

Cost Effectiveness of Port Site Bupivacaine Injection in Early Post-Operative Period After Laparoscopic Cholecystectomy

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ABSTRACT

Background: Post-operative Cholecystectomy pain is a very important factor affecting administration of analgesics. Cost of management of this pain may have a big burden on public health care system. **Objective:** To observe the effect of port site bupivacaine injection on reducing the cost of parenteral analgesia in early post-operative period after laparoscopic cholecystectomy. **Study design:** Randomized Control study. **Settings:** DHQ Teaching hospital Faisalabad. **Duration:** 27 September, 2017 – 2nd May, 2018. **Methodology:** A total of 100 cases were included in this study and were admitted through OPD for elective laparoscopic cholecystectomy. They were divided in to two groups. Group A (study group) received 10 mL of 0.25% bupivacaine injection in 4 ports; 7 mL in epigastric and umbilical ports, 3 mL in the other two port sites at the end of surgery. Group B (control Group) received no Local analgesic treatment. Post-operative monitoring and pain assessment was done using Wong Baker FACES pain rating scale. Inj. Toradol (Ketoralac) 30 mg intravenous was given as rescue analgesic when pain score exceeded ≥ 3 . **Results:** Post-operative pain was reduced as a result of bupivacaine infiltration in Group A as compared to Group B. As a result, expenditure done on analgesics which are quite expensive was reduced. Two Groups were studied as cases and controls based on delivery of port site infiltration of Local analgesia and pain score was observed. There was a remarkable decrease in use of parenteral rescue analgesia as a result. **Conclusion:** Port-site Infiltration of bupivacaine reduces the cost on management of post op pain and saved funds may be used else- where on the treatment of patients.

Keywords: Laparoscopic cholecystectomy, Port site bupivacaine infiltration, Postoperative abdominal pain, Cost effectiveness.

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INTRODUCTION

Laparoscopic Cholecystectomy was first introduced by Philip mouret^{1,2} and since then it has enjoyed the status of becoming the gold standard for symptomatic gall stone disease.¹¹ A large number of surgeons have learned the technique and the principles.

The popularity of this technique can be gauged by the fact that almost all the operations can now be done laparoscopically. This technique offers great advantages in term of being minimally invasive, less disfiguring and with less pain.³⁻⁵

Number of injections used for analgesia are reduced and so the cost on pain management also be reduced.⁶

Pain after Laparoscopic Cholecystectomy is less intense but some patients do have significant pain during early post-operative hours specially movement.^{10,11}

Many researchers have found that infiltrating the port-site with long acting local anesthesia further enhances its benefits in terms of pain.⁶ Post laparoscopy pain has been divided in to somatic pain, visceral pain and shoulder tip pain.⁷

In OUR study we have tried to explore the impact of infiltration of port site with bupivacaine on cost reduction of parenteral analgesia.

METHODOLOGY

Study design: Randomized Control study.

Settings: DHQ Teaching hospital Faisalabad.

Duration: 27 September, 2017 – 2nd May, 2018.

Inclusion Criteria: All patients operated for elective Laparoscopic Cholecystectomy and recovered without postoperative complications.

Exclusion Criteria: All patients where Lap. Cholecystectomy was converted in to open cholecystectomy. Patients who have post-operative complications i.e. Bile leakage, Hemorrhage, Peritonitis.

Methods: This randomized control study was done in DHQ teaching Hospital Faisalabad where 100 patients were included in the study from sept 2017 to May 2018. Elective cholecystectomy was done for all the patients. All the patients were investigated and found fit for anesthetic intervention.

The details of procedure, the post-operative pain was explained thoroughly to the patients, and their informed consent was obtained prior to surgery. Patients with acute cholecystitis, choledocholithiasis, or previous upper abdominal surgery, and those who were suspected with some other diseases particularly effecting post-operative pain duration and intensity, were excluded from the study.

Two Groups were made randomly, namely A and B, A being the study group and patients included in Group A received port site local anesthesia while Group B patients (control group) did not receive the local anesthesia. The operation was done under

General Anesthesia and Endotracheal Intubation was done for all the patients and all of them were administered with the same drugs without any exception.

Pneumoperitoneum was achieved by introduction of co2 in the abdomen by closed method and classical 4 ports were inserted. Intraoperative pressure was maintained at 12 – 14 mmHg. Administration of local anesthesia was done by infiltrating 20 ml of 0.25% bupivacaine in port sites, 7 ml in epigastric and umbilical port wounds respectively and other two port wounds received 3 ml of bupivacaine respectively.

