



## TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POST OPERATIVE ANALGESIA IN LOWER ABDOMINAL SURGERIES.

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### ABSTRACT

**Introduction** TAP block can be used as an adjunct for post operative pain control in lower abdominal surgeries involving the T6 to L1 distribution and to provide analgesia to anterior abdominal wall. **Methods** All 60 patients are divided into 2 groups. In group TAP -TAP block with Inj. Ropivacaine 0.2% 20 ml on each side given , group P – iv Paracetamol given at the end of surgery. Pain severity is measured using a visual analogue scale ( VAS ) **Results** Duration of analgesia was longer in group -TAP and use of rescue analgesic was less in 24 hrs. **Conclusions** TAP block is effective than traditional iv analgesics in reducing post operative pain in lower abdominal surgeries.

**KEYWORDS** : TAP Block , Inj. Paracetamol , Inj. Ropivacaine 0.2%

### INTRODUCTION

Enhanced recovery after surgery includes early resumption of oral intake, early initiation of mobilization and optimization of post operative analgesia. Inadequate control of post-operative pain leads to several unwanted adverse events ranging from patients' discomfort, prolonged immobilization to thromboembolic phenomenon, nosocomial infections and pulmonary complications.<sup>11</sup> Traditionally, analgesia for abdominal surgery is provided either by systemic drugs such as opioids, nonsteroidal anti-inflammatory drugs, alpha-2agonists, and paracetamol or by epidural anesthesia. Peripheral nerve blockade is an alternative means of providing analgesia, by anesthetizing the sensory nerves<sup>46</sup>.

Local anaesthesia is a technique to render any part of body insensitive to pain without affecting consciousness, so local anaesthetics are the compounds that provides reversible loss of sensation and thus allowing patient to undergo surgical procedures as well as postoperative period without pain and distress. The Transversus Abdominis Plane (TAP) Block is a local anaesthetic block used to provide analgesia to the anterior and lateral abdominal wall<sup>18</sup>TAP block was first defined by Rafi in 2001<sup>1</sup>

The Transversus Abdominis Plane (TAP) block is a recently described approach to provide analgesia to the anterior abdominal wall. Carney J, McDonnell JG<sup>30</sup>, evaluated the analgesic efficacy of the TAP block in patients undergoing total abdominal hysterectomy via a transverse lower abdominal wall incision, in a randomized, controlled, double-blind clinical trial and provided superior analgesia when compared with placebo block up to 48 postoperative hours in total abdominal hysterectomy patients. It provides adequate post-operative pain relief following various abdominal surgeries.

Incisional pain is particularly troublesome after lower abdominal surgical procedures. Because the sensory afferent nerves run behind abdominal muscle , by a method called Transversus abdominis plane (TAP) block, these nerves could be blocked and postoperative pain could be managed. It involves innervations of the anterolateral abdominal wall derived from T6-L1.<sup>4</sup>

TAP Block can also cause reduction in neuroendocrine levels including norepinephrine (NE), epinephrine (E), cortisol (Cor), glucose (Glu), interleukin (IL)-6 and IL-10 during 48 h after surgery. TAP block efficiently relieves postoperative acute pain up to 12 h postoperatively with more stable perioperative Hemodynamics. Thus it can be used to reduce perioperative stress response in patients undergoing Abdominal surgeries.<sup>3</sup>

The TAP block is a simple procedure that can be used as an adjunct for postoperative pain control in abdominal, gynecologic, or urologic surgery involving the T6 to L1 distribution. Surgical procedures investigated by randomized clinical trials include large bowel resection, caesarean delivery, abdominal hysterectomy, open appendectomy, and laparoscopic cholecystectomy. However, the TAP block has also found clinical utility in procedures such as abdominal and inguinal hernia repair , radical prostatectomy, nephrectomy , and many different laparoscopic procedures in general. Bilateral TAP blocks can be used for midline incisions. This technique is also useful for procedures in which epidural analgesia is contraindicated (ie, anticoagulated patients). In addition, if prolonged analgesia is desired, a continuous TAP block technique with placement of a catheter has been described. Use of sonography for placement of the needle and drug distribution can lower the risks associated with TAP block , particularly in overweight people and increases safety and effectiveness of block.

