

TAP block efficacy in laparoscopic TAPP

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ABSTRACT

Introduction: The effectiveness of transversus abdominis plane (TAP) block has been shown in recent studies to provide post-operative analgesia in abdominal surgeries. Local anesthetic drugs used in TAP block are generally cheaper and have less side effects than drugs used for post-operative analgesia. We investigated the effectiveness of TAP block in order to reduce the cost and side effects of analgesic drug use in patients after laparoscopic TAPP (transabdominal pre-peritoneal) operations.

Materials and Methods: The data of 52 patients who underwent laparoscopic TAPP for inguinal hernia between January 2020 and July 2021 in the Department of General Surgery were retrospectively analyzed. Patients who had been operated for inguinal hernia with open procedure and patients younger than 18 years of age were selected as the exclusion criteria.

Results: TAP block was applied to 26 of the patients. The mean visual analog scale (VAS) scores of the patients who underwent TAP block were 2.5, 2.12, and 1.12 at the post-operative 0, 6, and 24 h, respectively. The mean VAS scores of the patients who did not experience TAP block were 5.38, 3.04, and 1.5 at the post-operative 0, 6, and 24 h, respectively. The mean VAS score of the patient group in whom TAP block was applied was lower in all measurements, the greatest difference was at the post-operative 0th h, followed by the 6th h. There was no difference between the groups in terms of the mean VAS score at the 24th h.

Conclusion: In our study, the need for post-operative analgesics is lower in patients who underwent TAP block, due to less pain at the post-operative 0th and 6th h.

Keywords: Analgesic, laparoscopic TAPP, laparoscopy, tap block

Introduction

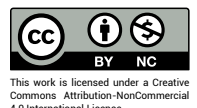
One of the most common operations performed by general surgeons is inguinal hernia operations. There are approximately 20 million cases per year worldwide. In the past few decades, the number of applications of laparoscopic transabdominal pre-peritoneal (TAPP) surgeries has gradually increased with the development of laparoscopic techniques and the reduction of the learning curve.

In patients who underwent laparoscopic TAPP technique, in comparison to patients who underwent open surgery, we know that there is less post-operative pain in the initial period. Transverse abdominal plane (TAP) block is the injection of local anesthetic into the space between the internal oblique and transversus abdominis muscles to numb the thoracolumbar nerves (T6-L1) that transmit sensation to the anterior abdominal wall.^[1] It is a proce-



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cedure that an anesthesiologist or surgeon can execute after the surgery beneath ultrasound guidance. It was first made from Petit triangle by Rafi in 2001.^[2] It was first performed under ultrasound guidance by Hebbard et al. in 2007.^[3] Nowadays, ultrasound guidance is more preferred because it is easier and more reliable.

The effectiveness of TAP block has been shown in recent studies to supply post-operative analgesia in abdominal surgeries.^[4] Local anesthetic drugs used in TAP block are generally cheaper and have less side effects than drugs used for post-operative analgesia. We investigated the effectiveness of TAP block in order to reduce the cost and side effects of analgesic drug use in patients after laparoscopic TAPP operations.

Materials and Methods

This study was carried out after receiving approval from the ethics committee. All patients provided written informed consent. The data of 52 patients who underwent laparoscopic TAPP for inguinal hernia between January 2020 and July 2021 in the Department of General Surgery were retrospectively analyzed. Patients who had previously been operated for inguinal hernia and patients under the age of 18 were selected as the exclusion criteria of the study.

All operations were performed by the same surgeon using the laparoscopic TAPP technique, and all TAP block applications were also performed by the same surgeon under ultrasound guidance, before the patient woke up, before the operation ended. Patients who underwent TAP block were administered 5 mg bupivacaine during the procedure and 100 mg tramadol together with 10 mg paracetamol at the post-operative 12th h. In the patient group who did not receive TAP block, 3 doses of 100 mg tramadol and 10 mg paracetamol were used every 8 h.

Data collected included demographic information, pre-operative and intraoperative factors, post-operative complications, and length of hospital stay. The operation was performed on the day of admission. Post-operative pain control was gaged at 0, 6, and 24 h after surgery. The visual analog scale (VAS) was used to assess the level of pain.

