Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

Intraperitoneal Analgesia for Postoperative Pain Relief after Laparoscopic Surgeries.

Asit Kumar Sethy[1]

[1]Assistant Professor, Department of Surgery, SCB Medical College and Hospital, Cuttack, Odisha.

Received: October 2017
Accepted: October 2017

ABSTRACT

Background: Though laparoscopic surgeries is less invasive and produces less post-operative pain,post-laparoscopy pain is still a concern. Intraperitoneal (IP) instillation of local anaesthetics has been shown to minimize the postoperative pain after laparoscopic surgeries. This study was conducted to compare the efficacy of intraperitoneal instillation of dexmedetomidine with bupivcaine and bupivacaine alone in reducing postoperative pain. **Methods:** 60 patients, enrolled for laparoscopic surgeries were divided randomly into two groups of 30 each. Group B: Bupivacaine (30ml,0.25%) with 2 ml normal saline was instilled prior to removal of trocars, and Group BD: Bupivacaine(30ml,0.25%) with dexmedetomidine(1mcg/kg,diluted to 2 ml) was instilled under prior to removal of trocars . In postoperative period, Visual Analogue Score (VAS) was recorded up to 24 hours. Postoperative analgesic requirements, and side effects were recorded. **Results:** The Visual Analogue Score (VAS) during the first postoperative 24 hours was significantly lower in group BD compared to group B. Time to first of analgesia required was delayed and total analgesic consumption was lower in group BD compared to group B which was statistically significant. **Conclusion:** Intraperitoneal instillation of dexmedetomidine with bupivcaine is an effective and safe method for reducing pain after laparoscopic surgeries.

Keywords: Intra-peritoneal instillation, laparoscopic, dexmedetomidine, gynecological.

INTRODUCTION

Laparoscopic surgeries have many advantages over open procedures. They are less hemorrhage, better cosmetic results, less postoperative pain; and short recovery time, short hospital stay and less expenditure.[1] Laparoscopic surgeries have been increased recently due to the above advantages. Postoperative pain management remains a major challenge after laparoscopic surgeries.[2] Effective pain management provides early ambulation, which significantly reduces the risk of deep vein thrombosis and pulmonary embolism.[3] This increases patient's ability to take deep breaths to decrease the risk of pulmonary complications like atelectasis and pneumonia. Pain after laparoscopic surgery has two components like visceral and somatic. Visceral component is due to surgical handling, tissue injury, and the stretching of nerve endings.[4] Pneumoperitoneum produce stretching of the peritoneum and the diaphragmatic muscle fibres, which irritates phrenic nerve endings. As this nerve shares a common route with nerves that innervate the shoulder, it may produce shoulder pain.

Name & Address of Corresponding Author
Dr. Asit Kumar Sethy
Assistant Professor,
Department of Surgery,
SCB Medical College and Hospital,
Cuttack,
Odisha.

The somatic component of pain is due to the holes made in the abdominal wall for the entry of trocar.[5] Various methods are available for management of postoperative pain but still preventing and relieving the pain remains an challenge. It has been reported that the postoperative pain is inadequately treated in approximately one half of all surgical procedures.[6] Therefore, a multimodal approach, using local anaesthetics with adjuvants may help in improving the quality of analgesia, without producing any side effects.[7] The aim of this study was to assess the effect of intra-peritoneal bupivacaine with dexmedetomidine in reducing postoperative pain after laparoscopic surgeries. The primary outcome was to assess the postoperative pain scores. Secondary outcomes was assessment of postoperative analgesic requirements and side effects.

MATERIALS AND METHODS

This prospective, double-blind, randomized and controlled study was conducted in 60 patients of aged 45 to 65 years posted for laparoscopic surgeries. All patients were divided into two groups and an informed written consent was obtained from all patient. Patients were posted for laparoscopic appendectomy or cholecystectomy. Pregnancy, genital malignancy, deep pelvic endometriosis, or inflammatory bowel disease, current opioid use

