R. Pain management following spinal surgeries: an appraisal of the available options.J Craniovertebr Junction Spine. 2015;6:105–110.
6. Breebaart MB, Van Aken D, De Fré O, Sermeus L, Kamerling N, De Jong L, et al. A prospective randomized double-blind trial of the efficacy of a bilateral lumbar erector spinae block on the 24h morphine consumption after posterior lumbar interbody fusion surgery. Trials. 2019; 20(1):441.
7. Bheemanna N, Nagaraj A, Appajigowda N. Ultrasound Guided Bilateral Erector Spinae Block With Dexamethasone For Post-Operative Analgesia In Lumbar Spine Surgery: A Case Series. Arch Anesth & Crit Care. 2023;9(3):211-214.
8. Van den Broek RJC, van de Geer R, Schepel NC, Liu WY, Bouwman RA, Versyck B. Evaluation of adding the Erector spinae plane block to standard anesthetic care in patients undergoing posterior lumbar interbody fusion surgery. Sci Rep. 2021 Apr 7;11(1):7631.
9. Jian C, Shen Y, Fu H, Yu L. Effects of ultrasound-guided erector spinae plane block with dexmedetomidine combined with ropivacaine of the same dose and different concentrations on analgesic effect and rehabilitation quality of patients undergoing thoracoscopic wedge resection of the lung: a prospective, randomized, controlled trial. BMC Anesthesiol. 2022 Jul 16;22(1):225.
10. Yi-han, W., Rong, T., Jun, L. et al. Dexmedetomidine combined with ropivacaine for erector spinae plane block after posterior lumbar spine surgery: a randomized controlled trial. BMC Musculoskelet Disord 23, 235 (2022).
11. Mathiesen O, Dahl B, Thomsen BA, Kitter B, Sonne N, Dahl JB, Kehlet H. A comprehensive multimodal pain treatment reduces opioid consumption after multilevel spine surgery. Eur Spine J. 2013;22(9):2089–96.
12. Brandao J, Graca R, Sa M, Cardoso J M, CarameloS, Correia C. Lumbar erector spinae plane block: successful control of acute pain after lumbar spine surgery. A clinical report. Rev Esp Anestesiol Reanim. 2019; 66(3):167–71.
13. Li J, Jin Y, Zhao S, Blessing M, Sun Y, Hu S, et al.Efficacy of ultrasound-guided erector spinae plane block for perioperative pain control and short-term outcomes in lumbar laminoplasty. MedRxiv. 2020;20019745.
14. Goyal A, Kalgudi P, Sriganesh K. Ultrasound-Guided Erector Spinae Plane Block for Perioperative Analgesia in Cervical and Thoracic Spine Surgeries - A Case Series. Neurol India. 2021 Mar-Apr;69(2):487-489.
15. Chiu KM, Lin TY, Lu CW, Wang SJ. Inhibitory effect of glutamate release from rat cerebrocortical nerve terminals by α2 adrenoceptor agonist dexmedetomidine. Eur J Pharmacol. 2011;670(1):137–47.
16. Kimura M, Saito S, Obata H. Dexmedetomidine decreases hyperalgesia in neuropathic pain by increasing acetylcholine in the spinal cord. Neurosci Lett. 2012;529(1):70–4.
17. Wahdan, A. S., Radwan, T. A., Mohammed, M. M., Abdalla Mohamed, A., & Salama, A. K. (2021). Effect of bilateral ultrasound-guided erector spinae blocks on postoperative pain and opioid use after lumbar spine surgery: A prospective randomized controlled trial. Egyptian Journal of Anaesthesia, 37(1), 100–106.