Original Article

Laparoscopic Assisted Transversus Abdominis Plane (TAP) Block: Development of Novel Technique for Postoperative Analgesia in Patients Undergoing Gynaecological Laparoscopic Surgeries

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ABSTRACT

Introduction: Postoperative pain after laparoscopy surgery can lead to an increased consumption of opioids, with subsequent nausea, delayed bowel function, and prolonged postoperative recovery. Laparoscopic assisted TAP block is safe, easy to perform and as it is under direct laparoscopic vision, it eliminates the risks of peritoneal perforation.

Method: 40 female patients between age 40-70 years, ASA physical status I, II and III undergoing total laparoscopic hysterectomy were divided in two groups T (TAP) and C (CONTROL) group. General anaesthesia was given with standard induction and maintenance technique. At the end of surgery, prior to extubation, in group-T laparoscopic assisted TAP block was given with inj. Bupivacaine plain (0.25%) injected bilaterally. Patients in group-C were not given TAP block. Post-operative VAS score, time until request of rescue analgesia and frequency of additional analgesia in first 24hr was noted.

Result: In terms of postoperative analgesia and additional analgesic requirement, group T (Tap) was better as compared to group-C (Control).

Conclusion: Laparoscopic guided TAP block is simple, safe and most effective supplemental techniques as part of the multimodal post-operative analgesic regimen in patients undergoing gynaecological laparoscopy surgery with lower visceral injury risk.

Key words: Total laparoscopic hysterectomy, TAP block, postoperative analgesia, VAS score, Bupivacaine plain (0.25%) solution.

INTRODUCTION

Laparoscopic surgery has assumed an important role in gynaecological surgery in terms of cosmesis, postoperative pain and morbidity. Laparoscopy is certainly not pain free in the acute period, and the issue of controlling pain from port-site wounds remains challenging. Postoperative pain can lead to an increased consumption of opioids, with subsequent nausea, delayed bowel function and prolonged postoperative recovery.[1] The transverses abdominis plane (TAP) block is used for patients undergoing surgeries involving anterior abdominal wall incisions. The lateral abdominal wall comprises three layers of muscle and their associated fascia: the most superficial muscle is the external oblique; deep to this is the internal oblique; and still deeper is the transversus abdominis. The fascial plane between the internal oblique and transversus abdominis muscles is called the transversus abdominis neurofascial plane. The anterior rami of the lower six thoracic and first lumbar nerves provide sensation to the skin, muscles, and parietal peritoneum of the anterior abdominal plane. Injecting local anaesthetic into the fascial plane between the internal oblique and transversus abdominis muscles produces the TAP block.[4] Laparoscopic assisted TAP block is safe, easy to perform, less time consuming, and does not require any extra equipment. As it is under direct laparoscopic vision, it eliminates the risks of intraperitoneal injection by visualizing any peritoneal perforation.[1]

MATERIAL AND METHOD

The prospective randomized study was conducted among indoor patients admitted to our tertiary care hospital. 40 female patients between age 40-70 years, ASA physical status I, II and III undergoing laparoscopic gynaecological procedure (total laparoscopic hysterectomy) on elective basis were included in the study. Patients having history of known allergy to local anaesthetic agent, any infection at the site of anatomical landmark, altered coagulation profile, use of more than 4 laparoscopic port ,case requiring conversion to laparotomy and those who were unable to understand visual analogue score were excluded out of the study.

Preoperative evaluation of patient was done before the surgery by taking history, general, systemic examination, necessary investigation and fitness for anaesthesia was decided accordingly. NBM status of patient was noted. After obtaining written informed consent i.v line was secured with 18/20G intravenous cannula for IV fluids and patients were premedicated with inj Glycopyrrolate 0.005-0.01 mg/kg and Inj Pentazocine 0.5mg/kg intramuscularly 30 minutes prior to surgery.

In operation theatre baseline vitals heart rate (HR), arterial blood pressure (SBP and DBP), % saturation of oxygen (SPO_2) on air were noted. Preoxygenation was done with

100% O_2 for 3 min. Induction was done with Inj Thiopentone Sodium 4-7 mg/kg and Inj Succinylcholine 1-1.5mg/kg with IPPV. Oral intubation done with adequate size portex cuffed ET tube. Maintenance of anaesthesia was done with 50% N_2O in 50% O_2 with 0.5-1% isoflurane and nondepolarizing skeletal muscle relaxant Inj Vecuronium 0.08-0.1 mg/kg loading dose followed by 0.01-0.015mg/kg maintenance dose. After completion of surgery, prior to extubation, in group-T(TAP-group) laparoscope was maintained in situ .Under direct laparoscopic visualization, 23G quincke's spinal needle was inserted midway between iliac crest and lower costal margin in midaxillary line at apex of triangle of petit (inferior lumbar triangle) until two distinct "pops" were felt. As needle approached parietal peritoneum, slow injection was performed to tent the peritoneum and needle was slightly withdrawn to infiltrate correct plane. Inj Bupivacaine Plain (0.25%) maximum 2.5mg/kg 20 ml volume injected bilaterally after negative aspiration for blood. Diffuse buldge can be visualized on LED screen expanding anterior to peritoneum and transverse abdominis. Patients in group-C (control group) were not given TAP block. Neuromuscular blockade was reversed with injection glycopyrrolate 0.01mg/kg and Inj neostigmine 0.05mg/kg IV. Extubation was done after achieving adequate respiration, muscle power, tone and reflexes. Post-operative vitals were noted and assessment was done at 1st, 2nd,4th,6th ,8th,10th,12th,16th,20th and 24th hour for duration of analgesia using 10 point Visual Analogue Score (VAS) (0-no pain.1-2 mild pain,3-6 moderate pain,7-10 severe pain).Time until request of rescue analgesia with Inj Tramadol 1.5 mg/kg iv followed by Inj Ondansetron 0.1-0.2 mg/kg iv when (VAS >= 3) was noted. Frequency of additional analgesia in first 24hr was noted.