In this Prospective, Randomized, Interventional study, we try to assess the analgesic effect of TAP block for patients undergoing lower abdominal surgeries in comparison to standard IV analgesic(Paracetamol).

### MATERIALS AND METHODS

This is a prospective, randomised, interventional study which is done at Civil Hospital Ahmedabad with study duration of one year june 2019 to may 2020. The study involves the use of Ropivacaine in TAP block in 30 pts undergoing lower abdominal surgeries and the use of conventional I.V analgesic; Paracetamol in other 30 pts undergoing lower abdominal surgeries.

#### Inclusion criterias:

1. Age: 18-65 years.
2. Gender: Both.
3. ASA physical status I, II.
4. Elective lower abdominal surgeries.
5. Duration of surgery: around three hours.

#### Exclusion criterias:

1. ASA status III, IV, V.
2. Emergency surgeries.
3. Local site infection.
4. History of allergic reactions to local anaesthetics, bleeding diathesis.
5. Pre-existing neurological or spinal diseases, mental retardation, neuromuscular disorder.
6. Patients with H/o cardiac, respiratory, renal or hepatic failure.

7. Patient's refusal.

#### Sample size:-

All 60 patients were divided into two groups:

#### Group TAP:

TAP block with inj. Ropivacaine (0.2%) 20 ml on each side.

#### Group P:

I.V. ANALGESIC (Paracetamol)

All patients were thoroughly assessed a day before surgery and screened for any associated medical illness. Routine investigations like hemoglobin estimation, platelets, blood sugar, serum creatinine estimation, chest X-ray and ECG were carried out.

Patients were also assessed for vitals like temperature, pulse rate (PR), blood pressure (BP), and respiratory rate (RR). Respiratory System, cardiovascular System and central Nervous System were also assessed. Airway assessment done by malampatti gradation. Spine examination done for skin changes, edema, injuries, surgical scars, deformities, mass/cysts and interspace.

All patients were made familiar with standard visual analogue score (VAS). All patients were informed about the benefits and adverse reactions of drugs under study and a written informed consent was taken and surgery carried out on all the patients as per hospital rules and regulations. Preparation of patients included period of fasting for 6 hrs. On the day of operation, all the patients were re-assessed in pre-operative-anesthesia room and basal vital data like PR, BP, RR and SPO<sub>2</sub> recorded.

#### Preparation in OT:

Baseline vitals- ECG, Pulse, Blood pressure, SpO<sub>2</sub>, Temperature

Monitoring- ECG, NIBP, SpO<sub>2</sub>, Temperature

Securing of an intravenous line with 18 or 20 gauge intravenous cannula and i.v fluids started accordingly. Pre-loading done with Crystalloid (Ringer Lactate) 15-20 ml/kg body wt.

#### Premedication:

Inj. Ondansetron 0.1 mg/kg IV 10 minutes prior to anaesthesia procedure.

#### Spinal Anaesthesia:

Under all aseptic and antiseptic precautions, subarachnoid block given with inj. Bupivacaine 0.5% (heavy) 3 ml in left lateral position using a 23-gauge Quincke spinal needle positioned at the L3-L4 interspace. Patients immediately turned to the supine position. Onset and level of sensory and motor block recorded. Sensory level checked with pin prick method and achieved between T8 to T10 segment. Intra-operative Blood pressure, Heart rate, SpO<sub>2</sub>, ECG and Respiratory rate monitored till the completion of surgery. Time of completion of surgery noted and at the end of surgery TAP block performed in group A while iv analgesic Paracetamol given in group B.

#### Technique of TAP block

Under all aseptic and antiseptic precaution area over the triangle of Petit was (lumbar triangle) painted and draped. The needle held at right angles to the coronal plane and once the skin barrier is breached (required a large force), the needle withdrawn back so that the tip lie just under the skin. The needle then advanced through the external oblique fascia and a pop sensation felt when the needle entered the

plane between external oblique and internal oblique. We looked for a 'bounce' of the needle on the fascia before feeling the pop.

