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PRE-EMPTIVE VERSUS POST-SURGERY INTRAPERITONEAL INSTILLATION OF LOCAL ANAESTHETIC: COMPARATIVE EVALUATION FOR POST OPERATIVE PAIN RELIEF AFTER LAPAROSCOPIC CHOLECYSTECTOMY – PROSPECTIVE RANDOMIZED COMPARATIVE STUDY

Anaesthesiology

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ABSTRACT

Aims & Background: the aim of study was to compare pre-emptive versus post-surgery IPLAI (intra peritoneal local anaesthetic instillation) for control of postoperative pain after elective laproscopic cholecystectomy. **Methods:** In this study, 70 patients undergoing laparoscopic cholecystectomy were randomized into two groups: patients from **pre-emptive (PE)** group received levo-bupivacaine (30ml of 0.375%) (n=35) at the beginning of the surgery (just after creation of capnoperitoneum) and patients from **post-surgery (PS)** group received levo-bupivacaine (30ml of 0.375%) (n=35) at the end of the surgery. The visual analogue scale (VAS) to assess pain, haemodynamic variables and side effects were noted and compared at different time interval. The data analysis was carried out with unpaired Student's *t*-test and Chi-square test using medcalc software. **Results:** The mean of VAS pain score at various time intervals was more in PS group compared to PE group, and the difference was statistically significant ($P < 0.05$). Group PE required less number of total rescue analgesia in 24 hours as compared to group PS($p<0.001$). **Conclusion:** Pre-emptive Intraperitoneal instillation of levo-bupivacaine requires less consumption of rescue analgesics in first 24 hours after surgery and relatively longer pain free period.

KEYWORDS

Pre emptive IPLA; Post surgery IPLA; Levobupivacaine

1. INTRODUCTION

Laparoscopic cholecystectomy is now a days, a routinely performed procedure that has replaced conventional open cholecystectomy because of its advantages like; smaller incision, less blood loss, shorter hospital stays and reduced pain which cut down to less cost. Although, laparoscopic cholecystectomy is less invasive than classical approach resulting in less pain but still it is not pain free procedure. Post operative pain after laparoscopic cholecystectomy remains a major concern **(T.K., Bindra *et al.*,11(3), 740,2017)**. The pain after laparoscopic surgery is complex and multifactorial in nature having three different components, e.g., Parietal, visceral and shoulder tip pain. Parietal pain originates from surgical skin incision. Visceral pain is due to stretching of the abdominal cavity due to pneumoperitoneum and peritoneal inflammation **(Bisgaard, 2006)** and shoulder tip pain is a referred pain due to diaphragmatic irritation resulting from residual carbon dioxide in the peritoneal cavity. Visceral pain is more pronounced in laparoscopic surgeries in compared to open cholecystectomy **(Yadava *et al.*,60(10), 757,2016)**. To avoid post laparoscopy pain; multimodal analgesic techniques have been in practice. These include parenteral use of non-steroidal anti-inflammatory drugs, opioids, alpha-2 receptor agonists, local infiltration with local anaesthetics, epidural and intrathecal opioids and local anaesthetics, interpleural and intercostal nerve blocks as well as intraperitoneal routes. Amongst these various different approaches, intraperitoneal instillation of local anaesthetic agents has been most promising to relieve postoperative pain after laparoscopic surgery. Intraperitoneal route blocks the visceral afferent signals and modifies visceral nociception. Concept of pre-emptive analgesia recent advances suggest that an afferent block (with local anaesthetics) achieved before nociceptive input can reduce or eliminate the onset of central neural hyper excitability and can thus significantly reduce both intensity and duration of pain, while also delaying its onset.

However, the timing remains debatable **(Putta *et al.*, 63(3),205,2019)**. Many studies done regarding IPLAI (Intraperitoneal local anaesthetic instillation) but regarding timing of IPLAI is contradictory, so we aim to compare the effect of timing of IPLAI on post-operative analgesia. We hypothesised that intraperitoneal instillation of local anaesthetic immediately after pneumoperitoneum (pre-emptive analgesia) would be more efficient than at the end of the surgery (post-surgery analgesia) in controlling postoperative pain and discomfort.

