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To Compare The Efficiency Of Ultrasound Guided Tranversus Abdominis Plane Block Versus Quadratus Lumborum Block For Post Operative Analgesia In Patients Under Going Lower Abdominal Surgeries.

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ABSTRACT
Pain is a complex phenomenon that includes both sensory, discriminative and motivational-affective components. The definition of pain as proposed by the international association for the study of pain emphasizes the complex nature of pain as a physical, emotional, and psychological condition[1]. It is one's fundamental right to be pain free.

It is needed to control postoperative pain as it plays a huge role in facilitating the patient's recovery towards normal function and reduces the incidence of physiologic and psychological effects associated with acute, uncontrolled pain. This shall be achieved by a variety of mechanisms, one of which is the use of interventional techniques.

With this background, we aimed to compare the efficiency of ultrasound guided tranversus abdominis plane block versus quadratuslumborum block for post operative analgesia in patients under going lower abdominal surgeries.

I. INTRODUCTION

Studies have found out that, more than 300 million patients undergo surgery globally each year. Of those 30% to 80%[2] of patients report moderate to severe pain in the days following surgeryand 20% developing chronic pain. Persistent pain not only affects the patient's recovery which in turn leads to longer hospital stay,but also adds to the psychological burden of the patient, and their family. For families and society, both the direct increase in hospitalization expenses and consumption of medical resources, and the consequent indirect decline of individual labor force and even unemployment, are issues that should never be underestimated[3].

At present, pharmacological analgesia remains the dominant modality for the treatment of postoperative pain. These can meet the requirements of short-term and rapid analgesia, but their side effects such as the addiction to opioids, the gastrointestinal harm and possible cardiovascular risks of non-steroidal anti-inflammatory drugs (NSAIDs) should also be considered.

The truncal nerve blocks, for post operative pain management, were brought into clinical practice over 40 years ago. In the beginning of the 21st century, the transversus abdominis block was introduced commonly in everyday practice, providing a much better analgesia. Initially, these blocks were performed without ultrasound guidance, using landmark techniques. However, the clinical use of truncal[4] block techniques have evolved over time and their expansion was driven by bringing in ultrasound into anesthesiology practice.

Quadratuslumborum block is basically a block of the posterior abdominal wall, "interfascial plane block" which is performed exclusively under ultrasound guidance. It was described by Dr. Rafael Blanco[5] an anesthesiologist as a variant of the transversus abdominis planeblock in 2007.

II. MATERIALS AND METHODS

The study design is a prospective, randomized, double-blinded, controlled trial.Primary objective being postoperative pain assesment by Visual Analogue Scale. Secondary objectives being Time taken and ease of administration of block, Hemodynamic stability, to observe inadvertent side effect if any.

This study was conducted in 58 patients undergoing lower abdominal surgeries at Stanley medical college and hospital Chennai. Both male and female patientsconsenting for surgeries in lower abdomen belonging to age above 18 years and below 60 years, ASA PS I and II Patient were included in the study.Exclusion criteria included patients refusal,patients with known allergic

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reaction to local anesthetics,hemodynamic instability,history of bleeding disorders and coagulation abnormalities, patients with significant neurological, psychiatric or neuromuscular disorders, hepatic, renal or cardiopulmonary abnormalities, parturient, breast feeding mothers, ASA PS III and IV Patients, infection at Needle insertion site.

58 patients were divided into two groups with 29 patients in each group GROUP T: Contains patients who will receive ultra sound guided transversus abdominal block given using 20ml of 0.25% bupivacaine, GROUP Q: Contains patients who will receive ultrasound guided quadratuslumborum block given using 20ml of 0.25% bupivacaine.

III. METHODOLOGY

After thorough pre anaesthetic evaluation in pre anaesthetic assessment clinic and explaining the procedure to the patients on the day before surgery, patients will be on nil per oral according to fasting guidelines. All patients will be investigated for Haemoglobin, leukocyte count, platelet count, Random blood sugar, Renal function test(urea, creatinine)and liver function tests, 12 lead electrocardiography (ECG) and chest X-ray . In the operating room temperature will be maintained at 23^0C.The method of visual analog scale as a method of pain rating will be explained to the patient prior to the surger.

IV. PROCEDURE:

In the preoperative waiting room baseline data like (PR, BP,SPO2, RR) were collected.

Both groups were explained about the procedures (SUBARACHNOID BLOCK ,QUADRATUS LUMBORUM and TRANSVERSUS ABDOMINIS PLANE Block) and postoperative follow up pattern. The Visual analogue score was explained. The investigator, patients and postoperative care physicians were blinded to group assigned.

Common to both groups are 18G IV Cannula was secured and preloading done with balanced salt solution. Under aseptic precaution, in sitting or lateral position subarachnoid block given with 0.5% Bupivacaine heavy using 25G Quincke's spinal needle to all the patients in both groups. Patient monitored intra-operatively and after the surgical procedure was over patients sensory level was assessed, once when the sensory level reached to t10, transversus abdominis plane or quadratuslumborum block was performed.

Both the blocks were performed with all sterile and safety precautions adhered to, using Ultrasound.

With a Linear Array Transducer at the level Anterior axillary line between 12^{th} rib and iliac crest, Ultrasound Guided Transversus abdominis Plane Block was performed in Lumbar Triangle Of Petit . The Drug of 20ml of .25% bupivacaine was given using a 23 gauge spinal needle in the plane between Internal Oblique Muscle and Transversus abdominis plane Muscle for transversus abdominal block.