Further advancement of the needle resulted in second 'pop' after it is passed through the internal oblique fascia in to the transversus abdominis plane. After careful aspiration to exclude vascular puncture, a test dose of 1 ml injected. Whenever substantial resistance is felt while giving injection, it is considered that the needle is not between fascial planes, and repositioning of the needle done. After a negative test, dose of 20 ml Ropivacaine 0.2% injected through the needle and signs of toxicity observed closely. The TAP block then performed on the opposite side using an identical technique if required.

#### Post operative

After this patient was transferred to the post anaesthesia care unit (PACU). The presence and severity of pain, vitals (pulse, NIBP, spo<sub>2</sub>) and complications assessed systematically. These assessments were performed in the PACU at 30 min, 1 hour, 2 hour, 4 hour, 6 hour, 12 hour & 24 h postoperatively. Pain severity measured using a visual analogue scale (VAS).



#### Visual analogue scale (VAS)

Rescue analgesic in form of injection of paracetamol was given when VAS  $\geq$  4 or patient's demand for pain relief. Time to first request of analgesia was recorded. Group B patients received I.v analgesic Paracetamol at end of surgery and subsequent doses then repeated 8 hourly, in between if patients required rescue analgesics they were given. For any complication and side effect patients were treated appropriately.

#### Patients were assessed for

- Additional analgesic requirement.
- VAS score at (0min, 30min, 1hr, 2hr, 4hr, 6hr, 12hr, 24hr).
- Complications (nausea, vomiting, hypoxia, hypotension, bradycardia,
- respiratory depression).

#### Statistics

All data were entered into excel spread sheet and analyzed by SPSS and GRAPHGPAD software. categorical variables (demographic parameters like sex, ASA physical status) were measured using PEARSON's chi square test. Normally distributed numerical variables such were analyzed using unpaired t test. Data was expressed as mean values  $\pm$  standard deviation (SD).

P value  $<$  0.05 was interpreted as statistically significant.

P value  $>$  0.05 was interpreted as statistically non-significant

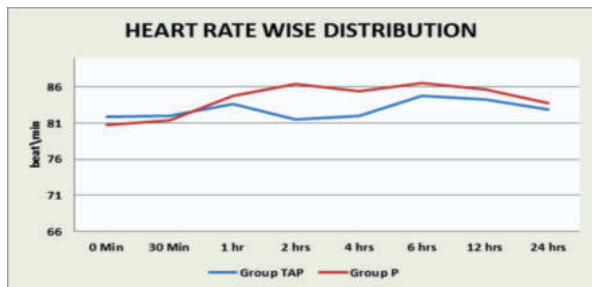
#### OBSERVATION AND RESULTS

In the present study 60 patients aged between 18-65 years of either sex belonging to ASA Grade 1-11, scheduled for lower abdominal surgeries under spinal anaesthesia were compared in a prospective and randomized manner after approval from Institutional Ethics Committee, B.J Medical College, Ahmedabad,

- All 60 patients were divided into two groups:

- Group A: TAP block with inj Ropivacaine (0.2%)20 ml on each side.
- Group B: I.V. ANALGESIC with inj Paracetamol (15mg/kg)

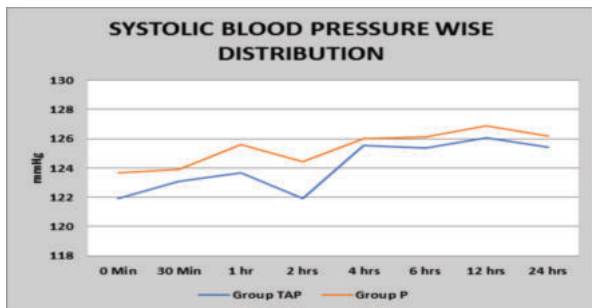
**Table 1: Heart Rate Wise Distribution**



(Statistical analysis done with t-test  $p < 0.05$  significant)

Graph 1 showing post-operative mean pulse rate changes in both the groups at different time intervals. There was no statistically significant pulse rate changes observed between TAP group and control group.