were excluded from study. History of all patients was obtained and general, abdominal, and local pelvic examination was done. Pre-anaesthetic check-up and routine investigations, such as complete blood count test, random blood sugar level, liver and renal function tests and coagulation profile were done. Patients were explained regarding use of the VAS.[8] All patients were randomly assigned to one of the two groups: Group-B: 30 patients received bupivacaine, and Group-BD: 30 patients received bupivacaine with dexmedetomidine. On arrival in the operating room, standard intraoperative anaesthetic, analgesic, and antiemetic were administered in all cases. Laparoscopic surgery was started after establishment of carbon dioxide pneumoperitoneum. Trendlenburg's position was performed at 30 degrees and 3 accessory trocars were then inserted (two lateral pelvic and one suprapubic). Intraabdominal pressure was maintained below15 mm of Hg.At the end of surgery , prior to removal of trocars, a 32-ml of study drug was instilled intraperitoneally. In Group B ,Bupivacaine (30ml,0.25%) with 2 ml normal saline and in Group BD ,Bupivacaine(30ml,0.25%) with dexmedetomidine(1mcg/kg,diluted to 2 ml) was instilled prior removal of trocars. All surgeries were performed by surgeon, who was not informed about the content of the instilled study drug. After operation, the postoperative pain was assessed using the Visual Analogue Score (VAS) and recorded at 0.5,1,4,8,12,16 and 24 hours postoperatively. Patients who had VAS >4, were administered a IV paracetamol (1gm) injection as rescue analgesia. Time to first postoperative analgesic requirement ,total analgesic requirement and occurrence of side effects like nausea and vomiting in the first 24 hrs postoperatively were recorded. All data was expressed mean, standard deviation, number, and percent. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS/version 20) software and. For categorized data Chi square test was used while for numerical data t-test was used to compare two groups. P<0.05 was considered as significant.

RESULTS

There was no significant differences between the two studied groups with respect of basic characteristics like age, body mass index and duration of surgery [Table 1].

Table 1: Demographic data.

Parameter	Group B	Group BD	P value
Age (year)	49.6±10.4	48.9±11.5	0.43
Weight (kg)	60.7± 10.5	62.4±8.7	0.36
Height (cm)	161.4 ±7.9	163.4±8.1	0.38
Duration of surgery (min)	70.4±10.8	72.6±10.2	0.32

Regarding postoperative pain assessment, VAS at different time interval after laparoscopy was less in group BD compared to group B which was statistically significant. [Table 2]. Postoperative analgesia was assessed by observing the time required for 1st analgesic dose and amount of analgesia needed. There was a significant increase in the time required for 1st rescue analgesia in group BD more than group B (165.5±30.8 minutes versus 310.4±32.5 minutes). Amount of paracetamol needed was significantly less in group BD (1.2±0.8gm)compared to group B(3.6±0.4gm). [Table 3] [Table 4] showed that patients in group BD had significantly less side effects like nausea, vomiting and shoulder pain compared to group B. [Table 4]

Table 2: VAS-Visual analogue score.

Time (h)	Group B	Group BD	P value
At 0.5	4.1±1.5	3.6±0.4	<0.05
At 1	5.6±1.1	3.9±0.1	<0.05
At 4	5.9±1.2	3.1±0.7	<0.05
At 8	4.8±1.3	3.4±0.6	<0.05
At 12	4.3±1.5	2.9±0.9	<0.05
At 16	5.5±1.3	3.1±1.0	<0.05
At 24 hours	3.9±1.2	3.0±0.9	<0.05

Table 3: Comparison between the two studied groups regarding postoperative analgesia.

Postoperative analgesia	Group B	Group BD	P value
Time for 1st analgesia (in mins)	165.5±30.8	310.4±32.5	<0.05
Amount of Paracetamol needed (gm)	3.6±0.4	1.2±0.8	<0.05

Table 4: Side effects.

Variable	Group B(n)	Group BD(n)
Nausea	8	2
Vomiting	6	3
Shoulder pain	6	2

DISCUSSION

Many methods have been investigated for an optimum pain relief in the postoperative period out of which, intraperitoneal instillation of local anaesthetic agents offer theoretical and practical advantages over other methods.[9] Intraperitoneal instillation of local anaesthetics with adjuvants was started in early 1990s during laparoscopic surgery.[10] In laparoscopic surgeries because of gas insufflations and raised intraperitoneal pressure, there is peritoneal inflammation and neuronal rupture with a linear relationship between abdominal compliance and resultant severity of post-operative pain. Hence, we choose intraperitoneal route because it blocks the visceral afferent signals and modifies visceral nociception.[11,12] The local anaesthetic agents provide antinociception by affecting nerve membrane associated proteins and by inhibiting the release and action of prostaglandins which stimulates the nociceptors and cause inflammation.