Figure 1: Laparoscopic Assisted Transversus Abdominis Plane (TAP) Block

RESULTS

A study was conducted among 40 female patients undergoing elective gynecological laparoscopic surgery. The collected data was subjected to statistical analysis. Continuous variables were presented as mean ± SD. Quantitative data was analyzed using student's t-test.

Both groups were comparable in terms of demographic data like age, weight, duration of surgery and hemodynamic parameters such as heart rate, systolic blood pressure, diastolic blood pressure and % saturation of oxygen. There was statistically no significant difference between two groups in terms of the above parameters (P>0.05).

After extubation postoperative Visual Analogue Score was comparable among both the groups with (p<0.001) and there was statistically significant difference in VAS score among both the groups at 2nd,4th ,6th,16th,20th and 24th hour, while it was statistically not significant at 8th and 12th hour(p>0.05).

The time until request of rescue analgesia i.e. duration of analgesia was (660 ± 1.77) min in Group-T while it was (210 ± 0.88) min in Group-C. It was comparable among both the groups with (p=0.003) and there was statistically significant difference among them. Frequency of additional analgesia in first 24 hr was (2.25 ± 0.44) times in Group-T while it was (3.65 ± 0.48) times in Group-C. There was statistically significant difference among them. (p<0.001)

Table 1: Patient's demographic data

Characteristics	Group-T (TAP)	Group-C (Control)	p-value
Age (Years)	52 ± 5.1	53 ± 5.1	0.53
Weight (Kg)	55 ± 2.1	56 ± 1.5	0.09
Duration of surgery (mins)	159.25±22.3	158.30±21.1	0.89

