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RESEARCH ARTICLE

STUDY ON THE COMPARISON OF INTRAPERITONEAL INSTILLATION OF BUPIVACAINE,ROPIVACAINE AND SALINE FOR POST OPERATIVE PAIN RELIEF AFTER LAPAROSCOPIC INTRA ABDOMINAL SURGERIES.

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Abstract

Aim: To evaluate the efficacy of intraperitoneal instillation of local anaesthetics for postoperative pain relief after laparoscopic abdominal surgeries and compare the efficacy of two different local anaesthetics- Bupivacaine vs Ropivacaine.

Materials and methods: This study is a prospective, randomized, comparative study for evaluating the efficacy of intraperitoneal instillation of bupivacaine 0.5% vs Ropivacaine 0.5% for postoperative pain relief after elective laparoscopic abdominal surgeries. Institutional ethical committee approval was obtained. Totally 90 patients were selected. After getting the informed consent from the patients they were randomly allocated into 3 groups, group B (Bupivacaine), group R (Ropivacaine), and group C (Control).

Result: Duration of post operative pain relief after intraperitoneal instillation of Bupivacaine was longer than Ropivacaine. The VAS score was lower in Bupivacaine and Ropivacaine group when compared to saline group over the first 6 hrs post operatively. Total fentanyl requirement was lower in Bupivacaine and Ropivacaine when compared to saline group. Postoperative nausea and vomiting was significantly lower in both Ropivacaine and Bupivacaine group when compared to control group. Duration of surgery, hemodynamic parameters and complications were comparable in all groups.

Conclusion: We conclude that intraperitoneal instillation of local anaesthetic drug is useful for post operative pain relief for patients undergoing laparoscopic surgeries and 0.5% Bupivacaine is a better analgesic when compared to intraperitoneal instillation of 0.5% Ropivacaine, with well maintained hemodynamics postoperatively.

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Introduction:-

Laparoscopy is a modern, minimally invasive surgical/diagnostic procedure, in which abdominal cavity is visualized with a scope. This surgery can be performed with minimal surgical incision thereby leading to less pain, less paralytic ileus, short hospital stay and early ambulation.

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The mechanism of analgesia is by blocking the visceral nociceptors, thereby, decreasing the visceral pain in laparoscopic surgeries. It also has anti-inflammatory action and prevents peritonitis and bowel adhesion.

Creation of pneumoperitoneum can cause various physiological changes. Respiratory changes include impaired ventilation, absorption of CO₂ from the peritoneum, V/Q mismatch and patient positioning. When intra-abdominal pressure rises >10 mmHg there is significant reduction in cardiac output; also there will be an increase in intrathoracic pressure, which increases the peripheral vascular resistance. Venous stasis may lead to deep vein thrombosis. There is also reduction in renal blood flow, glomerular filtration and urine output.

Aim And Objective:-

To evaluate the efficacy of intraperitoneal instillation of local anaesthetics for post-operative pain relief after laparoscopic abdominal surgeries and compare the efficacy of two different local anaesthetics—Bupivacaine vs ropivacaine.

Materials And Methods:-

This study is a prospective, randomized, comparative study for evaluating the efficacy of intraperitoneal instillation of bupivacaine 0.5% vs Ropivacaine 0.5% for postoperative pain relief after elective laparoscopic abdominal surgeries. Institutional ethical committee approval was obtained. Totally 90 patients were selected. After getting the informed consent from the patients they were randomly allocated into 3 groups,

Group B:-

Bupivacaine group—patients received 2mg/kg of body weight 0.5% Bupivacaine intraoperatively

Group R:-

Ropivacaine group—patients received 2mg/kg of body weight 0.5% Ropivacaine intraoperatively

Group C:-

Control group—patients received 20 ml of 0.9% saline intraoperatively

All the 90 patients both male and females were between the age group 16-70 years who had been preoperatively assessed under ASA PS I & II. They were posted for elective laparoscopic abdominal surgeries in the department of general surgery and department of surgical gastroenterology.

Exclusion Criteria:-

ASA PS III, IV, & V

Local anaesthetic drug allergy

patient refusal

pregnancy

patients with liver, CVS, respiratory, renal diseases

if any other surgeries combined with the laparoscopic surgery in the same sitting.

Anaesthesia And Surgery:-

After getting the informed consent, height and weight were measured; patients were shifted to theatre. Local anaesthesia test dose was given. After confirming the absence of allergic reaction, monitors were connected (ECG, NIBP, PR, SPO₂, ETCO₂). Basal parameters were noted. Patients were preoxygenated with 100% O₂ for 3 min with bag and mask. Induction was carried out with inj. fentanyl 2mc/kg, inj. thiopentone 5mg/kg and intubated with an approved size endotracheal tube after a loading dose of inj. atracurium (0.5 mg/kg), maintenance of anaesthesia was with N₂O:O₂ 2:1, Sevoflurane 1-2%, inj. atracurium 0.1 mg/kg. No extra dose of analgesia was given intraoperatively

All the surgeries were done by trained surgeons. After skin incision 11mm trocar is introduced via umbilical port, abdomen is inflated with CO₂ 1lit/min intra-abdominal pressure kept around 12-14 mmHg in all patients

After the procedure gets over, abdomen was thoroughly washed to remove the blood clots and debris. Inj. Bupivacaine 0.5% with 10 ml distilled water / Inj. Ropivacaine 0.5% with 10 ml distilled water / 30 ml of normal saline is instilled intraoperatively under vision. After the removal of trocar, CO₂ gas was completely evacuated from the abdomen. Patients were kept in Trendelenburg position for 10 mins. If abdominal drain was present it was

clamped.4ml of 2% Lignocaine was infiltrated into the skin.During the surgery ETCO2 value was maintained between 25-35mmhg.