Intraperitoneal instillation of 0.25% bupivacaine provides effective analgesia. To prolong the duration of analgesia,we have added dexmedetomidine to bupivacaine. In the present study, intraperitoneal instillation of local anaesthetics was done prior to removal of trocars. There was significant reduction in VAS pain scores during the first 24 hours following surgery in Bupivacaine-dexmedetomidine group. The incidence of postoperative nausea and vomiting and shoulder pain was less with Bupivacaine-dexmedetomidine group. Narchi et al. in their study found that intraperitoneal instillation of local anaesthetics are more effective in reducing pain up to 48 h postoperatively in patients undergoing diagnostic laparoscopy.[13] Golubovic et al.[14] assessed the analgesic effects of intraperitoneal instillation of bupivacaine and tramadol in patients undergoing laparoscopic cholecystectomy and concluded that intraperitoneal instillation of bupivacaine or tramadol or combination of both are effective method for management of pain after laparoscopic cholecystectomy. Bisgaard et al. had reported that the visceral pain experienced after laparoscopic cholecystectomy can be theoretically blocked by IP analgesic instillation.[15] The results of the present clinical trial seem to be in accordance with the findings of these studies. Our results correlate with study done by Ahmed et al.[16] which has shown that intraperitoneal instillation of mepiridine or dexmedetomidine in combination with bupivacaine 0.25% significantly decreases the post-operative analgesic requirements and decreased incidence of shoulder pain in patients undergoing laparoscopic gynaecological surgeries. Memis et al.[17] studied the effects of tramadol or clonidine added to intraperitoneal bupivacaine, on post-operative pain in total abdominal hysterectomy and found that combination of tramadol or clonidine with intraperitoneal bupivacaine was more effective than bupivacaine alone. In gynecologic laparoscopy, one previous study carried out by Goldstein et al. reported that the intraperitoneal instillation of 20 mL of either 0.5% bupivacaine or 0.75% ropivacaine prevented postoperative pain and decreased the need for postoperative analgesia, when compared with placebo in patients undergoing laparoscopic gynaecologic surgery.[18] Arden D et al. have compared instillation of 100 mg bupivacaine in 100 mL normal saline with instillation of 100 mL normal saline alone and concluded that bupivacaine was effective in reducing postoperative pain.[19] Ranjita et al in his study concluded that better postoperative analgesia can be provided with intraperitoneal, ropivacaine with dexamedetomidine after total laparoscopic hysterectomy compared to ropivacaine alone.[20] These results agree with the current study. Early mobilization was possible in the group which received local intraperitoneal instillation analgesia with dexmedetomidine.

CONCLUSION

We conclude that intraperitoneal instillation of bupivacaine in combination with dexmedetomidne in laparoscopic surgeries significantly reduces the postoperative pain and significantly reduces the analgesic requirement in the postoperative period as compared to control group without any side effects.

