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Comparison of the Mean Post-Operative Pain Score with Ultrasound Guided Transversus Abdominis Plane (TAP) Block and Wound Infiltration with Local an Aesthetic Agent in Abdominal Surgeries

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ABSTRACT

Objectives: To compare the mean post-operative pain score with ultrasound-guided transversus abdominis plane block and wound infiltration with local anaesthetic agents in abdominal surgeries.

Study design: Comparative prospective study

Place and Duration of Study: Department of Anaesthesia, Intensive Care and Pain Management, Combined Military Hospital, Bahawalpur Pakistan, from Oct 2018 to Apr 2019.

Methodology: Sixty patients undergoing abdominal surgery aged 18-60 years were included. The patients in Group-A received transverses abdominis plane block with 20 ml of 0.25% Bupivacaine bilaterally, while those in Group-B received 20 ml of 0.25% Bupivacaine as local wound infiltration. Each patient was followed till 6 hours post-operatively.

Results: Out of 60 patients, 35(58.33%) were male, and 25(41.67%) were females. In our study, the Visual analogue score was 1.63±0.85 in Group-A (ultrasound-guided TAP block) compared with 4.47±1.07 in patients with Group-B (wound infiltration with a local anaesthetic agent) with a *p*-value of 0.001, which was statistically significant.

Conclusion: The study concluded that the mean pain score in patients with ultrasound-guided Transversus abdominis plane block is less compared to wound infiltration with local anaesthetic agents in abdominal surgeries.

Keywords: Abdominal surgeries, Post-operative pain, Transversus abdominis plane block.

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INTRODUCTION

Acute post-operative pain is a dilemma which is frequently seen not only by anaesthetists and surgeons but also by all medical professionals.[1] Pain control is the most important part of perioperative anaesthetic management because it is a vital parameter like others, such as blood pressure and heart rate, which should be managed before shifting the patient from operating room recovery.[2] However, it is still a topic of discussion whether management of acute post-operative pain has any effect on surgical outcomes.[3] Local anaesthetics are a game changer; its usage in epidurals provide not only efficient pain control but also overcome many side effects seen by use of opioids.[4] Therefore, alternative techniques like peripheral nerve blocks and wound infiltration can be implicated, especially in cases where intrathecal or intravenous opioids are contraindicated.[5]

Transversus abdominis plane (TAP) blocks anaesthetize the anterior abdominal wall by blocking sensory nerve from T6 to T11 by infiltrating local anaesthetics in the transversus abdominis fascial plane, which linking the internal oblique and transversus abdominis muscles.[6,7] TAP block has shown effective pain relief after abdominal surgery, hysterectomy and caesarean delivery compared with no intervention or placebo in previous meta-analyses. Single-shot local anaesthetic infiltration (LAI) is another technique for managing post-operative pain.[8,9]

Pain after abdominal surgery is the most frequent post-operative complaint, if not treated, can lead to poor outcomes with increased morbidity. Hence, this study intended to weigh up the mean post-surgical pain score with transversus abdominis plane (TAP) block and wound infiltration with a local anaesthetic agent. Although previous local study available on this, this study has shown different results compared to other studies described above, so there must be a reevaluation of the better technique among these two for providing these particular patients with non-pharmacological methods for reducing post-operative pain to reduce morbidity. Based on previous studies, we cannot conclude better among these two as the above-described studies have shown variable results, so our study will help to resolve this controversy.

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METHODOLOGY

The comparative prospective study was conducted at the Department of Anaesthesia, Intensive Care and Pain Management, Combined Military Hospital, Bahawalpur Pakistan, from October 2018 to April 2019 after getting approval from the Ethical Committee (EC/03/2018). The WHO sample size calculator was used to calculate the sample size taking mean pain score in the ultrasound-guided transversus abdominis plane (TAP) block group as 4.50±0.50, and in the local wound infiltration Group as 7.24±1.13.[10]

Inclusion Criteria: Patients of either gender, aged 18-60 years, undergoing abdominal surgery, whereas patients with previous history of abdominal surgery were included.

Exclusion Criteria: Patients with post-operative complications such as excessive bleeding and patients requiring post-op ICU care were not included.

Sixty patients planned for abdominal surgery under general anaesthesia at the Department of Anesthesiology, Combined Military Hospital, Bahawalpur, satisfying the inclusion criteria, were chosen by lottery method. Informed consent was taken for participation in the study; all patients were randomized in a double-blind fashion in two groups by using lottery method (Figure). Every patient in the Group was asked to take out a slip from a total number of slips named A & B, and the patient was placed in that particular group. The patients in Group-A received a TAP block with 20 ml of 0.25% Bupivacaine on both sides, whereas those in Group-B received local wound infiltration of 20 ml of 0.25% Bupivacaine. Each patient was followed till 6 hours post-operatively when the pain score was noted in both groups. All the data was documented on a preplanned proforma.

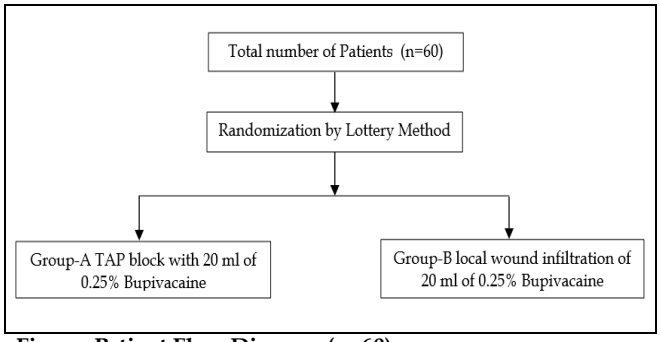

Figure: Patient Flow Diagram (n=60)

Statistical Package for Social Sciences (SPSS) version 25.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Independent sample t-test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was set as the cut-off value for significance.

