Evaluation of Intraperitoneal Bupivacaine for Pain Relief after Laproscopic Cholecystectomy

Authors
Ashish Agrawal1*, Vinita Agrawal2, Prateek Porwal3
1Professor Department of General Surgery, 2Professor Department of Obstetrics and Gynecology, 3Postgraduate Department of General Surgery, IMCHRC, Indore, M.P. INDIA
*Corresponding Author
Ashish Agrawal
Email: skyline.ashish@gmail.com

Abstract
Background:- Cholecystectomy is now widely practised. There are various methods of pain relief. Aim of our study is to assess the analgesic effect of intraperitoneal bupivacaine in laproscopic cholecystectomy.

Material and Method:- A prospective randomized study was conducted in which patients were enrolled for group 1 (20 ml of saline injected) and group 2 (20 ml of 0.5% of bupivacaine with adrenaline injected). Postoperative pain was assessed by VAS at regular interval, shoulder pain, and requirement of analgesic.

Results:- results shows that VAS score was significantly low (p= <0.001) in group 2 at 1, 4 and 8 hrs. Pain was low but not statistically significant in 12 and 24 hrs.

Conclusion:- intraperitoneal bupivacaine reduces pain in initial postoperative period after laproscopic cholecystectomy.

Keywords:- bupivacaine, intraperitoneal, laproscopic, VAS score.

Introduction
Laproscopic cholecystectomy is now an well-established form of treatment for patients with symptomatic gallstone. patient may experienced considerable pain after Laproscopic cholecystectomy.1,2) As it is relatively new procedure, there is no general agreements as effective postoperative pain control. The various methods use are NSAIDs, infiltration of local anaesthesia3, and intermittent intramuscular narcotics4. It is recognised that laproscopic shoulder tip pain is a common complaint and may delay discharge from hospital5.

Narchi et al observed reduction in postoperative shoulder pain in minor gynaecological surgery after intraperitoneal instillation of local anaesthesia.6) The present study was conducted in patients undergoing laproscopic cholecystectomy using 20ml of 0.5% bupivacaine with adrenaline 1:200000.

Material and Method
The study was conducted in dept. of surgery in index medical college hospital and research centre, Indore from period 1 jan 2015 to 31 dec  2015.after taking approval from hospital ethical committee.
Study was performed in 40 consecutive patients listed for elective laproscopic cholecystectomy for symptomatic gallstone surgery. Patient selected are level ASA 1 and 2. Age group between 20 to 65 of either sex. Exclusive criteria are acute cholecystitis, patient who did not give consent and those who did not understand VAS. Patients were randomized into one of two group Group A patient received 20ml of 0.9% normal saline as placebo (n=20) Group B patient received 20ml of 0.5% bupivacaine with adrenaline 1:200000 (n=20) All operation were performed by a single surgeon by using four port techniques The local anaesthetic or placebo solution was sprayed on the upper surface of liver, on right sub diaphragmatic space to allowed to diffuse into the hepatodiaphragmatic space , near and above the hepatodudenal ligaments and above the gallbladder fossa. And also the drug was instilled before deflation of pneumoperitoneum and in $20^\circ$ head down tilt maintained for 20 minutes This was done using irrigation catheter inserted via subcostal port under direct laproscopic vision. Postoperatively the patients were assessed for pain utilizing visual analogue score, shoulder pain and number of analgesic dose required. Above parameter were assessed at 1, 4, 8, 12 and 24 hrs. The VAS consist of a 10cm scale representing varying intensity of pain from 0 (no pain) to 10 (worst imaginable pain).

Rescue analgesic consist of inj. Diclofenac 75mg/ml utilized when VAS was more than 6. The BP, HR, and RR were also assessed at above time.

**Result**

The characteristics of the both patient group, including factors likely to increase postoperative pain, such as bile spillage from punctured gallbladder, or difficult dissection due to adhesion from previous surgery, are shown in table 1. There was no difference in characteristics between these groups. Both the groups were comparable for age, sex and preoperative vital signs. The VAS was higher in group 1 as compare to group 2 at 1hr ($p<0.001$), 4th hr ($p<0.001$) and 8th hr ($p<0.05$) postoperative hour and difference was statistically significant. At12th and 24th hr VAS was not significantly difference. None of the patients in either of the groups had shoulder pain up to 8 hours postoperatively. At 12th and 24th hr the number of patient having shoulder pain was higher in group 1 than group 2, however this difference was not statistically significant. The amount of analgesic requirement was also higher in group 1 then group 2 but difference was statistically significant only 4th hr.

37 patients were discharged the morning after surgery and remaining 3 patients were discharged the same evening.

