

Pre-Emptive Analgesia by Intraperitoneal Instillation of Lignocaine in Laparoscopic Cholecystectomy

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ABSTRACT

Objective: To compare the effects of preemptive intraperitoneal instillation of local anesthetic (lignocaine) with conventional instillation after the removal of gall bladder in elective laparoscopic cholecystectomy.

Study Design: Quasi-experimental study.

Place and Duration of study: General Surgical ward, Combined Military Hospital, Rawalpindi Pakistan, from Jan to Apr 2018.

Methodology: Patients fulfilling the inclusion criteria were randomly assorted into two groups. Group A received intraperitoneal lignocaine at the conventional timing where as in Group B local anesthetic was instilled preemptively at the time of insertion of trocar. Post operatively pain was measure on visual analogue scale at 3,6 and 12 hours.

Results: Total of 184 patients were followed up post-operatively. Mean age of patients in Group A was 44.5±13.57 years and in Group B was 46.2±13.9 years. Mean post-operative pain on visual analogue scale score for Group A was 2.53±0.73 and that for Group B was 2.0±0.66 with *p*-value<0.01.

Conclusion: The use of preemptive instillation of local anesthetic intraperitoneal was found better as compared to conventional timing of instillation in reducing the post-operative pain in elective and uncomplicated cases of laparoscopic cholecystectomy.

Keywords: Cholecystectomy, Laparoscopic, Lidocaine, Pain, Postoperative.

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INTRODUCTION

Cholelithiasis is a common condition presenting in our Outpatient departments. Surgical removal of gall bladder remains the standard treatment for symptomatic gall stones however the approach to surgery has evolved over a period of time from open Cholecystectomy to mini cholecystectomy to the present era of minimally invasive surgery.¹ LC constitutes a major portion of all the minimally in-vasive surgeries being performed at our setup.

Post-operative pain is the main limiting factors in early mobilization and recovery of the patient. LC has marked benefits over Open cholecystectomy in terms of post op pain and therefore allows early mobilization, less hospital stay and early return to activity.² Despite these advantages LC is not a pain free procedure. Different systemic and local anesthetics with different timings of administration have been studied to achieve the lowest post-operative pain but no gold standard regime has yet been established.^{3,4} The instillation of local anesthesia intraperitoneally and

in the wound site per-operatively along with rescue systemic analgesia in the post-operative period is the standard multimodal analgesia approach used in our setup.

The efficacy of intraperitoneal instillation of local anesthetic is well established in LC as well as other abdominal surgeries such as gynecological procedures.⁵ The timing of this instillation of local anesthetic is however the subject query of this study. LA can be instilled preemptively into peritoneum just after the creation of pneumoperitoneum or at the completion of surgery just before the removal of trocars. Tripat *et al.* in a study conducted in India studied concluded the advantage of preemptive instillation of Ropivacaine in LC.⁶ Muhammad Rizwan *et al.* compared the analgesic effects of intraperitoneal lignocaine and bupivacaine in LC and showed both agents as equally safe and effective.⁷ Visual Analogue Scale (VAS) is a commonly used measurement tool for assessing the amount of pain across a of 10cm line by measuring the distance between “no pain” anchor and the patients mark. For literate patients scale is explained to them for filling the scale while for illiterate ones it is scored with assistance from a health professional.

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The effects of preemptive and conventional timing of intraperitoneal instillation of local anesthetic (other than lignocaine) has been studied, however data regarding use of Lignocaine as local anesthetic in LC has been limited in our setup so far therefore we designed this study to compare the effects of preemptive intraperitoneal instillation of local anesthetic (lignocaine) with conventional instillation after the removal of gall bladder in elective laparoscopic cholecystectomy.

METHODOLOGY

The quasi experimental study was conducted at General Surgery ward 2, Combined Military Hospital, Rawalpindi after review and approval from ethical committee and supervisor. The study was conducted for a period of four months from Jan to Apr 2018. Sample size was calculated by using the WHO sample size calculator and using population prevalence proportion of response to analgesia as 87%. 186 patients were enrolled in the study using non-probability consecutive sampling.

Inclusion Criteria: Patients above the age of 12, of either gender, undergoing elective LC with an ASA of 1 and 2 were included.

Exclusion Criteria: Patients who had acute cholecystitis, who underwent conversion to open cholecystectomy, didn't give consent or developed post-operative complication of biliary tract injury, peritonitis or re-surgery were excluded from the study.

All patients enrolled in the study were kept NPO at least 06 hours before surgery. General anesthesia was given using standard techniques. Pneumoperitoneum was created using open method and pressure maintained at 12 mmHg during the surgery. LC was performed using conventional 4 ports (two 10mm and two 5mm). All patients received a multimodal approach to post-operative pain in the form of local anesthesia intraperitoneally as well as at the trocar insertion site.

