ORIGINAL RESEARCH PAPER

General Surgery

# PROSPECTIVE STUDY OF ANALGESIC EFFICACY OF RECTUS SHEATH BLOCK IN PATIENTS UNDERGOING LAPAROTOMY FOR POSTOPERATIVE PAIN CONTROL IN COMPARISION WITH CONVENTIONAL ANALGESIC TECHNIQUES

**KEY WORDS:** Rectus Sheath Block, Postoperative Analgesia, VAS, NRS, Analgesia in Laparotomy.

**Dr. Kavitha Gondesi** Senior Resident, Department of General Surgery, Sri Devaraj Urs Medical College

**Dr. Shashirekha C. A.** Professor, Department of General Surgery, Sri Devaraj Urs Medical College

**Dr. Ravikiran HR** Professor, Department of General surgery, Sri Devaraj Urs Medical College

**Dr. Prakash Dave** Professor, Department of General Surgery, Sri Devaraj Urs Medical College

**ABSTRACT**

**Background:** Pain in the postoperative period in open abdominal surgeries prevents early ambulation increasing risk of deep vein thrombosis, pulmonary atelectasis, leading to increased morbidity, prolonged hospital stay. Surgically placed Rectus sheath catheter is safe and provides good pain relief. **Aims and Objectives:** To compare the efficacy of Rectus sheath catheter block with conventional analgesia technique in postoperative pain control and assess the safety of Rectus sheath catheter block analgesia. **Methodology:** 60 patients posted for laparotomy at R.L.Jalappa Hospital, Kolar from September 2022 to June 2024 were studied, divided into study group with Rectus sheath catheter block (RSB) and control group with conventional analgesia (CA). Postoperative pain evaluated with VAS, NRS and ANVP pain scores, time for requirement of analgesia, secondary complications like nausea, vomiting, tachycardia / bradycardia, Analgesic efficacy, were noted and compared in two groups. **Results:** With VAS score 40% of the cases had mild pain and 10% of the cases had moderate pain in RSB group; 25% of the cases had mild pain, 21.7% moderate pain and 3.3% had worst pain in CA group respectively, significant association between RSB group and CA group (p value =0.035). NRS (p value=0.037) and ANVP scale (p values of 0.002, 0.0002 and 0.010 at 1st hour, 6 hours and 12 hours postoperatively respectively) showed statistical significance. Hypotension, bradycardia and PONV were same among groups. Rescue analgesia within 24 hrs were required more CA group (20%) than RSB(1.7%) (p value =0.0005). Median diclofenac consumption was less in RSB (75 mg) than CA (150 mg) group (p value <0.0001). **Conclusion:** Rectus sheath catheter block provides good postoperative analgesia with out complications like tachycardia, postoperative nausea and vomiting and very rare requirement of rescue analgesia.

## INTRODUCTION

Pain is defined as "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" by the International Association for the Study of Pain[1]. Midline incision laparotomies results in severe postoperative pain, which produces neuroendocrine stress response[1,2]. Good Postoperative analgesia aids in early mobilization, lowers the risk of deep vein thrombosis and postoperative pneumonia[3,4].

Postoperative pain severity is increased by 86% in midline abdominal operations, extremely painful procedures[5] and severe pain leads to atelectasis, reduced movement, and troubled sleeping[6,7].

Delayed hospital discharge, decreased patient satisfaction, delayed postoperative mobilization increase health care costs[8].

In midline abdominal surgeries, thoracic epidural analgesia (TEA), abdominal field blocks, and parenteral analgesics are being used[9]. TEA is gold standard choice, but limitations are individual patient contraindications, lack of expertise , hypotension, 6–8% technical difficulties[10].

RSB is beneficial in midline laparotomies, open gynaecological and major urological pelvic surgeries, umbilical and epigastric hernia repair[11,12].

RSB is done in four locations on either side of the umbilicus, with 0.25% of 10-15 ml at each location[13]. 0.25% of 30–40 ml bupivacaine in adults [14], 0.2–0.3 ml/kg of 0.25% bupivacaine 2–3 cm from the midline in pediatric group[15] at space between posterior rectus sheath and rectus muscles[15,16].

RSB have no hemodynamic alterations and early mobilisation [17,18]. RSB is effective with land mark approach for laparoscopic surgery[15,19], increases quality of life and level of analgesia[20,21]. Ultrasound-based RSB increase accuracy in obese patients[22].

Opioids have side effects, epidural analgesia is difficult technique, not available widely, needs expertise and not suitable for hemodynamically unstable patients[23,24].

### Objectives

- To compare efficacy of Rectus sheath block with conventional analgesia in post operative pain control
- To assess the safety of Rectus sheath catheter block.

## METHODOLOGY

Prospective observational study conducted at R. L. Jalappa Hospital, Tamaka, Kolar, from September 2022 to August 2024 after obtaining approval from the Institutional Ethics Committee. Sixty cases posted for midline laparotomy were included in the study; thirty cases in rectus sheath block group (RSB) and thirty cases in conventional analgesic group (CA) allotted by Computer generated random numbering. Written and informed consent obtained from participants, demographic details, detailed medical history and clinical examination of the patients was done.