Technique

After the laparoscopic TAPP operation was completed, TAP block was performed with portable ultrasound in the neutral position in the supine position before the pa-

tients woke up. The procedure was performed on the ipsilateral of the operated site. The ultrasound probe was placed lateral to the abdominal wall between the iliac crest and the subcostal border (Fig. 1). The probe was placed parallel to the subcostal line. The plan was entered by feeling and seeing 2 resistance points by following the monitor with a 22 gauge needle. After negative aspiration was performed and controlled, 5 mg bupivacaine was injected.

Surgical Procedure

The patient was positioned supine. The abdomen was stained with povidone iodide and sterile draped. After the supraumbilical incision, the abdomen was insufflated to 12 mmHg with a Veres needle. From here, a 10 mm trocar was inserted and the camera was placed. A 30° angle camera was used. With camera guidance, the other two trocars were placed bilaterally from the midclavicular line at the midpoint of the umbilicus and iliac crest. The abdomen was then explored. The patient was positioned in the Trendelenburg position. The flap was prepared by opening the peritoneum from the spina iliaca interna superior to the medial umbilical ligament. The hernia sac was dissected. The spermatic cord was preserved. Symphysis pubis was released and Cooper's ligament was dissected. The graft was taken into the abdomen and placed. It was fixed to the symphysis pubis and abdominal wall with AbsorbaTack. Then, the peritoneal flap was fixed with an AbsorbaTack over the graft. The 10 mm fascia was sutured with 1 no. Vicryl.



Figure 1. After the laparoscopic TAPP operation is completed, the subcostal and iliac crests are drawn on the ipsilateral of the operated area of the patient in the supine position before the patient wakes up.

Statistical Analysis

Data descriptive statistics include mean, minimum, maximum frequency, and percentage values. The Shapiro–Wilk test was used to validate the quantitative data’s normality assumption. For normally distributed variables, the independent sample t-test (Mann–Whitney U test for variables that do not provide the normality assumption) was performed. The Pearson Chi-square test was used to investigate the relationships between category variables. Statistical analyzes were performed using the IBM SPSS Statistics 25.0 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) package program. In all analyses, the grade of significance was set at 0.05.

Results

The data of 52 patients who underwent laparoscopic TAPP between January 2000 and July 2021 were analyzed retrospectively. TAP block was applied to half of the patients; TAP block was not applied to the other half. The mean age of the patients who underwent TAP block was 53.3 (21–81) years. The average age of patients who did not have TAP block was 51.5 (19–82) years. The gender distribution of both the groups was equal. TAP block was performed bilaterally in 12 (46.2%) patients; unilateral repair was performed in 14 (53.8%) patients. Ten patients (38.5%) who did not undergo TAP block were treated bilaterally; unilateral repair was performed in 16 (61.5%) patients. In one of the patients who underwent TAP block, ecchymosis was observed at the needle site; testicular seroma was seen on the operated side in one of them. Testicular seroma was seen on the operated side in one of the patients who did not undergo TAP block (Table 1). The mean VAS scores of the patients who underwent TAP block were 2.5, 2.12, and 1.12 at the post-operative 0, 6, and 24 h, respectively.

Table 1. Demographic and surgical data

	Block Applied	Block not applied
Age (Mean)	53.38	51.58
Gender (Male:female)	23:3	23:3
One-sided repair	14 (53.8%)	16 (61.5%)
Double-sided repair	12 (46.2%)	10 (38.5%)
Indirect hernia	14 (65.4%)	19 (73.1%)
Direct hernia	7 (26.9%)	4 (15.4%)
Direct + indirect hernia	2 (7.7%)	2 (7.7%)
Complications	2	1

The mean VAS scores of the patients who did not experience TAP block were 5.38, 3.04, and 1.5 at the post-operative 0, 6, and 24 h, respectively. The mean VAS of the patient group who underwent TAP block was lower in all measurements, with the greatest difference observed at the post-operative 0th h ($p<0.010$), followed by the 6th h ($p=0.030$). There was no distinction between the groups in terms of VAS mean at the 24th h ($p=0.070$) (Fig. 2).