2. MATERIALS AND METHODS

The present study was carried out after taking permission from the Ethical and scientific Research Committee of the institute, in the Department of Anaesthesiology, Govt. Medical College and S.S.G. Hospital, Baroda, in period of March 2022 – December 2022. It was a prospective randomized single-blind study carried out in the following manner.

Sample Size & Sampling Method:

Sample size estimation was performed using mean and standard deviation value derived in main reference study. "Putta, P. G., Pasupuleti, H., Samantaray, A., Natham, H., & Rao, M. H. (2019). A comparative evaluation of pre-emptive versus post-surgery intraperitoneal local anaesthetic instillation for postoperative pain relief after laparoscopic cholecystectomy: A prospective, randomised, double blind and placebo-controlled study. Indian journal of anaesthesia, 63(3), 205." With reference to the study mention above Sample size was calculated using parameter time to first analgesic request between two groups as 71.7 minutes with SD ±106.5 minutes at 95% confidence interval and 80% power. By using open Epi software.

For any kind of clinical study in order to study any significant difference in two group minimum sample size required is 35 so to authenticate the study we took 35 patients in each group. Randomization was done by sealed envelope method

Inclusion Criteria:

- Patients posted for elective laparoscopic cholecystectomy
- American Society of Anaesthesiologists physical status I and II
- Age from 18 to 65 years

- Either gender

Exclusion Criteria:
- Patient refusal and not able to understand study protocol
- Patient having allergy to study drug (Levobupivacaine)
- BMI >30
- Patients with acute cholecystitis
- Patients with severe pulmonary, cardiac and renal diseases
- Chronic alcoholism or drug abuse
- Patients receiving any sort of pain medication on chronic basis
- Patients who needed conversion to open cholecystectomy or insertion of a drain at the end of the procedure

According to inclusion and exclusion criteria total 74 patients were enrolled for study out of that 3 patient needed intraperitoneal drain placement so excluded from study and 1 patient need open cholecystectomy so excluded. Total 70 patients randomised into two group.

Grouping of the patients:
Group-PE (Pre-Emptive):
Patients were receive pre-emptive intraperitoneal instillation of Levobupivacaine just after creation of pneumoperitoneum (30ml of 0.375%). (n=35)

Group-PS (Post-Surgery):
Patients were receive postoperative intraperitoneal instillation of Levobupivacaine at the end of surgery (30ml of 0.375%). (n=35)

MATERIALS AND METHODS:
After getting permission from The Institutional Ethics Committee for Human Research- PG Research (IECHR-PGR) to carry out this study, first patient was enrolled.

Day before surgery:
Patients were thoroughly counselled during the preoperative evaluation and properly explained about the anaesthetic procedure as well as information sheet before taking the written consent. All patients were educated about the visual analogue scale (VAS) pain score of 0 to 10.

Informed written consent obtained- Yes Patients were kept nil by mouth from 10 p.m. previous night. Tab. Ranitidine 150mg orally given on the previous night of surgery On the day of surgery.

OT Preparation:
- Anaesthesia machine, anaesthetic drugs, airway equipments including difficult airway cart, suction apparatus, multipara monitor, and all resuscitation drugs checked by myself and kept ready.
- Multipara monitor attached. Baseline pulse rate, systolic blood pressure, diastolic blood pressure, arterial oxygen saturation and end tidal CO2 will be recorded. Intravenous line will be taken with 18G cannula.

