

Intraperitoneal and periportal injection of bupivacaine for pain after laparoscopic cholecystectomy

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Abstract

Purpose: to study the analgesic efficacy of intraperitoneal and periportal injection of bupivacaine following laparoscopic cholecystectomy.

Materials and methods: 40 patients undergoing laparoscopic cholecystectomy were randomized into two groups of 20 each. Group A (study group) received 40 ml of intraperitoneal injection of 0.25% bupivacaine and 20 ml of same concentration in 4 ports, 5 ml each at the end of surgery. Group B (control) received no treatment. Post operative patient monitoring and pain assessment was done by another doctor blinded to the procedure using VAS score at 1,2,3,6,9 and 24 hours after surgery. Pethidine 50 mg intramuscular was given as rescue analgesic when demanded by patient within first 24 hours.

Results: when VAS score was analyzed in the two groups, the study group had less scores compared to control group though it was statistically not significant ($p>0.05$). The rescue analgesic requirement was significantly less in study group ($p<0.00$).

Conclusion: Intraperitoneal and periportal injection of bupivacaine is effective in decreasing pain after laparoscopic cholecystectomy.

Key words: Laparoscopic surgery, intraperitoneal bupivacaine, analgesia, VAS score

Laparoscopy is endoscopic visualization of intra-abdominal contents after insufflation of peritoneal cavity by using gas. Different types of abdominal surgeries are done laparoscopically by using two or more ports which produce surgical trauma and moderate to severe pain. Intraperitoneal insufflation of gas like carbon dioxide stretches the abdominal tissues, causes traumatic vessel tear, nerve traction and release of inflammatory mediators causing perioperative pain. Pain may be visceral or somatic, upper abdominal, lower abdominal or in shoulders as well.¹

Postoperative pain may be transient and most of the time lasts for 24 hours and sometimes even up to 3 days. Intensity of pain is more immediately after surgery and less after 24 hours. Compared to open methods of surgery, the intensity of post-operative pain is less after laparoscopic surgeries, but there will still be moderate to severe pain and other complications like nausea and vomiting in the first 24 hours. This pain can be reduced by the use of local anaesthetics, nonsteroidal anti inflammatory drugs and other analgesics as well. Local anaesthetics can be given as epidural, intraperitoneal or as infiltration around the laparoscopic port sites before and after surgery².

Materials and methods

40 patients of ASA I & II, undergoing laparoscopic cholecystectomy under General anaesthesia, were randomly divided into two groups. At the end of surgery, the study group received 40 mls of 0.25% bupivacaine as intraperitoneal infiltration and local infiltration of 20 mls of 0.25% bupivacaine in the port sites (5 ml infiltration in each port). The control group didn't receive any treatment. General anaesthesia was conducted with pethidine 1mg/kg, sodium thiopentone induction, endotracheal intubation with succinylcholine facilitation, maintenance with 50% O₂ in air, halothane, pancuronium and IPPV, residual effect of pancuronium reversed with neostigmine and atropine.

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Standard monitors, including end-tidal CO₂ monitoring were used intraoperatively. Visual Analogue Score (VAS) of 0-10 was explained to the patients during preoperative visit as below:

- 0-----no pain
- 1-3----- mild pain
- 4-7----- moderate pain
- 8-10----- severe pain

Level of pain was assessed using the 10 point VAS Score at 1, 2, 3, 6, 9, 12 and 24 hours after surgery. Rescue analgesic, pethidine 50 mg intramuscular, was given whenever patients complained of moderate to severe pain within first 24 hours of surgery. Data analysis was done using word excel and SPSS 11 for windows. Independent samples T test and Chi-square test were used for inter-group comparison. Results were reported as mean ± standard deviation. The p value of <0.05 was taken as statistically significant difference between the two groups.

Results

Inter-group comparison of demographic parameters i.e. age, sex and weight were similar and there were no significant differences in the duration of surgery and the duration of anaesthesia between the two groups (Table1).

VAS scores at 1, 2, 3, 6, 9, 12 and 24 hours after surgery were assessed in both the groups. Number of patients having mild, moderate and severe pain was higher in the control group in all assessed hours after surgery compared to those in the study group. Rescue analgesic requirement, which was given as 50 mg I/M pethidine, was also higher in the control group, which was significantly different (p <0.00), Table 2 & 3 below.