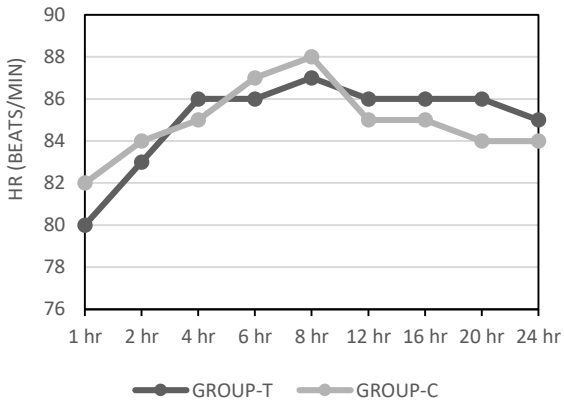

Figure 2: Monitoring of Heart Rate

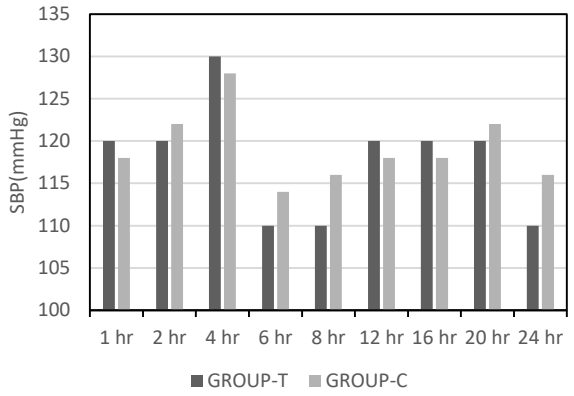

Figure 3: Monitoring of Systolic Blood Pressure

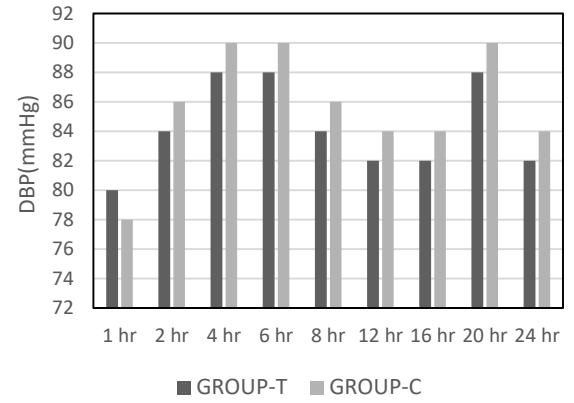

Figure 4: Monitoring of Diastolic Blood Pressure

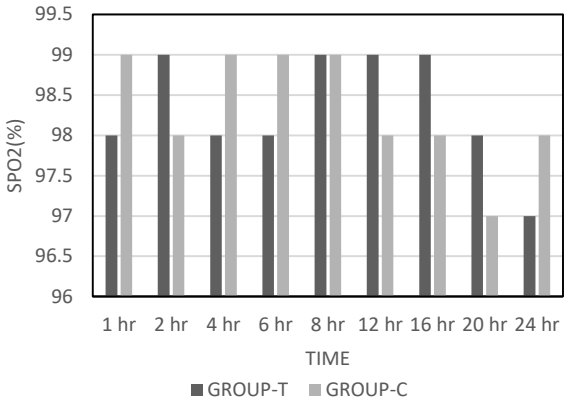

Figure 5: Monitoring of oxygen saturation

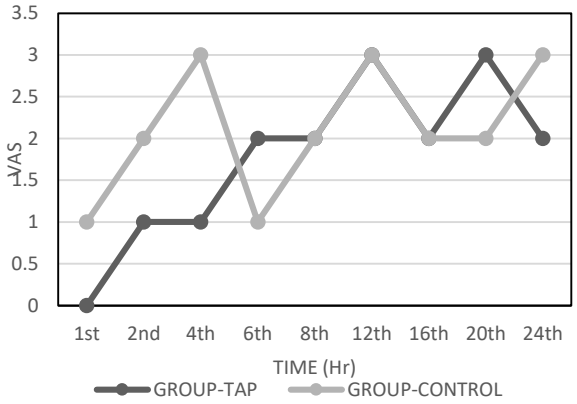

Figure 6: Monitoring of Post-operative VAS score

DISCUSSION

An adequate post-operative pain control provides low morbidity rates and shortens the recovery period. Over the last decade, the effectiveness of TAP block for post-operative pain control supplementary to the general anaesthesia has been demonstrated in many studies.

In our studies 40 female patients between age 40-70 years, ASA physical status I, II and III undergoing total laparoscopic hysterectomy were divided in two groups T (TAP) and C (CONTROL) group. General anaesthesia was given with standard induction and maintenance technique. At the end of surgery, prior to extubation, laparoscope was maintained insitu and in group-T (TAP) inj Bupivacaine Plain (0.25%) maximum 2.5mg/kg 20 ml volume was injected bilaterally after negative aspiration for blood under laparoscopic assistance in TAP plain. Patients in group-C (CONTROL) were not given TAP block.

In July 2018 Mofeed A. Abdelmaboud et al[3] conducted a study to assess efficacy of TAP block for postoperative analgesia after abdominal surgeries in morbidly obese patient. In their study they found that there were no statistically significant differences between the study groups with respect to demographic and hemodynamic parameters between TAP and control group($p>0.05$). Our study have demonstrated result consistent with above study in terms of demographic and hemodynamic parameters.

In May 2016 Deniz Tihan, Tolga Totoz et al[2] conducted a study to assess efficacy of laparoscopic transversus abdominis plane block for elective laparoscopic cholecystectomy in elderly patients. In their study post-operative 24th-hour-VAS for pain were found consecutively (2±1-3) in Group with TAP block as compared to (3±2-5) in group without TAP block. Patient's VAS was higher in without TAP block group with a statistically significant difference ($p = 0.001$).Our study have demonstrated result consistent with above study in terms of postoperative VAS score. When VAS score was ≥ 3 rescue analgesia with Inj Tramadol 1.5 mg/kg IV followed by Inj Ondansetron 0.1-0.2 mg/kg IV was given.

In 2018 V. Shankar et al conducted a study to compare post-operative analgesic effect of laparoscopic guided TAP block versus ultrasound guided TAP block in patient undergoing laparoscopic ventral hernia repair. They found that the time until request of rescue analgesia was (719.64 ± 304.98) min in group receiving laparoscopic guided TAP block. Our study have demonstrated result consistent with above study in terms of duration of analgesia.

In July 2018 Mofeed A. Abdelmaboud et al[3] conducted a study to assess efficacy of TAP block for postoperative analgesia after abdominal surgeries in morbidly obese patient. In their study frequency of analgesia in the first postoperative 24 h was (2 ± 1.3) in TAP block group and (4 ± 2.4) in control group. Our study have demonstrated result consistent with above study.

In this study, we described a technique that is safe, easy to perform, less time consuming, and does not require any extra equipment. Laparoscopically assisted TAP block is technically simple and provided consistent postoperative analgesia. As block is given under direct laparoscopic vision, there are less chances of visceral perforation.

CONCLUSION

Laparoscopic guided TAP block is simple, safe and most effective supplemental techniques as part of the multimodal post-operative analgesic regimen in patients undergoing gynaecological laparoscopy surgery with lower visceral injury risk.

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