Premedication:(5 minutes before induction)
- Inj. Glycopyrrolate 5 mcg/kg IV
- Inj. Fentanyl 2 mcg/kg IV
- Inj. Ondansetron 4 mg IV
- Inj. Midazolam 0.2 mg/kg IV

Induction and Maintenance:
- Preoxygenation was done with 100% oxygen for 3 minutes. Induction of general anaesthesia accomplished with inj. Propofol 2 mg/kg iv, inj. xylocard 2mg/kg iv, inj. Vecuronium bromide 0.1 mg/kg iv to facilitate the endotracheal intubation inj. Paracetamol(1gm) given as an analgesia after induction. Maintenance of anaesthesia was done with sevoflurane along with O2: N2O (50%:50%) and
- Vecuronium bromide 0.02 mg/kg incremental dose as and when required.
- Nasogastric tube of appropriate size inserted. Ventilation adjusted to maintain end-tidal carbon dioxide between 35 and 40 mmHg. Patients placed in 15-30 anti-trendelenburg position with left side tilt during laparoscopy. Intraabdominal pressure maintained between 12 to 14 mmHg.
- Patients from pre-emptive group (PE) received 30 ml 0.375% levobupivacaine at the beginning of surgery (after creation of capnoperitoneum) equivalent to preemptive and patients from post-surgery (PS) received 30 ml of 0.375% levobupivacaine at the end of the surgery. Study drugs was given intraperitoneally in trendelenburg position, into the hepato-diaphragmatic space, on gall bladder bed and near and above hepatoduodenal ligament by the surgeon and wait for 3 minutes and then patient were again given anti trendelenburg position. Study drugs prepared by me in sterile syringe under aseptic precautions. Skin incisions sutured after local infiltration with 2% lignocaine 2 ml in each port.
- Neuromuscular block reversed with Inj. Neostigmine 50 mcg/kg IV and Inj. Glycopyrrolate 10 mcg/kg IV and patient will be extubated after thorough oropharyngeal suction and fulfilment of criteria for extubation. Patients with peritoneal drain after surgery as well as patients who converted to open cholecystectomy for some reason will be excluded from the study.

Intraoperative monitoring:
Heart rate, systolic blood pressure, diastolic blood pressure arterial oxygen saturation and end tidal carbon dioxide (ETCO2) will be recorded just before induction (i.e., baseline parameters) and thereafter every 5 min for the first 15 minutes and then every 15 minutes up to 90 minutes or till surgery lasts.

Post-operative monitoring:
1)Time to first analgesia (duration of post operative analgesia):
We will assess the intensity of pain was recorded for all patients using visual analogue scale at 0, 0.5, 1, 1.5, 2, 4, 6, 8, 10, 12, 18 & 24 hours after surgery. Duration of post-operative analgesia will be defined as the time from (zero point) at extubation up to the first requirement of rescue analgesia.

Rescue analgesia:
Paracetamol 1gm by intravenous infusion over 15 minutes will be given as rescue analgesic when VAS $\geq$4
2) Number of total doses of rescue analgesia given in 24 hours will be noted.
3) Incidence of shoulder pain

4) Vital parameters
in the form of pulse rate, blood pressure and arterial oxygen saturation will be recorded at 30 minutes interval postoperatively up to 2 hours and then at 2 hourly intervals up to 12 hours and then at 6 hourly intervals up to 24 hours.

5) Postoperative complications in the form of bradycardia, tachycardia, hypotension, hypertension, nausea, vomiting, subcutaneous emphysema and respiratory depression will be noted and if needed treatment will be given. Bradycardia will be defined as decrease in pulse rate<60/minute and it will be treated by Inj.Atropine0.06mg IV. Tachycardia will be defined as increase in pulse rate >100/minute and we will find the cause and treat accordingly. Mean and Standard deviation values were taken out. Statistical analysis of the data for the various parameters was done using student's 't' test for all continuous variables and chi-square test was used for qualitative (nonparametric) data using MedCalc software. P value was used to determine the significance of a statistical study. The P value < 0.05 was considered as significant and p value <0.01 was considered as highly significant.