Rescue analgesic consumption in the first 24 hours after surgery was also significantly less in the study group, (70% patients demanding once, 20% twice, 10% three times and 30% didn't ask for pethidine in 24 hours) compared to the control group where all patients asked for at least once, 80% two times and 20% three times (Table 3).

When patients having moderate to severe pain were analyzed eight times in 24 hours, control group had more number of patients compared to study group. Number of patients having mild pain was also less and number of patients having no pain was absent in control group but most of the patients were pain free in early 12 hours after surgery in study group.

Table 1: Demographic parameters and duration of anaesthesia and surgery in studied patients.

Parameters	Control group	Study group	P value
Age, years	19-57(35.0±12.08)	24-72)37.3±13.12	0.527
Male:female	4:16	5:15	
Weight, kg	40-75(54.3±11.5)	45-79(55.5±9.50)	0.766
Duration of anaesthesia, minutes	30-120(75.7±26.7)	45-140(80.0±25.3)	0.199
Duration of surgery, minutes	25-110 (66.25±25.89)	35-120(74.4.25±22.20)	0.944

Table 2: Number of patients with VAS scores (no pain, mild, moderate and severe pain) after 1, 2, 3, 6, 9, 12 and 24 hours after surgery.

Pain score (VAS)	Control group / Study group								P value
	1	2	3	6	9	12	24		
Severe (8,9,10)	10 / 3	4 / 1	4 / 2	7 / 1	7 / 0	2 / 1	2 / 0	0.09	
Moderate (4,5,6,7,8)	3 / 1	3 / 2	9 / 2	2 / 2	7 / 2	5 / 0	6 / 0	0.038	
Mild (1,2,3)	7 / 7	13 / 9	11 / 4	12 / 9	12 / 7	10 / 14	13 / 18	0.100	
No pain (0)	0 / 9	0 / 8	0 / 7	2 / 5	1 / 6	3 / 5	1 / 2	0.160	
Time after surgery (hours)	1	2	3	6	9	12	24		

Table 3: Rescue analgesic requirements in first 24 hours after surgery.

Rescue analgesic	Control group (no. of patients)	Study group (no. of patients)	P value
Not required	0	6(30%)	0.00
once	20(100%)	14(70%)	0.00
twice	16(80%)	4(20%)	0.00
thrice	4(20%)	2(10%)	0.00

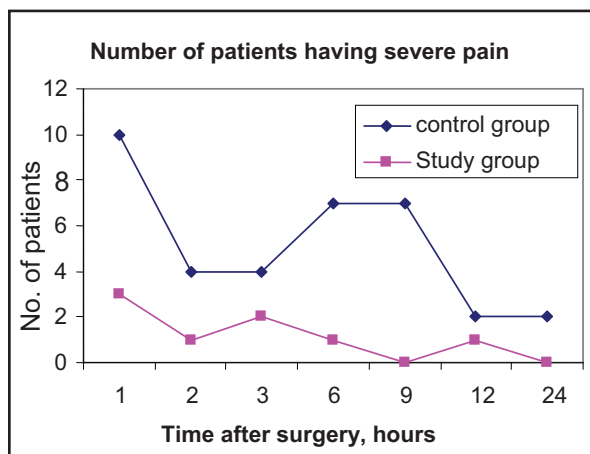


Fig 1: Showing number of patients having severe pain, in assessed hours. Control group has more number of patients having severe pain.

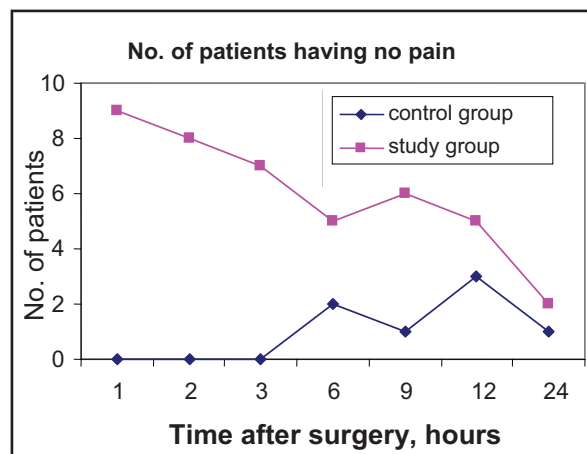


Fig 2: Showing number of patients' pain free for the first 24 hours after surgery.