Patients enrolled in the study were randomly and equally divided into group A and Group B using computer generated tables. Group 'A' received Lignocaine HCL 2% 20mg/ml (lidocaine) at the dose of 3mg/kg diluted in 20ml normal saline intraperitoneally after the surgical removal of gall bladder and just before removing the last trocar. Group 'B' received similar quantity of Lignocaine just after the insertion of trocar and before the start of any dissection intraperitoneally. Post-operatively all patients were

followed up and abdominal pain measured on VAS at 3, 6 and 12 hours by doctors who were blinded to study as the group of patient was not mentioned in the post-operative notes. Zero hour was considered once patient was shifted back to ward from operation theatre recovery. Patients of both group A and B received rescue analgesia of intravenous ketorolac, 30mg diluted in 100ml normal saline if the post-operative pain on VAS was more than.⁴

SPSS 22.0 was used for the data analysis in this study. Percentage and frequencies were mentioned for the qualitative variables. The mean post-operative pain VAS was calculated for each Group A and group B. Independent sample t-test was used to compare the mean post-operative pain and p-value of ≤ 0.05 was considered as significant.

RESULTS

Of the 186 patients enrolled in the study, 2 were excluded from the study because one was converted to open surgery and one patient LAMA before calculation of post-op VAS. The mean age of the patients was 45.35±13.7 years (Table-I). The mean post-operative pain measured on VAS for group A was 2.43±0.72 and group B was 1.93±0.66. The post-operative mean VAS at 3, 6 and 12 hours for group A and B were shown in Table-II.

Table-I: Age Distribution of Patients Undergoing Laparoscopic Cholecystectomy and Getting Enrolled in the Study (n=184)

Age Group	Group A	Group B	Total
12-30 Years	23(25%)	17(18.4%)	40(21.73%)
30-50 Years	40(43.4%)	41(50.6%)	81(44%)
> 50 Years	29(31.5%)	34(36.9%)	63(34.2%)
Total	92(50%)	92(50%)	184(100%)
Mean and SD for Age	44.5±13.57	46.2±13.9	-

Table-II: Comparison of Mean Visual Analogue Scale Pain Score Post-Operation (n=184)

Mean Visual Analogue Scale Pain Score	Group A (Mean Visual Analogue Scale Score±SD)	Group B (Mean Visual Analogue Scale Score±SD)	p-value
AT 3 Hours Post-Operative	3.7±0.85	3.0±0.77	<0.001
AT 06 Hours Post-Operative	2.7±0.61	2.1±0.59	
AT 12 Hours Post-Operative	1.2±0.75	0.9±0.63	
Mean Visual Analogue Scale Pain Score	2.53±0.73	2.0±0.66	

DISCUSSION

Cholelithiasis is a common disease in the modern era. In western population the incidence of screen detected gallstone incidence in general population varying from 0.6 to 1.39% per year where as in selected morbid population between 2 to 26 %.⁸ In Pakistan the incidence is 10.2% with a female predominance (M:F of 14.8:5.7).⁹ Laparoscopic cholecystectomy is the gold standard treatment for symptomatic cholelithiasis.

Post-operative pain is one of the main factor limiting early recovery in LC. Kahokehar *et al.* in his 'two wound model' explained the visceral component of post-operative pain in abdominal surgeries in contrast to only somatic component in limb surgeries. In abdominal surgeries somatic wound is created in abdominal wall to gain access into the abdomen and peritoneal and visceral wounds collectively make the autonomic wound¹⁰. Therefore this multifactorial pain requires a multimodal analgesia such as infiltration of local anesthesia at trocar site, intraperitoneal instillation of LA, low pressure pneumoperitoneum, rectus sheath block, systemic analgesia or other forms of analgesia.

Intraperitoneal LA has been used in different surgeries including gynecological procedure.⁵ Different LA that can be used for Intraperitoneal instillation in LC include bupivacaine, lignocaine and ropivacaine.

Geun Joo *et al.* conducted a meta-analysis and concluded that intraperitoneal local anesthetic as an analgesic adjuvant in patients undergoing laparoscopic cholecystectomy has an advantageous effect in terms of abdominal, viscera and shoulder post-operative pain.¹¹ A systemic review and meta-analysis conducted by Shaun *et al* and few other study authors concluded that pre-emptive analgesia instilled intraperitoneally decreased pain post-operatively as compared to placebo and post-operative infiltration.¹²⁻¹⁵ Barczyński *et al.* compared the intraperitoneal instillation of LA pre-emptively with intraperitoneal instillation of LA at completion of surgery. The mean VAS at 0, 1, 3, 6 and 12 hours was significantly lower in the group who received pre-emptive analgesia however the difference in mean VAS was insignificant beyond 12 hours post-operatively.¹⁶⁻¹⁸ The results of our study were comparable to the afore-mentioned studies.

Finally the most appropriate is a multimodal approach consisting of preemptive intraperitoneal instillation of local anesthetic as well as trocar site

infiltration. Systemic analgesic provides additional rescue analgesia.

CONCLUSION

The use of preemptive instillation of local anesthetic intraperitoneal was found better as compared to conventional timing of instillation in reducing the post operative pain in elective and uncomplicated cases of laparoscopic cholecystectomy.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MTA: & MUA: Critical review, data acquisition, drafting the manuscript, approval of the final version to be published.

SMH: & AUDN: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

TA: & RA: Data acquisition, data analysis, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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