**Inclusion Criteria:** Patients

- Posted for midline laparotomy
- ASA 1 and 2 physical status
- Both genders of age >18 yrs

**Exclusion Criteria:** Patients with

- Patient refusal
- Known hypersensitivity to local anesthetics
- Severe systemic illness
- Coagulation abnormalities
- Local skin infection at site of needle entry

RSB Group: At end of surgery Rectus sheath layers are separated, feeding tube 8 is placed between two layers of rectus sheath bilaterally under vision, secured with silk suture, flushed with normal saline to prevent occlusion during closure of abdomen. 15 ml of 0.125% bupivacaine is injected.

CA GROUP (CONVENTIONAL ANALGESIA): Inj. Tramadol iv/ im TID .

Breakthrough pain in both groups is treated with INJ. Diclofenac IM .

**Table 1: VAS in RSB and CA**

| VAS | RSB | CA | TOTAL | p value |
|---|---|---|---|---|
| Mild Pain(2-4) | 24 | 15 | 39 | 0.035 |
| Moderate pain(5-7) | 6 | 13 | 19 | |
| Worst pain(8-10) | 0 | 2 | 2 | |
| Total | 30 | 30 | 60 | |

**Table 2: NRS vs RSB Group and CA Group cases**

| NRS | RSB | CA | Total | p value |
|---|---|---|---|---|
| Mild pain (1-3) | 20 | 12 | 32 | 0.037 |
| Moderate pain (4-6) | 9 | 13 | 22 | |
| Severe pain (7-10) | 1 | 5 | 6 | |
| Total | 30 | 30 | 60 | |

**Table 3: ANVP vs RSB Group and CA Group**

| ANVP | RSB | CA | p value |
|---|---|---|---|
| 1 hr | 2.5±0.9 | 3.4±1.3 | 0.002 |
| 6 hrs | 2.5±1.0 | 3.7±1.3 | 0.0002 |
| 12 hrs | 2.7±1.0 | 4.0±2.5 | 0.010 |

## DISCUSSION

VAS score; In RSB group 40% had mild pain, 10% moderate pain, 25% had mild pain, in CA group21.7% had moderate pain and 3.3% cases had worst pain. Difference in NRS score between RSB group and CA group was found to be significant at 1 hour, 6 hours and 12 hours. ANVP scale showed significant difference between the groups at 1 hour, 6 and 12 hours.

Rescue analgesia required for 1.7% patients in RSB group, 20% cases in CA group. Mean first analgesia request time was prolonged in RSB group in comparision with CA. Paracetamol and diclofenac consumption is more in CA group.

Study findings were comparable with; Amir M S et al[25], Ghada MNB et al[26], Edward T et al[27]. Al,aa ED et al[28], RSB Group used less opioids during and after surgery, mean pain scores were significantly low than control group. RSB group had low sedation score and lower frequency of nausea and vomiting and higher patient satisfaction.

Debas Y M et al[29], Diriba T et al[30], also showed less analgesic requirement in 24 hours after surgery.

Limitations: Small sample size, single hospital setting. A larger sample size and a large scale study is needed for validation of efficacy.

## CONCLUSION

Rectus sheath block is safe and preferred choice of analgesia compared to conventional analgesia for midline laparotomy.