3. RESULTS:
1. The two groups in our study were comparable to each other with respect to age, weight, sex and ASA physical status (Table no. 1).
2. There were no significant difference noted in intraoperative vital parameters (heart rate, systolic blood pressure, diastolic blood pressure, SPO2, ETCO2) between both the group.
3. Postoperative analgesia was assessed with the help of VAS score. The VAS was higher in group PS as compared to group PE at 6th (P<0.05).,8th (P<0.05), 10th (P<0.05), 12th hr (P<0.05) and 24th postoperative hour and this difference was statistically significant. At 18th hour the change in mean VAS was highly significant(p<0.001).
4. There were no significant difference noted in post operative vital parameters (heart rate, systolic blood pressure, diastolic blood pressure, SPO2) between both the group.
5. Time to first rescue analgesia was noted. patients in group PS started complaining of mild pain from 6th hour onwards and required first rescue analgesia between 6th to 10th hour in the post operative period. In group PE, majority of the patients required

rescue anaesthesia between 10th to 12th hours. But we can say that in group PE the first rescue analgesic dose requirement started from somewhere between 10th& 12th hour onwards. the time to first requirement of rescue analgesia between both the groups. It was 341+/-47 minutes in group PS as compared to 520+/-63 minutes in group PE($p<0.001$) which was statistically highly significant (Table no. 2).

6. We also noted the total number of rescue analgesic doses required in 24 hours. the total rescue analgesia required in 24 hours was less in group PE (2.41+-/0.48) as compared to group PS (3.11+-/0.57) which was statistically highly significant($p<0.001$) (Table no.3).
7. We also noticed incidence of shoulder pain in both the groups. In group PE 2 (5.71%) patients, whereas in group PS 6 (17.14%) patients had shoulder pain. which was statistically not significant ($p>0.05$) (Table no.4).
8. We observed postoperative complication in both the group. In group PE 2 (5.71%) patients had nausea, whereas in group PS 4 (11.42%) patients had nausea. which was statistically not significant ($p>0.05$). In group PE 4 (11.42%) patients had vomiting, whereas in group PS 6 (14.28%) patients had vomiting. which was statistically not significant ($p>0.05$) (Table no.5).
9. No any other postoperative complications were noted in both the groups.

Table -1: Demographic Profile:

GROUP	GROUP PE	GROUP PS	P VALUE
AGE (Years) (Mean±SD)	45.45+/-10.55	49.45+/-17.32	>0.05
WEIGHT (Kg) (Mean±SD)	61.82+/-10.14	61+/-10.82	>0.05
ASAPS I ASAPS II	20 15	18 17	
SEX FEMALE:MALE	25:40	35:30	

Table 2: Time To First Requirement Of Rescue Analgesia

PARAMETER	GROUP PE	GROUP PS	P VALUE
TIME FOR FIRST RESCUE ANALGESIA(MIN)	520+/-63	341+/-47	<0.0001(HS)

Table 3: Total Rescue Analgesia Requirement In 24 Hours

PARAMETER	PE GROUP	PS GROUP	P VALUE
TOTAL RESCUE ANALGESIA IN 24 HOURS	2.41+-/0.48	3.11+-/0.57	<0.0001(HS)

Table 4: Incidence Of Shoulder Pain:

	Group PE			Group PS		P value
	Number of patients	%		Number of patients	%	
Incidence of shoulder pain	2	5.71%		6	17.14%	>0.05

Table 5: Postoperative complications

Complications	Group PE		Group PS		p value
	Number of patients	%	Number of patients	%	
Nausea	2	5.71%	4	11.42%	>0.05
Vomiting	4	11.42%	5	14.28%	>0.05
Bradycardia	0	-	0	-	
Tachycardia	0	-	0	-	
Hypotension	0	-	0	-	
Hypertension	0	-	0	-	
Subcutaneous emphysema	0	-	0	-	
Respiratory depression	0	-	0	-	

4. DISCUSSION:

What is pre emptive analgesia:

