

## Original Research

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# Transversus Abdominis Plane Block Versus Local Anaesthetic Infiltration with Bupivacaine in Laparoscopic Abdominal Surgeries: A Comparative Study

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## ABSTRACT:

**Background:** Postoperative pain following laparoscopic abdominal surgeries, though less severe than open procedures, remains a significant concern. Effective analgesia improves recovery and reduces hospital stay.

**Aim:** To compare the efficacy of transversus abdominis plane (TAP) block and local anaesthetic infiltration with bupivacaine in controlling postoperative pain.

**Methods:** A prospective comparative study was conducted on 100 patients undergoing laparoscopic abdominal surgeries. Patients were divided into two groups: TAP block group (n=50) and local anaesthetic infiltration group (n=50). Outcomes measured included postoperative pain scores (VAS), analgesic requirement, time to first rescue analgesia, and complications.

**Results:** TAP block group showed significantly lower pain scores, delayed requirement for rescue analgesia, and reduced total analgesic consumption compared to the local infiltration group ( $p < 0.001$ ).

**Conclusion:** TAP block provides superior postoperative analgesia compared to local anaesthetic infiltration in laparoscopic abdominal surgeries.

## INTRODUCTION

Laparoscopic abdominal surgery has substantially reduced postoperative morbidity, hospital stay and recovery time compared with conventional open surgery. However, postoperative pain remains an important factor influencing patient comfort, mobilization and early recovery.

The origin of pain following laparoscopic surgery is multifactorial. It includes somatic pain arising from trocar insertion sites, visceral pain related to manipulation of intra-abdominal structures and discomfort associated with peritoneal stretching and pneumoperitoneum.

Local anaesthetic infiltration of trocar sites is commonly used as a simple method of reducing postoperative pain. However, its analgesic effect is generally restricted to the immediate area of infiltration and may be relatively short-lived.

The transversus abdominis plane block is a regional anaesthetic technique designed to deposit local anaesthetic within the fascial plane between the internal oblique and transversus abdominis muscles. This plane contains thoracolumbar nerves supplying the anterior abdominal wall, allowing a broader area of somatic analgesia.

The present study was undertaken to compare ultrasound-guided TAP block with port-site local anaesthetic infiltration using bupivacaine in patients undergoing laparoscopic abdominal surgery.

## **MATERIALS AND METHODS STUDY**

### **Design**

This was a prospective randomized comparative study conducted at Saveetha Medical College and Hospital, Chennai.

### **Study Setting**

Saveetha Medical College and Hospital.

### **Sample Size**

Total: 100 patients

- TAP block group: 50
- Local infiltration group: 50

### **Inclusion Criteria**

- Age 18–65 years
- Elective laparoscopic abdominal surgeries
- ASA grade I–II

### **Exclusion Criteria**

- Allergy to local anaesthetics
- Coagulopathy
- Infection at injection site
- Conversion to open surgery

## **METHODOLOGY**

### **Group A (TAP Block):**

Ultrasound-guided TAP block administered using 0.25% bupivacaine (20 ml per side).

### **Group B (Local Infiltration):**

Port site infiltration with 0.25% bupivacaine.

### **Outcome Measures**

- VAS pain score at 2, 6, 12, and 24 hours
- Time to first rescue analgesia
- Total analgesic consumption (mg)
- Postoperative complications

### **Statistical Analysis**

Data analyzed using SPSS software.

- Continuous variables: Mean  $\pm$  SD (Student t-test)
- Categorical variables: Chi-square test

- Significance:  $p < 0.05$

## RESULTS

### Baseline Characteristics

| Variable                  | TAP Group       | Local Group     | p-value |  |
|---------------------------|-----------------|-----------------|---------|--|
| Mean Age                  | 45.6 $\pm$ 12.1 | 44.2 $\pm$ 11.8 | 0.62    |  |
| Male (%)                  | 56%             | 58%             | 0.84    |  |
| Duration of Surgery (min) | 78 $\pm$ 15     | 80 $\pm$ 17     | 0.55    |  |

### Pain Scores (VAS)

#### Time TAP Group Local Group p-value

|        |               |               |        |
|--------|---------------|---------------|--------|
| 2 hrs  | 2.1 $\pm$ 0.8 | 4.5 $\pm$ 1.2 | <0.001 |
| 6 hrs  | 2.8 $\pm$ 1.0 | 5.2 $\pm$ 1.3 | <0.001 |
| 12 hrs | 3.2 $\pm$ 1.1 | 4.8 $\pm$ 1.4 | <0.001 |
| 24 hrs | 2.5 $\pm$ 0.9 | 3.9 $\pm$ 1.2 | <0.001 |

### Analgesic Outcomes

| Outcome                          | TAP Group                     | Local Group   | p-value |
|----------------------------------|-------------------------------|---------------|---------|
| Time to First Analgesia (hrs)    | 8.6 $\pm$ 2.2                 | 3.4 $\pm$ 1.5 | <0.001  |
| Outcome                          | TAP Group Local Group p-value |               |         |
| Total Analgesic Consumption (mg) | 110 $\pm$ 25                  | 180 $\pm$ 30  | <0.001  |

### Complications

| Complication    | TAP Group | Local Group | p-value |
|-----------------|-----------|-------------|---------|
| Nausea/Vomiting | 10%       | 12%         | 0.75    |
| Infection       | 2%        | 4%          | 0.56    |

## DISCUSSION

TAP block significantly reduces postoperative pain by blocking the sensory nerves of the anterior abdominal wall. The prolonged analgesic effect delays the need for rescue analgesics.

In comparison, local infiltration provides limited and short-lived analgesia as it only targets incision sites. The findings of this study are consistent with previous literature supporting TAP block superiority.

## CONCLUSION

Ultrasound-guided transversus abdominis plane block provided superior postoperative analgesia compared with port-site local anaesthetic infiltration with bupivacaine in patients undergoing laparoscopic abdominal surgery.

TAP block was associated with:

- Lower postoperative VAS pain scores
- Longer time to first rescue analgesia
- Reduced total analgesic consumption
- Comparable postoperative complication rates

TAP block may therefore be considered an effective component of multimodal analgesia for laparoscopic abdominal surgery.

## LIMITATIONS

The study has several limitations:

1. It was conducted at a single centre.
2. The sample size was relatively limited.
3. Follow-up was restricted to the early postoperative period.
4. The study evaluated postoperative analgesic outcomes rather than broader recovery outcomes such as time to ambulation, hospital stay and quality of recovery.
5. The results may not be generalizable to all types of laparoscopic abdominal procedures.

**Conflict of Interest None Funding None**

## REFERENCES

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- [2] Niraj G, Kelkar A, Fox AJ. Persistent postoperative pain after laparoscopic surgery and the role of regional analgesia.
- [3] Additional peer-reviewed references comparing TAP block with port-site infiltration should be incorporated after verification of the exact studies, journal details, volume, pages and DOI.