## REFERENCES


1. W. Rozen, T. Tran, M. Ashton, M. Barrington, J. Ivanusic, G. Taylor, Refining the course of the thoracolumbar nerves: a new understanding of the innervation of the anterior abdominal wall, Clin. Anat.: Off. J. Am. Assoc. Clin. Anat. Br. Assoc. Clin. Anat. 21 (4) (2008) 325–333.
2. A.M. Shabana, M. Dar, M.A. Ghanem, Surgically performed rectus sheath block–effect of morphine added to bupivacaine versus bupivacaine only: a prospective randomized controlled double blinded trial, Egypt. J. Anaesth. 29 (4) (2013) 401–405.
3. K.M. Wilkinson, A. Krige, S.G. Brearley, S. Lane, M. Scott, A.C. Gordon, et al., Thoracic Epidural analgesia versus Rectus Sheath Catheters for open midline incisions in major abdominal surgery within an enhanced recovery programme (TERSB): study protocol for a randomized controlled trial, Trials 15 (1) (2014) 1–12.
4. F. Imani, Postoperative pain management, Anesthesiol. Pain Med. 1 (1) (2011) 6.
5. Apfelbaum JL, Mehta SS, Gan TJ. Postoperative pain experience: results from a national survey suggest postoperative pain continues to be undermanaged. AnesthAnalg 2003;2(97):534e40.
6. LeeB, LeeG. Effects of pain control education on pain control barrier, postoperative pain and pain control satisfaction. J KorAcad Nurse 2006;6(36):968e75.
7. Talmage D, Egan. Miller's Anesthesia, 6th Edition. Anesthesiology 2005;103(673).
8. Malchow R, Jaeger L, Lam H. Rectus sheath catheters for continuous analgesia after laparotomy without postoperative opioid use. Pain Med 2011:1124e9.
9. Bhattacharjee S, Ray M, Ghose T, Maitra S, Layek A. Analgesic efficacy of transversusabdominis plane block in providing effective perioperative analgesia in patients undergoing total abdominal hysterectomy: a randomized controlled trial. J AnaesthesiolClinPharmacol 2014;30(3):391e6.
10. Santhanam S, Padmini HS, Raju A, Prasad L. Efficacy of rectus sheath block for postoperative pain management: a comparison with epidural analgesia. J Med SciClin Res 2016;4(12):14627e32.
11. Ferguson S, Thomas V, Lewis I. The rectus sheath block in paediatricanaesthesia: new indications for an old technique. PaediatrAnaesth 1996;6(6):463e6.
12. C P, P F, L D. Para-umbilical block: a new concept for regional anaesthesia in children. PaediacAnaesthesia 1997;7:211e4.
13. Keith G, wilsonlH. Oxford hand book of anesthesia:rectus sheath block, 3. UnitedVRG;2006. p. 1156.
14. Yarwood J, Berrill A. Nerve blocks of the anterior abdominal wall. ContEducAnaesthCrit Care Pain 2010;10(6):182e6.
15. Johnson C. Rectus sheath block in children. Tech Regional Anaesth Pain Manage 1999;(3):189e90.
16. Smith B, Suchak M, Siggins D. Rectus sheath block for diagnostic laparoscopy Anaesthesia, 1988;(43):947e8.
17. Turky AM. Evaluation of Ultrasound Guided Rectus Sheath Block as a part of peri- operative analgesia for midline and paramedian abdominal incisions in cancer patients. 2016.
18. Cüneyito_glu S, ,Türktan M, Biricik E, €Ozcengiz D. Ultrasound guided rectus sheath block in gynaecological surgery with pfannenstiel incision. Turkish J AnaesthesiolReanim 2015;43(5):318e22.
19. Isaac LA, McEWEN JU, Hayes JA, Crawford MW. A pilot study of the rectus sheath block for pain control after umbilical hernia repair. Pediatric Anesthesia 2006;16(4):406e9.
20. Mugita M, Kawahara R, Tamai Y, Yamasaki K, Okuno S, Hanada R, et al., Effectiveness of ultrasound guided transversusabdominis plane block and rectus sheath block in pain control and recovery after gynecological transumbilical single incision laparoscopic surgery. ClinExpObstetGynecol 2014;41:627e32.
21. Skinner AV, Lauder GR. Rectus sheath block: successful use in the chronic pain management of pediatric abdominal wall pain. Pediatric Anesthesia 2007;17(12):1203e11.
22. Dolan J, Lucie P, Geary T, Smith M, Kenny GN. The rectus sheath block accuracy of local anesthetic placement by trainee anesthesiologists using loss of resistance or ultrasound guidance. RegAnesth Pain Med 2009;34(3):247e50.
23. Bonnet F, Marret E. Influence of anaesthetic and analgesic techniques on outcome after surgery. Br J Anaesth 2005;(95):52e8.
24. Elkenany S, Ebrahim HM. Epidural block VS rectus sheath block on postoperative pulmonary function:clinical trials. U.S National institute of health;2017
25. Shabana AM, Dar M, Ghanem MA. Surgically performed rectus sheath block–effect of morphine added to bupivacaine versus bupivacaine only: a prospective randomized controlled double blinded trial. Egyptian Journal of Anaesthesia. 2013 Oct 1;29(4):401-5.
26. Bashandy GM, Elkholy AH. Reducing postoperative opioid consumption by adding an ultrasound-guided rectus sheath block to multimodal analgesia for abdominal cancer surgery with midline incision. Anesthesiology and pain medicine. 2014 Aug;4(3).
27. Tudor EC, Yang W, Brown R, Mackey PM. Rectus sheath catheters provide equivalent analgesia to epidurals following laparotomy for colorectal surgery. The Annals of The Royal College of Surgeons of England. 2015 Oct 1;97(7):530-3.
28. Elbahrawy K, El-Deeb A. Rectus sheath block for postoperative analgesia in patients with mesenteric vascular occlusion undergoing laparotomy: A randomized single- blinded study. Anesthesia, Essays and Researches. 2016 Sep;10(3):516.
29. Melesse DY, Chekol WB, Tawuye HY, Denu ZA, Agegnehu AF. Assessment of the analgesic effectiveness of rectus sheath block in patients who had emergency midline laparotomy: Prospective observational cohort study. International Journal of Surgery Open. 2020 Jan 1;24:27-31.
30. Teshome D, Hunie M, Essa K, Girma S, Fenta E. Rectus sheath block and emergency midline laparotomy at a hospital in Ethiopia: A prospective observational study. Annals of Medicine and Surgery. 2021 Aug 1;68:102572.