The concept of preemptive analgesia to reduce the magnitude and duration of post operative pain was paved in 1983 by woolf. Who showed evidence for a central component of post injury pain hypersensitivity in experimental studies. **Woolf CJ et al.** Preemptive analgesia is defined as a treatment that is initiated before surgery in order to prevent the establishment of central sensitization evoked by the incisional and inflammatory injuries occurring during surgery and in the early postoperative period. **Kissin I et al.** Owing to this "protective" effect on the potential to be more effective than a similar analgesic treatment initiated after surgery. As a consequence, preemptive analgesia can reduce immediate postoperative pain and also prevent the development of chronic pain by decreasing the altered central sensory processing. **Woolf CJ et al.**

Intraperitoneal route of instillation:

Concept of Intraperitoneal local anaesthetics (IPLA) which act as "visceral blocks" is since as early as 1950 and it has been used to reduce shoulder tip pain, overall pain, nausea and vomiting, and hospital stay. **(Kahokehr A et al., ANZ J Surg 3. 2011; 81:237-45).** Recently IPLA has become a popular practice for providing pain relief after laparoscopic surgery. Several reports are available on the efficacy of intraperitoneal administration of local anaesthetic for analgesia after laparoscopic surgery. Because of gas insufflation and raised intraperitoneal pressure during laparoscopic surgeries, there is peritoneal inflammation and neuronal rupture with a linear relationship between abdominal compliance and resultant severity of postoperative pain. However, absorption from large peritoneal surface may also occur, which may be a further mechanism of analgesia**. (Albanese AM, et al., SurgRadiolAnat2009; 31:369-77)** Hence, we choose the intraperitoneal route in our study because it blocks the visceral afferent signals and modifies visceral nociception. The local anaesthetic agents when given intraperitoneally acts by affecting nerve membrane associated proteins and it also inhibits the release and action of prostaglandins and other agents that sensitize or stimulate the nociceptors and contribute to inflammation. **(Liu SS, at el., Lippicott Williams and Wilkins; 2001.p. 449-69)**

Type of surgery:

There are several studies that deal with the monitoring and control of pain after Laparoscopic cholecystectomy. Bina butala et al[20] , Malhotra N et al[21] and Colbert ST et al[22] used intraperitoneal route for pain relief after laparoscopic gynaecological surgeries.

We in our study selected laparoscopic cholecystectomy as an operative procedure.

Drugs used:

We choose Levobupivacaine for our study because the incidence of adverse cardiac and neurological events was significantly higher with bupivacaine as compared to levobupivacaine when used in regional anaesthesia. Similarly, the potential for CNS toxicity is lower with levobupivacaine as compared to bupivacaine. Levobupivacaine exerts its pharmacological action through reversible blockade of neuronal sodium channels. Myelinated nerves are blocked through exposure at the nodes of Ranvier more readily than unmyelinated nerves; and small nerves are blocked more easily than larger ones. In general, the progression of anaesthesia is related to the diameter, myelination and conduction velocity of the affected nerve fibers. Specifically, the drug binds to the intracellular portion of sodium channels and blocks sodium influx into nerve cells, which prevents depolarization. It blocks nerve conduction in sensory and motor nerves mainly by interacting with voltage sensitive sodium channels on the cell membrane. **Sukhminder Jit Singh Bajwa and Jasleen Kaur et al.,**

Prabhu Putta et al., studied that preemptive versus post surgery intraperitoneal instillation of Bupivacaine for post operative pain relief after laproscopic cholecystectomy and concluded that IPLI immediately after instillation of capno peritoneum reduces the magnitude of post operative pain prolongs the duration of first analgesic request, reduces analgesic consumption, reduces incidence of shoulder pain in post operative period and facilitates early resumption of normal activity.

T K Bindra et al., studied that preemptive analgesia by intraperitoneal instillation of Ropivacaine in laproscopic cholecystectomy concluded that preemptive analgesia with intraperitoneal instillation of ropivacaine in saline before pneumoperitoneum has improved surgical outcome after laproscopic cholecystectomy in terms of significantly diminished total abdominal and shoulder tip pain, decreased analgesia request and analgesic consumption.