RESULTS

The total number of study participants was 60. The mean age of patients in Group-A was 40.50±11.18 years, and in Grou-B was 42.40±11.05 years. Of 60 patients, 35(58.33%) were male, and 25(41.67%) were females. We have found a Visual analogue score of 1.63±0.85 in Group A (ultrasound-guided (TAP) block) compared with 4.47±1.07 in patients with Group B (wound infiltration with a local anaesthetic agent) with *p*-value of 0.001, which was statistically significant. Comparison of different parameters with post-operative pain in study groups is shown in the Table.

Table: Comparison of Different Parameters with Post-operative pain (n=60)

Parameters		Group A (n=30) Pain Score Mean +SD	Group B (n=30) Pain Score Mean +SD	*p*-value
Age (years)	18-40	1.86±0.86	4.58±1.08	0.001
	41-60	1.44±0.81	4.39±1.09	0.001
Gender	Male	1.65±0.49	4.89±0.83	0.001
	Female	1.62±1.19	3.83±1.12	0.001
Duration (minutes)	≤30	1.75±0.75	4.60±1.08	0.001
	>30	1.56±0.92	4.40±1.10	0.001
BMI (kg/m2)	≤27	1.87±0.92	4.71±1.20	0.001
	>27	1.40±0.74	4.25±0.93	0.001
Type	Caesarian Section	1.50±1.23	4.0±±.41	0.001
	Hysterectomy	1.33±1.53	3.71±1.11	0.001
	Cholecystectomy	1.89±0.78	4.57±0.79	0.001
	Laparotomy	1.58±0.52	5.0±0.85	0.001
Place of living	Rural	2.0±0.73	4.0±0.97	0.001
	Urban	0.9±0.57	5.0±0.96	0.001
Diabetes Mellitus	Yes	1.44±0.88	4.45±1.13	0.001
	No	1.71±0.85	4.47±1.07	0.001
Hypertension	Yes	2.0±0.82	4.75±0.89	0.001
	No	1.52±0.85	4.3±.14	0.001

DISCUSSION

Ultrasound-guided transversus abdominis plane (TAP) block is an emerging technique in peripheral nerve blocks to treat or reduce post-surgical pain. The technique has proved to be very efficient, thus helping us to circumvent the utilization of intravenous and neuraxial opioid analgesics, thus avoiding its side effects.[10] The studies have shown that TAP block provides momentous pain relief, specifically from T10 up to L1 level; therefore, it is effective and suitable for

lower abdominal surgeries.[11] The performance of the procedure with the help of ultrasound showed better results because of the availability of some visualization of structures and planes where local anaesthetic is to be injected. The drug can be delivered continuously by placing the catheter in the plane, thus extending the analgesic effect. Although most of the available studies on TAP block have used local anaesthetic (LA) agent, few studies have reported that adjuvant medications were added to LA to prolong the effect of TAP block.[12] Transversus abdominis plane block (TAP Block) has gained popularity in managing the post-surgical pain specifically for lower abdominal surgeries and interventions. Hebbard *et al*.[13] explained the success of this peripheral block by subcostal oblique approach under ultrasound guidance, which gives proficient pain control in both the upper and lower abdomen, and as USG provides a good visualization resulting in less chance of damage to surrounding structures and a much less rate of complications. A few studies have been available on the OSTAP block approach in abdominal surgeries, being heterogeneous regarding the method or the postsurgical palliative course of therapy.[14]

Ranjit et al. compared the effects and differences of ultrasound-guided TAP block versus local wound infiltration for postsurgical pain relief in patients who planned to undergo surgery under general anaesthesia. They established that TAP block on both sides efficiently decreased postsurgical pain for at least 8–12 hours post-operatively. Moreover, the TAP block minimizes the usage of opioids.[15] Yu *et al*. conducted a study titled "TAP block versus LA wound infiltration in lower abdominal surgery: A systematic review and meta-analysis of randomized controlled trials." They establish that TAP block, as compared to LA infiltration, offers enhanced long-term effects, particularly up to 24 hours after surgery.[16] Another study by Mishra et al. comparing TAP block versus wound infiltration of local anaesthesia for post-operative analgesia concluded that TAP block and wound infiltration of local anaesthesia both provide significant post-operative analgesia initially. However, the effects are more long-lasting in the TAP block.[17]

El-Dawlatly *et al*.[18] in a study, observed the outcome of TAP block when given for laparoscopic cholecystectomy as compared to no intervention resulted in a lesser utilization of intraoperative opioids (8.6µg vs 23µg; p<0.01) in the first postoperative day (10.5mg vs 22.8mg; p<0.05). Nealon *et al*.[19] also established that TAP block decreases the numeric verbal pain score in the most vulnerable time after surgery and gives prolonged pain relief, thus reducing the use of opioids and their side effects.

RECOMMENDATION

It is recommended that an ultrasound-guided transversus abdominis plane (TAP) block should be used, preferably in preventing postoperative pain in abdominal surgeries, in order to reduce the patient's morbidity.

CONCLUSION

This study concluded that the mean pain score in patients with ultrasound-guided transversus abdominis plane (TAP) block is less as compared to wound penetration with local anaesthetic agents in abdominal surgeries.

Conflic of Interest: None.

Authors' Contribution:

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

AS & AS: Conception, study design, drafting the manuscript, approval of the final version to be published.

AG: Data acquisition, data analysis, data interpretation, 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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