Discussion

Pain after laparoscopic surgery is variable in duration, intensity and character. Tendency and preference of patients for laparoscopic surgery is more due to cosmetic scars, less hospital stay and less pain. But there is less importance in recognition and management of pain. The results of this study shows that intraperitoneal infiltration of 0.25% bupivacaine along with infiltration in and around the all ports used, decreases the pain in first 24 hours and there will be less analgesic consumption as well.

Lee OK et al had studied the bupivacaine infiltration in ports and intraperitoneal infiltration before and after surgery. In that study, incisional somatic pain dominated and incisional pain was lower in patients with preincisional periportal injection. Peritoneal infiltration didn't decrease visceral pain. They had recommended preincisional bupivacaine to decrease somatic pain after surgery³.

Chu PT et al, reported that pain after laparoscopic surgery is generally mild and patients usually complain of diffuse abdominal pain, minor shoulder tip pain and pain in the incision site. Local surgical trauma can produce severe and deep-seated pain requiring narcotics, although NSAID's are often sufficient. Infiltration of puncture sites with bupivacaine is useful!!

Johnson et al., had performed two consecutive studies with intraperitoneal bupivacaine and periportal injection of bupivacaine after completion of surgery. They had reported that intraperitoneal bupivacaine is as effective as wound infiltration and the addition of NSAID's makes no difference in decreasing post-operative

pain after laparoscopic cholecystectomy⁴. A study reported that pre-incisional infiltration of bupivacaine is effective in decreasing the pain after laparoscopic cholecystectomy⁵.

Bourget JL et al reported that there was no better pain control with pre-incisional infiltration than with post-incisional infiltration of bupivacaine, and questioned about the benefit of preemptive analgesia at the local level in long term postoperative pain management⁶. Alenxander et al reported the effectiveness of periportal and intra-peritoneal infiltration of bupivacaine. Analgesic requirement were less and pain scores were less in the studied patients though it was statistically insignificant⁷.

We didn't study the visceral pain level as it was difficult to evaluate in our patients and we infiltrated the 0.25% bupivacaine only at the end of surgery. Despite that there was significant difference in analgesic requirements and severity of pain in the patients receiving intraperitoneal and periportal bupivacaine. Therefore we recommend the use of bupivacaine infiltration both intraperitoneal and periportal to decrease pain intensity and decrease the postoperative analgesic requirements after laparoscopic surgery.

Conclusion

Infiltration of 0.25% bupivacaine in peritoneal cavity and around the ports used for surgery significantly reduces the severity of post-operative pain and the analgesic requirement in the postoperative period following laparoscopic surgeries.

References

1. Chu pt, Gin T & Oh TE. Anesthesia for laparoscopic general surgery. *Anesthesia Analog* 1993.
2. J.I. Alexander. Pain after laparoscopy. *British journal of anesthesia*. 1997;79:369-378
3. Lee, II-OK et al. pain after laparoscopic cholecystectomy: the effect and timing of incisional and intraperitoneal bupivacaine. *Canadian journal of anaesthesia*, June 2001, volume 48,number 6.
4. Johnson RC,Hedges AR, Morris R, StamakakisJD. Ideal pain relief following laparoscopic cholecystectomy. *Int J Clin Pract* 1999;53:16-8.
5. Ure BM, Troid H et al. preincisional local anaesthesia with bupivacaine and pain after laparoscopic cholecystectomy.a doubl blind randomized clinical trial. *Surg Endosc* 19993;7:482-8.
6. Bourget JI, Clark J, Joy N. Comparing preincisional with postincisional bupivacaine infiltration in the management of postoperative pain. *Arch Surg* 1997; 132:766-9.
7. AlexanderDJ, Ngoi SS, Lee L, et al. Randomised trial of periportal peritoneal bupivacaine for pain relief after laparoscopic cholecystectomy. *British Journal of Surgery* 19996; 83:1223-5.
8. Pasqualucci A, De Angelis V, contardo R, et al. Pre-emptive analgesia: intraperitoneal local anesthetic in laparoscopic cholecystectomy. A ramdomised, double blind, placebo controllrd study. *Anesthesiology* 19996; 85:11-20.