It was ensured that local anesthesia was properly administered and all the wounds were infiltrated on all sides including deep tissues. All the injections were given before the deflation of abdomen and wound closed using silk No. 1 sutures. Patients were kept in post-operative recovery in operation theatre and observed for 2 hours and once stable, were shifted to the ward. Time that patients were received in the ward post operatively, was considered '0 hour' and subsequent time was calculated using this as reference.

Record of analgesia was maintained by resident doctors on a proforma which was specifically made for the study and contained all the check boxes required to attain the data.

RESULTS

Number of surgeries per month in DHQ teaching Hospital, FSD.

Month	No of Lap. Cholecystectomies
September 2017	36
October 2017	32
November 2017	35
December 2017	30
January 2018	31
February 2018	37
March 2018	36
April 2018	38
May 2018	32
Mean	34

Mean number of cases were found to be 34. Average Patients of Lap. Cholecystectomy per anum 408.

Requirements for Rescue Analgesia

Estimation of rescue analgesia given in patients with port site bupivacaine injection:

18 patients were provided with no rescue analgesia. while 9 patients were given only one injection. Two injections were prescribed to 20 patients and only 3 patients were injected with the maximum dose of 3 injections. A sum of 58 injections were given to the patients in study group.

Estimation of rescue analgesia given in patients without port site bupivacaine injection:

8 patients were injected with 2 injections and 22 with three injections, maximum dose stood at 4 injections which was given to 20 patients and a sum of 162 injections was given to this group of patients the cost of single ingredient 10 ml injection Bupivacaine 18 Rs. while the cost of Inj. Toradol which was used as rescue anesthesia was found to be 120Rs.

Table 1: Cost estimation of the Injections in patients

Patients	No of rescue analgesia injections	Cost per injection	Cost of total injections
With port site bupivacaine	58	Rs. 120	Rs. 6960
Without port site bupivacaine	162	Rs. 120	Rs. 19440
Savings	104		12480

50 bupivacaine injections were given at 18 rupees each costing for about 900 rupees.

Table 2: Estimation of savings in term of Pakistani Rupees

Patients	Cost of Rescue analgesia Injections	Cost of Bupivacaine injections	Total	Cost estimation per person
With port site bupivacaine	6960	900	7860	157
Without port site bupivacaine	19440	0	19440	389
Savings	12480	-900	11580	232

Estimation of savings per Anum:

Average No of cases per year = 405
 Savings observed in patients
 With Bupivacaine injection = 232Rs
 Estimated Savings per Year = **93960 Rs**

DISCUSSION

Laparoscopic cholecystectomy is one of the commonest day case surgeries.⁸ Although its pain is less intense and lasts for shorter time than open surgery, it remains a problem and may delay discharge of the patient; therefore, adequate early postoperative relief of pain after laparoscopic cholecystectomy is an essential goal to enable the patient to go home early with little pain and in stable condition.⁹ So, in our study which was done on a sample of 100 patients it was found that a significant amount of public money can be saved.

In a total of 50 patients which were given Local anesthesia estimated amount of 232 rupees was saved per person which is about 30 % of the total amount of pain management and also the patients were pain free or having lesser pain Score right after the surgery which was helpful in early discharge of patients.

It was also observed that 18 patients making 36 % required no rescue analgesia but also quite a significant number of patients required comparatively less amount of analgesic injection and were pain free for long periods before the pain score exceeded 3 necessitating rescue analgesia. The total amount which can be saved per year in only a ward of hospital can be tens of thousands.

As study was performed in Liaquat ward DHQ Hospital FSD. The Average number of cases of Laparoscopic cholecystectomy

were estimated about 405 per year. The amount of savings collectively approximately equals the amount of 93960 rupees which is a significant amount when viewed on collective basis. Multiple studies prove that port site bupivacaine injection reduces post-operative pain and also requirement of rescue analgesia though different results have also been seen. For developing countries with low public sector Health spending and limited resources and budgets for health amounts saved in the form drugs can become significant as it can be utilized on other projects of health care and on other patients which can definitely benefit a nation.

The author tried their best to search for previous studies done elsewhere that probed the financial impact of adopting port-site infiltration with bupivacaine but were astonished to see paucity of such studies. This makes this study unique.





CONCLUSION

As observed in our study port site bupivacaine infiltration can decrease the expense of pain management drastically and reduce the financial burden on public health care system.

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