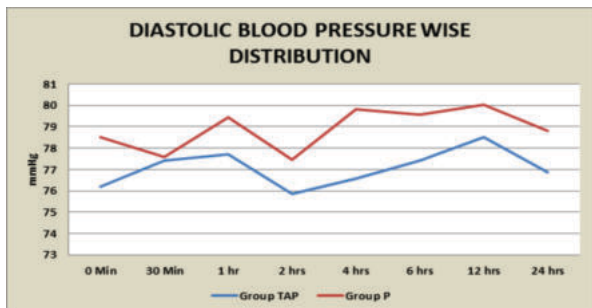
**Table 2: Systolic Blood Pressure Wise Distribution**



(Statistical analysis done with t-test  $p < 0.05$  significant)

Graph 2 showing change in mean systolic blood pressure changes in TAP group and Paracetamol group. There is no statistical significant difference in both the groups during all the time including at 30 min, 1, 2, 4, 6, 12, 24 hrs post operatively.

**Table 3: Diastolic Blood Pressure Wise Distribution**

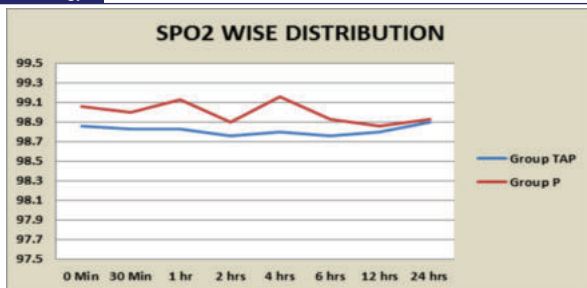


(Statistical analysis done with t-test  $p < 0.05$  significant)

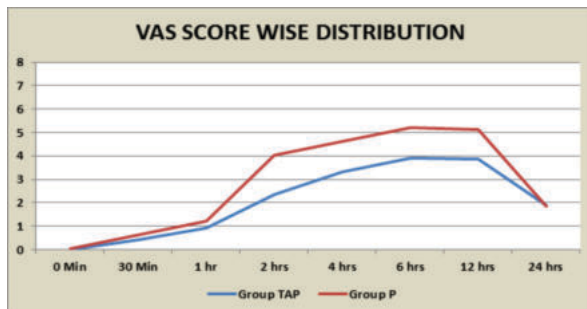
Graph 3 showing changes in mean diastolic blood pressure in TAP group and Paracetamol group. There is no statistical significant difference in both the groups during all the time including at 30 min, 1, 2, 4, 6, 12, 24 hrs post operatively.

**Table 4: Spo2 Wise Distribution**

- (Statistical analysis done with t-test  $p < 0.05$  significant)
- Graph 4 showing post-operative mean Spo2 changes in both the groups at different time intervals. There was no statistically significant change observed between TAP group and Paracetamol group.



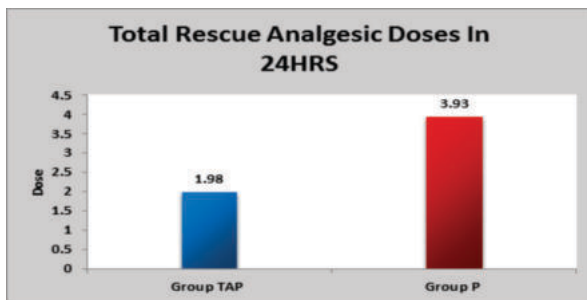
**Table 5: Vas Score Wise Distribution**



(Statistical analysis done with t-test  $p < 0.05$  significant)

Graph 5 showing changes in mean VAS pain score in TAP group and Paracetamol group in postoperative period. There is no statistical significant difference in both the groups initially up to 30 mins, 1 hr postoperatively. But after that the mean VAS score is consistently less in TAP group than Paracetamol group which was statistically significant at 2, 4, 6, 12 hrs. post operatively.