Post operatively all the patients were shifted to pacu for observation.primary and secondary outcomes were measured.vas score at 0,1,2,3,4,5,6,10,12,24 hrs were noted.inj.fentanyl 1mc/kg iv given as the rescue analgesia whenever the vas score was more than 3.total dose of fentanyl required was noted in these patients.time of the first rescue analgesic requirement was noted.presence of complications was noted.

Discussion:-

Rescue Analgesia Timing:-

Table 1:-

GROUP	NUMBER	MEAN	SD	P VALUE
Control	30	12.90	13.38	0.000 significant
ropivacaine	30	264.33	144.79	
bupivacaine	30	355.00	25.24	

Bupivacaine provided adequate analgesia for the first 6 hrs when compared to Ropivacaine, which provided adequate analgesia for about 4 hrs 24 mins

Table 2:-Total Rescue Analgesia Dose Requirement

GROUP	NUMBER	MEAN	SD	P VALUE
CONTROL	30	184	45.38	0.000 significant
ROPIVACAINE	30	92.33	34.81	
BUPIVACAINE	30	74.00	25.24	

Though, there was a difference in the amount of rescue analgesic requirement between Bupivacaine and Ropivacaine groups, the difference was found to be statistically insignificant (p=0.1260)

Vas Score:-

When compared with control group, Bupivacaine and Ropivacaine both group had less VAS score.

Pain threshold was maximum in the first hour and it was minimal in the sixth hour irrespective of the groups. These type of laparoscopic surgeries required higher analgesics upto six hours post operatively. After six hours the analgesic requirements were found to be minimal.

Table 3:-

VAS MEAN	CONTROL	ROPIVACAINE	BUPIVACAINE	P VALUE
0 HR	5.00	3.57	3.40	0.000
1HR	3.47	2.80	2.53	0.000
2HR	3.50	2.70	2.67	0.004
3HR	3.83	2.90	2.73	0.000
4HR	4.07	3.17	2.77	0.000
5HR	3.57	3.50	2.73	0.002
6HR	3.57	3.10	3.27	0.401
10HR	3.57	3.50	3.70	0.766
12HR	3.83	3.23	3.20	0.133
24HR	3.03	3.13	2.87	0.563

Laparoscopic techniques have gained popularity in the recent years mainly because of the facts that it involves small incision, short hospital stay and early ambulation though it has got various advantages on its own , the peritoneal stretching due to the insufflation of gases results in excessive pain post operatively. Various modes of providing analgesia were tried. The techniques that can be used for providing pain relief in laparoscopic surgeries include

surgery under subarachnoid block, parenteral opioid and NSAIDs , instillation of local anesthetics intraperitoneally etc.,

Instillation of local anesthetics solution intraperitoneally, as a mode of providing postoperative analgesia , has been studied extensively . It has the added advantage of early ambulation, reduced incidence of postoperative nausea, vomiting and reduces the use of parenteral opioids and NSAIDs . This study was done to compare the analgesic efficacy of Bupivacaine and Ropivacaine , which were instilled intraperitoneally , with a control group.

In our study it was found that the total dose of opioid required in the postoperative period was significantly less in both groups. Out of these two groups Bupivacaine group needed less fentanyl $74 \pm 25.24\mu\text{g}$, when compared with Ropivacaine group which needed $92.33 \pm 34.81\mu\text{g}$, though the difference was found to be statistically insignificant. In our study the median VAS score for Bupivacaine group was 2.82 over 24 hours and in Ropivacaine group was 3.15, which was found to be statistically significant.

Intraperitoneal instillation of Bupivacaine or Ropivacaine at the end of the surgery provided analgesia for 355 min and 264.33 min compared with saline group which was about 13 min, which was found to be statistically significant.

Summary:-

From this prospective, randomised, comparative, double blinded, case control study which evaluated the effectiveness of intraperitoneal instillation of Bupivacaine compared with Ropivacaine for post operative pain relief after laparoscopic abdominal surgeries.

The following observations were noted....

1. The demographic profiles like Age, Sex, BMI, ASA status were comparable in all the groups.
2. Duration of postoperative pain relief after intraperitoneal instillation of Bupivacaine was longer than Ropivacaine.
3. The VAS score was lower in Bupivacaine and Ropivacaine group when compared with saline group over the first 6 hours post operatively.
4. Total Fentanyl requirement was lower in Bupivacaine and Ropivacaine group compared with compared with saline group.
5. Postoperative nausea and vomiting was significantly lower in both Ropivacaine and Bupivacaine group when compared to control group.
6. Duration of surgery, hemodynamic parameters and complications were comparable in all groups.

Conclusion:-

We conclude that intraperitoneal instillation of local anaesthetic drug is useful for post operative pain relief for patients undergoing laparoscopic surgeries and 0.5% Bupivacaine is a better analgesic when compared to intraperitoneal instillation of 0.5% Ropivacaine, with well maintained hemodynamics postoperatively.

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