Discussion

Laparoscopic inguinal hernia repair was first described in 1990.^[5] Laparoscopic inguinal hernia repair is an increasingly popular technique as a result of the development of technology and advances in surgery. We know that one of the most important advantages of laparoscopic repair is fewer pain in the early days following surgery. However, post-operative pain at port incision sites is associated with significant discomfort in laparoscopic inguinal hernia repair.

In the study of Canakci et al., they compared the application of TAP block to placebo in patients who had undergone inguinal hernia surgery.^[6] Ultrasound-guided TAP block was applied to the patients in the TAP group using 20 cc of 0.5% bupivacaine solution. At post-operative 0, 4, and 24 h, it has been shown that post-operative pain is less in patients who underwent TAP block, and the release of proinflammatory cytokines correlated with these. Thus, TAP block, according to the researchers, has an affirmative role in immunomodulation.

TAP block can be done blindly by feeling the resistance points, it can be tried as a continuation of laparoscopy or it can be done with ultrasound. In our study, only one complication related to TAP block procedure was observed. With the introduction of ultrasound guidance by Hebbard et al. in 2007, procedural complications are very rare. In the study of Gurnaney et al., no procedure-related

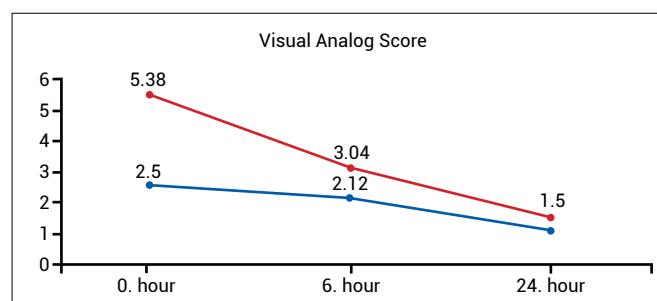


Figure 2. VAS comparison of two groups with and without TAP block.

complications were reported.^[7] The use of ultrasonography has been shown to increase the success rate of needle insertion in the TAP block. Today, the authors recommend that TAP block be performed with ultrasound. However, it was revealed that Gokalp et al.'s TAP block application performed by the laparoscopic method in patients who underwent laparoscopic sleeve gastrectomy had a similar success and complication rate to the ultrasonographic TAP block application.^[8-9]

In our study, the reason why there was no difference in the mean VAS at the post-operative 24th h between the two groups was thought to be related to the half-life of the drug used for local anesthetics. Okut et al. studied the pharmacokinetics of local anesthetics after TAP block in sleeve gastrectomy operation.^[9] The elimination half-life was 8.75 h on average.

In the study performed by McDonnell et al., they showed that the application of TAP block in patients who had abdominal surgery reduced post-operative pain and the use of opioids needed postoperatively.^[10,11] In these studies, McDonnell showed that the application of TAP block provides effective post-operative analgesia. It has been shown that the application of TAP block reduces scores for post-operative pain both at rest and in motion, and there are fewer post-operative opioid-related complications.

In our study, since patients who underwent TAP block had less pain at the post-operative 0th and 6th h, less post-operative analgesic drug use was sufficient and it was seen to be less costly. It has been revealed as a simple analysis that the use of less drugs will reduce the cost, and an objective cost analysis has not been made over drug expenses. Since our patients were usually discharged on the first post-operative day, they could not be followed up in terms of post-operative ileus. However, since there will be less opioid use in the patient group who underwent TAP block, we expect less post-operative ileus to develop. In addition, the lack of comparison of the VAS results of the patients at rest and in motion is the shortcoming of our study.

Disclosures

Ethics Committee Approval: The data of 52 patients who underwent laparoscopic TAPP for inguinal hernia between January 2020 and July 2021 in the Department of General Surgery were retrospectively analyzed.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Authorship Contributions: Concept – H.B.D., S.K.; Design – A.A.; Supervision – M.N.D.; Materials – H.B.D., S.K.; Data collection and/or processing – E.K.; Analysis and/or interpretation – H.B.D., A.A.; Literature search – S.K., A.A.; Writing – H.B.D., S.K.; Critical review – M.N.D., A.A.

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