### Table I. Characteristics of patients in the two group

|                          | Saline  | Bupivacaine |
|--------------------------|---------|-------------|
| Number in group          | 20      | 20          |
| Age (years)*             | 45 (15.8)| 43 (14.7)  |
| Male:female ratio        | 4:21    | 3:23        |
| Previous surgery         | 3       | 3           |
| Gallbladder puncture     | 2       | 2           |
| Length of operation (min)*| 39.0 (17.4)| 40.6(15.4) |
| * Mean (± SD)            |         |             |
Table II. Visual analogue pain scores in the two groups*

| Time after surgery | 1 h  | 4 h  | 8 h  | 12 h | 24 h |
|--------------------|------|------|------|------|------|
| Saline             | 3.55 | 2.87 | 1.69 | 1.52 | 0.12 |
| Bupivacaine        | 1.73 | 1.12 | 2.41 | 1.48 | 0.16 |
| P#                 | < 0.001 | < 0.001 | <0.05 | NS   | NS   |

* Mean pain scores
# Student's t test

Discussion

The results of the present study demonstrate that intraperitoneal instillation of bupivacaine with adrenaline produced lower VAS upto 8 hours postoperatively. The postoperative analgesic requirements are also less but there is no difference in the shoulder pain between the two groups.

Utilizing 20 ml of either 0.25% bupivacaine or 0.5% of lignocaine, Rademaker et al\(^1\) failed to demonstrate any reduction in postoperative pain. A possible explanation of the failed effect given by them was the small amount of local anaesthetics used as compared to Narchi et al\(^7\).

Visceral pain accounts for the major discomfort experienced in early postoperative periods whereas shoulder tip pain become main complaint on second day.\(^2\)

Keeping in view the importance of positioning while instilling the local anaesthetic Scheinin et al. administered 100ml of either 0.15% plain bupivacaine or with adrenaline in 20\(^0\) head down tilt maintained for 20 minutes\(^8\) They found no relief of pain after laparoscopic cholecystectomy. The lack of analgesic efficacy can be attributed to the lower concentration of bupivacaine used and more extensive and long duration of surgery compared to gynaecological laparoscopies.

Using 20ml of 0.5% bupivacaine, Pasquлучci et al noted a decrease in pain and consumption of analgescics probably due to a complete block using of afferents higher concentration and volumes than used by other authors.\(^9\)

It is the concentration of solution which is important in laparoscopy cholecystectomy rather than volume. Also drug in was instilled 20\(^0\)trendelberg position so as to encourage its accumulation in gall bladder bed.

Our study relief in pain was noted up to 8 hrs. postoperatively. Chundrigar et al also noted pain relief only up to 2hr with intraperitoneal administration of 0.25% bupivacaine \(^10\). This could be related to the lower concentrations used by them compare to our study.

Conclusion

Intraperitoneal bupivacaine instillation for laparoscopic cholecystectomy reduces pain in the initial postoperative period, it is easy to administer with no adverse effects and may become a routine practice for procedure.

References

1. Rademaker BM, Ringers J, Odoom JA, de WL, Kalkman CJ, Oosting J. Pulmonary function an stress response after laparoscopic cholecystectomy: comparison with subcostal incision and influence of thoracic epidural anaesthesia. Anesthesia and Analgesia 1992; 75: 381-385.
2. Joris J, Cigarini, I, Legrand M, Jacquet N, De GD, Franchiment P, Lamy M. Metabolic and respiratory changes after cholecystectomy performed via laparotomy or laparoscopy. Brit J Anaesth 1992; 69: 341-345
3. Lord Mc Coll. Laparoscopic cholecystectomy. Am R coll Surg Engl: 1992;74:231
4. Rees BI, Williams HR. Laparoscopic Cholecystectomy the first 155 patients. Am R Coll Surg Eng 1992; 74:233-236
5. Scott AND, Greville AC, Mc Millan L, Wellwood J Mc K. Laparoscopic laser cholecystectomy results of the technique in 210 patients Am R Coll Surg; 1992; 74: 237 – 241.
6. Dobbs FF, Kumar V, Alexander JI, Hull MGR. Pain after laparoscopy related to posture and ring versus clip sterilisation. BrJ Obstet Gynaecol 1987; 94: 262-6.

7. Narchi P, Benhamou D, Fernandez H. Intraperitoneal local anaesthetic for shoulder pain after day case laparoscopy. The Lancet 1991; 338: 1569-1570

8. Scheinin B, Kellokiempi I, Lindgren L, Haglund C, Rosenberg PH. Effect of intraperitoneal bupivacaine on pain after laparoscopic cholecystectomy Acta Anaesthesia Scand; 1995; 39: 195-198.

9. Pasqualucci A, Angelis VA, Contrado R et al. Preemptive Anagesia Intraperitoneal local anaesthetic in laparoscopic cholecystectomy. A randomised, double blind, placebo controlled study. Anesthesiology 1996; 85: 11-20

10. Chundrigar T, Morris R, Hedges AR, Starnatakis JD. Intraperitoneal bupivacaine for effective pain relief after laparoscopic cholecystectomy. Annals R coll surg Engl; 1993; 75:437-439.