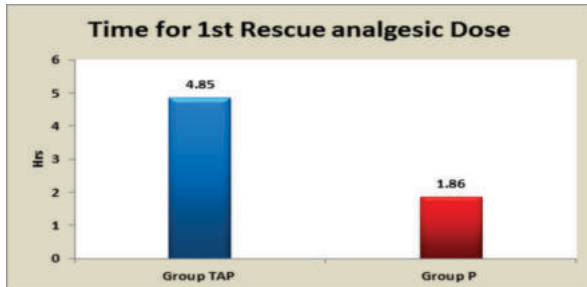
**Table 6: Total Rescue Analgesic Doses In 24 Hrs**



(Statistical analysis done with t-test  $p < 0.05$  significant)

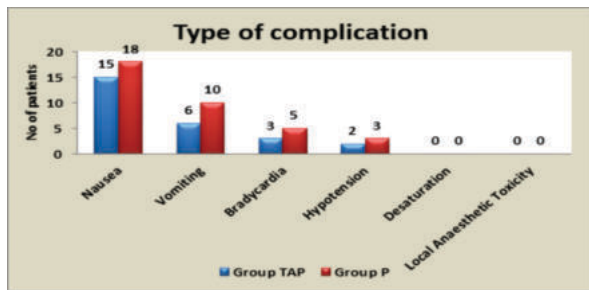
Graph 6 showing total number of analgesic doses consumption. mean total number of analgesics consumption is less in TAP group than in Paracetamol group which was statistically significant.

**Table 7: Time For 1<sup>st</sup> Rescue Analgesic Dose**



(Statistical analysis done with t-test  $p < 0.05$  significant)

Graph 7 showing mean duration of analgesia. mean duration of analgesia in TAP group is longer and statistically significant compared to Paracetamol group.

**Table 8: Post Operative Complications**

## DISCUSSION

The goal of pain management in a post-operative patient is to provide effective pain relief, to improve the perioperative outcome by promoting early ambulation and minimising opioid-related complications and to promote patient satisfaction. The current trends and evidence support the use of the multimodal approach and context-sensitive pain management as the most effective strategy to achieve optimal pain management. Poorly controlled post-surgical pain can lower the level of patients' satisfaction, delay their recovery and increase the costs of stay in hospital. Thus TAP block provides excellent analgesia for all lower abdominal surgeries.<sup>4</sup>

Post-operative pain control after any Gynecological & Obstetric surgeries especially caesarean section is a big challenge for obstetrician as it should address both for mother's comfort with equally no harmful-effects to the neonate. The neuraxial opioids provide excellent analgesia but those are associated with various adverse effects like feeling of nausea, vomiting and pruritis which can decrease patients' satisfaction. Our study demonstrated that ultrasound-guided TAP blocks decreased 24 hours post-operative pain intensity as well as analgesic requirement.<sup>2</sup>

TAP block is said to provide analgesia by blocking somatic component of pain thereby sparing the visceral component. Therefore, this limitation postmajor abdominal surgeries was thought to be overcome by supplementing with NSAIDs, paracetamol, tramadol, gabapentin, N methyl D- aspartic acid. antagonist. Patients undergoing extensive surgeries such as exploratory laparotomy and total abdominal hysterectomy, where there is large amount of tissue dissection and organ handling, the requirement for rescue analgesia despite TAP block was high. Whereas, requirement for rescue analgesia in the first 12 h post minimal tissue handling surg

## CONCLUSION

In our study, There is no statistically significant difference observed in demographic profile (age and weight). In Hemodynamic variables, there is no statistically significant difference in heart rate, Mean blood pressures (systolic, diastolic) and spo<sub>2</sub> in both groups at almost all the time postoperatively.

VAS scores were consistently low in TAP group than control group which were statistically significant at 2,4,6,12 hrs.

Duration of analgesia was longer in TAP group which was longer and statistically significant compared to control group.

Mean additional analgesic doses consumption as inj Paracetamol (15mg/kg) i.v. in 24 hrs post operatively was less in TAP group than in control group which was statistically significant.

We observed only bradycardia, hypotension, nausea and vomiting. No patient reported needle trauma, neural ischemia, inadvertent intravascular injection, local anaesthetic toxicity, convulsion, hypertension and infection.

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