REFERENCES

1. Kim TH, Kang HK, Park JS, Chang IT, Park SG. Intraperitoneal ropivacaine instillation for postoperative pain relief after laparoscopic cholecystectomy. J Korean Surg Soc. 2010;79:130-6.
2. Wu JM, Wechter ME, Geller EJ, Nguyen TV, Visco AG. Hysterectomy rates in the United States. Obstet Gynecol. 2003;2007:1091-5.
3. Kai-Yun Wu, Srithean Lertvikool, Kuan-Gen Huang, Hsuan Su, Chih-Feng Yen, Chyi-Long Lee. Laparoscopic hysterectomies for large uteri. Taiwanese J Obstet Gynecol. 2011;50:411-4.
4. El-Sherbiny W, Saber W, Askalany AN, El-Daly A, Sleem AA. Effect of intra-abdominal instillation of lidocaine during minor laparoscopic procedures. Int J Gynecol Obstet. 2009;106:213-5.
5. Pasqualucci A, de Angelis V, Contardo R, Colò F, Terrosu G, Donini A et al. Preemptive analgesia: Intraperitoneal local anesthetic in laparoscopic cholecystectomy. A randomized, double-blind, placebo-controlled study. Anesthesiology. 2000;85:11-20.
6. White PF. The role of non-opioid analgesic techniques in the management of postoperative pain. Anesth Analg. 2002;94:577-85.
7. Jiménez Cruz J, Diebolder H, Dogan A, Mothes A, Rengsberger M, Hartmann M et al. Combination of pre-emptive port-site and intraoperative intraperitoneal ropivacaine for reduction of postoperative pain: a prospective cohort study. Eur J Obstet Gynecol Reprod Biol. 2014;179:11-6.
8. Huang S, Mi S, He Y, Li Y, Wang S. Analgesic efficacy of trocar sites local anesthetic infiltration with and without transversus abdominis plane block after laparoscopic hysterectomy: a randomized trial. Int J Clin Exp Med. 2016;9(3):6518-24.
9. Marks JL, Ata B, Tulandi T. Systematic review and metaanalysis of intraperitoneal instillation of local anesthetics for reduction of pain after gynecologic laparoscopy. J Minim Invasive Gynecol. 2012;19:545-53.
10. Andrews V, Wright JT, Zakaria F, Banerjee S, Ballard K. Continuous infusion of local anaesthetic following laparoscopic hysterectomy - a randomized controlled trial. Br J Obstet Gynecol. 2014;121:755- 61.
11. Rivard C, Vogel RI, Teoh D. Effect of Intraperitoneal Bupivacaine on Postoperative Pain in the Gynecologic Oncology Patient. J Minim Invasive Gynecol. 2015;22(7):1260-5.
12. Saccardi C, Gizzo S, Vitagliano A, Noventa M, Micaglio M, Parotto M et al. Peri-incisional and intraperitoneal ropivacaine administration: a new effective tool in pain control after laparoscopic surgery in gynecology: a randomized controlled clinical trial. Surg Endosc. 2016;30(12):5310-8.
13. Narchi P, Benhamou D, Fernandez H. Intraperitoneal local anaesthetic for shoulder pain after day-case laparoscopy. Lancet. 1991;338:1569-70.
14. Golubovic S, Golubovic V, Tokmadzic VS. Intraperitoneal analgesia for laproscopic cholecystectomy. Periodicum Biologorum 2009;3:263-6

15. Goldstein A, Grimault P, Henique A, Keller M, Fortin A, Darai E. Preventing postoperative pain by local anesthetic instillation after laparoscopic gynecologic surgery: A placebo-controlled comparison of bupivacaine and ropivacaine. Anesth Analg. 2000;91:403-7.
16. Bisgaard T, Klarskov B, Kristiansen VB, Callesen T, Schulze S, Kehlet H et al. Multi-regional local anesthetic infiltration during laparoscopic cholecystectomy in patients receiving prophylactic multi modal analgesia: A randomized, doubleblinded, placebo-controlled study. Anesth Analg. 2009;89:1017-24.
17. Ahmed B, Elmawgoud AA, Dosa R. Antinociceptive effect of (ὰ-2 adrenoceptor agonist) dexmedetomidine vs meperidine, topically, after laproscopic gynecologic surgery. J Med Sci 2008;8:400-4.
18. Memis D, Turan A, Karamanlioglu B, Tükenmez B, Pamukçu Z. The effect of tramadol or clonidine added to intraperitoneal bupivacaine on postoperative pain in total abdominal hysterectomy. J Opioid Manag 2005;1:77-82
19. Arden D, Seifert E, Donnellan N, et al. Intraperitoneal instillation of bupivacaine for reduction of postoperative pain after laparoscopic hysterectomy: a double-blind randomized controlled trial. J Minim Invasive Gynecol. 2013;20:620-6.
20. Ranjita A, Daisy K, Megha K. Postoperative analgesia with intraperitoneal, ropivacaine with and without dexamedetomidine after total laparoscopic hysterectomy: Asian J Pharmaceu Clin Res. 2016;9:1-4.

How to cite this article: Sethy AK. Intraperitoneal Analgesia for Postoperative Pain Relief after Laparoscopic Surgeries. Ann. Int. Med. Den. Res. 2018; 4(1): SG09-SG12.

Source of Support: Nil, **Conflict of Interest:** None declared