Dilek Karaaslan et al., studied that preemptive analgesia in laproscopic cholecystectomy concluded that infiltration of 20ml of

0.5% bupivacaine to the subhepatic area offers good postoperative analgesia when apply just after creation of pneumoperitoneum, not before the pneumoperitoneum or after the termination of pneumoperitoneum.

Doses of drugs used:

Prabhu putta et al., used 0.5% of 20 ml bupivacaine at the beginning of the surgery and end of the surgery

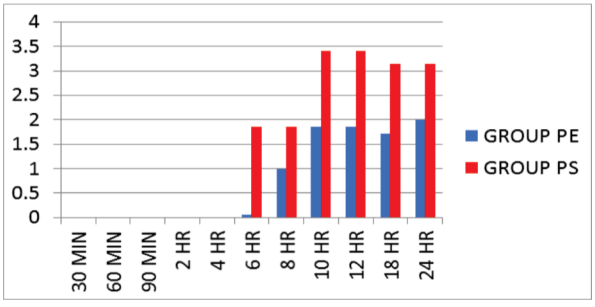
T K BINDRA et al,.used 3mg/kg ropivacaine intraperitoneal instillation in 100ml normal saline before creation of pneumo peritonium and after creation of pneumoperitoneum

Dilek karaaslan et al.,used 20ml 0.5% bupivacaine in subhepatic area before pneumoperitonium(group1), immediately after the creation of pneumoperitonium(group2),just before removal of trocars(group3) and received no local anaesthetic (group4)

there were no statistically significant changes in mean pulse rate, systolic blood pressure, diastolic blood pressure and arterial oxygen saturation between both the groups at various time interval in the postoperative period. Our results were similar to a study done by **Agrawal et al.**[35]

Assessment Of Postoperative Pain:

We assessed post-operative pain by Visual analogue scale (VAS) at 30 min, 60 min, 90 min, 2 hour, 4 hour, 6 hour 8 hour, 10 hour, 12 hour, 18 hour and 24 hour after surgery. Patients were given rescue analgesia in the form of Paracetamol 1gm by intravenous infusion over 15 minutes when VAS $\geq$4.



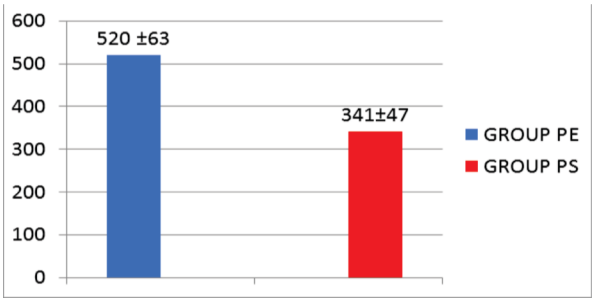
Graph 1: Changes In Mean Vas Score

Graph 1 shows that The VAS was higher in group PS as compared to group PE at 6th (P<0.05).,8th (P<0.05), 10th (P<0.05), 12th hr (P<0.05) and 24th postoperative hour and this difference was statistically significant. At 18th hour the change in mean VAS was highly significant(p<0.001).

Prabhu Putta et al.,evaluated PE group achieved a statistically significant lower vas score for all time points over control whereas PS group it reached stastical significant only at 4th and 24th hour

TK Bindra et al., evaluated group A achieved a statistically significant lower vas score at 1st,3rd,6th,12th hour over group B whereas at 18th and 24th hour vas score was comparable in both the group

M.Barczynski et al., evaluated vas score significantly lower in group A than in group B at 4 and 8 hour this difference became ninsignificant at 12 hour.pain relief higher in group A patients compare to group C throught the entire 48 hour .in group C and D patients pain relief is limited up to 24hour So, our results are in consonance with the above mentioned studies.



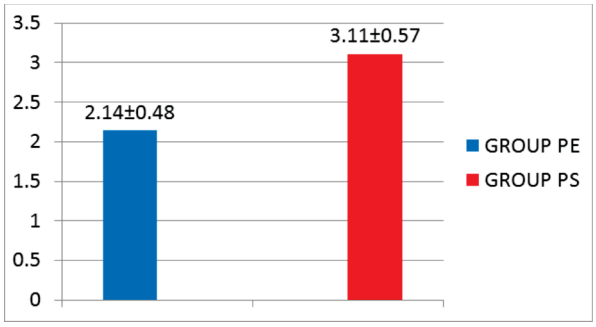
Graph 2: Time To Requirement Of First Rescue Analgesia

From Graph 1 we can say that patients in group PS started complaining of mild pain from 6th hour onwards and required first rescue analgesia between 6th to 10th hour in the post operative period. In group PE, majority of the patients required rescue anaesthesia between 10th to 12th hours. But we can say that in group PE the first rescue analgesic dose requirement started from somewhere between 10th& 12th hour onwards. Graph 2 shows the time to first requirement of rescue analgesia between both the groups. It was 341+/-47 minutes in group PS as compared to 520+/-63 minutes in group PE(p<0.0001) which was statistically highly significant.

A study done by **Prabhu Putta et al.,** also noticed that time to first analgesic request was longest in group PE compare to group PS (PE,409.2±115.5 minutes; PS,337.5±97.5;P<0.001)

A study done by **TK Bindra et al.,** noticed that the latency time from end of the operation to first rescue requirement was significantly longer in group A (472±26.32min) than in group B (189±11.87min)

Results of study done by **M.Barczynskibet al.,** was also in favour of our study results.



Graph 3: Number Of Analgesic Doses Required In 24 Hours

In our study, we noted that number of analgesic doses required in 24 hours was 2.14±048 in group PE whereas it was 3.11±0.80 in group PS which was statistically highly significant(p<0.0001)

Laparoscopic surgeries are considered to be a minimally invasive procedure and therefore characterised by having reduced pain. It is a myth if we consider it as a painless surgery. Patients undergoing laparoscopic cholecystectomy suffer considerable pain on the day of surgery frequently requiring narcotic analgesia. [35]

Analysis for total analgesic consumption in 24 hours by **Prabhu Putta et al**" found out that PE group consumed least number of paracetamol (2.2± 0.8) versus PS group (2.8±0.7; P=0.007) and control group C (3.7±0.5;P<0.001) The number of patients requiring rescue fentanyl was significantly higher in the control group compared to intetvention group (PE and PS).

TK Bindra et al., noticed that the number of rescue analgesia (paracetamol) was significantly lower in group A than group B and the difference was highly significant (P<0.001)

M.Barczynski et al., noticed that mean daily ketoprofen consumption was significantly lower in group A(93.5±75.7mg) than in group B (188.0±74.3 mg) on day 1 postoperatively.however on day 2 it is nonsignificant

Incidence of shoulder pain in both the groups. In group PE 2 (5.71%) patients, whereas in group PS 6 (17.14%) patients had shoulder pain. which was statistically not significant (p>0.05).

Prabhu Putta et al., noticed that incidence of shoulder pain significantly reduced in intervention group (PE and PS) in comparision control group. Such a high incidence of shoulder pain in group can be partially explained by relatively prolonged duration of surgery and partially by the absence of IPLA instillation.

T K Bindra et al., noticed that shoulder tip pain was also significantly less in group A as compared to group B.

Postoperative complication seen in both the group. In group PE 2 (5.71%) patients had nausea, whereas in group PS 4 (11.42%) patients

had nausea. which was statistically not significant (p>0.05). In group PE 4 (11.42%) patients had vomiting, whereas in group PS 6 (14.28%) patients had vomiting. which was statistically not significant (p>0.05) We did not observe any other complications in any of the groups.

5. CONCLUSION:

Our study Aimed at timing of insertion of intraperitoneal instillation of local anaesthetic. We found that Pre-emptive IPLAI is more beneficial and provide prolonged analgesia over Post surgery IPLAI. So once again our study established the importance of pre-emptive analgesia.

6. Financial Support And Sponsorship:

None.

7. Conflicts Of Interest:

None.

Clinical Trial Registration Number: REF/2022/05/053917

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