For the quadratuslumborum block, the posterior approach was used. A wedge was placed beneath the buttocks to facilitate probe movement, thereafter the transducer was placed at the level of the anterosuperior iliac spine and moved cranially until clear visualisation and identification of the 3 abdominal wall muscles. then, the transducer probe was moved posteriorly until appreciation of the lumbar interfascial triangle covering the paraspinal muscle between the latissimus dorsi and quadratuslumborum muscles a 23 gauge spinal needle was inserted in the plane anterolaterally to posteromedially, local anesthetic was injected on the posterior surface of quadratuslumborum muscle, between the quadratuslumborum and erector spinae muscles. After negative aspiration a total of 20ml of .25% bupivacaine was given.The spread of injectate was observed ultrasonographically as placed between the thoroco lumbar facia and quadrates lumborum muscle .After completion of procedure patient was be shifted to post operative care room.

The duration of post operative analgesia is defined as the term (in hours) from giving of transversus abdominis plane block/ quadrates lumborum plane block to the first analgesic request in the post operative period will be recorded.

The degree of pain will be observed using a 10cm VAS (visual analog scale) in 2hr, 4hr, 6hr,8hr ,12hr,18hr,24hr.

"0" representing as no pain and "10" representing as worst pain.

The patient will be treated with inj.Tramadol 100mg IM on demand or if the VAS>=4.All the observation will made by anaesthesiologist who is not aware of group allocation and the block given.

V. OBSERVATION AND RESULTS

The collected data were analysed with IBM SPSS Statistics for Windows, Version 23.0. (Armonk, NY: IBM Corp).To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical

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variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the Independent sample t-test was used. To find the significance in qualitative categorical data Chi-Square test was used. In both the above statistical tools the **probability value 0.05 is considered as significant level.**

VI. DISCUSSION

Patients experience severe pain post operatively, that leads to a variety of complications. Due to pain and discomfort, patients often do not cough and face difficulty in carrying out their daily normal activities. Therefore providing, adequate postoperative analgesia is very vital.

This study showed that the duration of postoperative analgesia was longer in the quadratuslumborum group than in the transversus abdominis plane group. The duration of first dose of opioid consumption post operatively was higher in the quadratuslumborum group than in the transversus abdominis plane group.

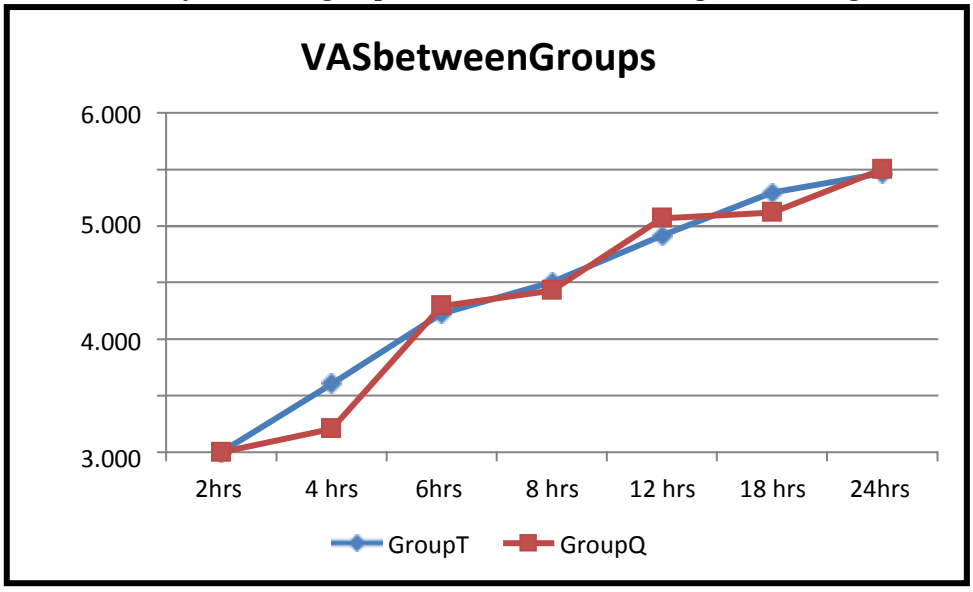
To date, regional blocks, act as an important link in multimodal analgesia,and is increasingly widely used for postoperative analgesia after abdominal surgery. transversus abdominis plane blocks and quadratuslumborum blocks belong to this treatment group category.

DURATION OF ANALGESIA AND VISUAL ANALOG SCORE

Variable	Groups	N	Mean	SD	t-value	p-value
Durationof Analgesia	Group T	29	355.0	24.2	18.741	0.0005 **
	Group Q	29	518.3	40.2		
**HighlyStatisticalSignificanceatp<0.01level						

Table1 DurationofAnalgesia betweentheGroups byIndependent samplet-test

ThemeandurationofsensoryblockadeingroupT is355±24.2minutes.
ThemeandurationofsensoryblockadeingroupQis518.3±40.2, thisshowshighstatisticalsignificance.



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VAS between Groups by Mann-Whitney U testat p > 0.05 level whereas in 8 hrs, 12 hrs shows statistical significance difference at p < 0.05 level and in 4 hrs, 18 hrs shows **highly statistical significance** difference at p < 0.01 level.
This result is in par with the studie done by Kumar GD, Gnanasekar N, Kurhekar P, Prasad TK[6]

Quadratuslumborum was more effective in providing visceral and somatic pain analgesia in comparision to transversus abdominis plane block this relates with study by Alansary , A.M., Kamaly, A.M.,Abdelhamid, H.S[7]

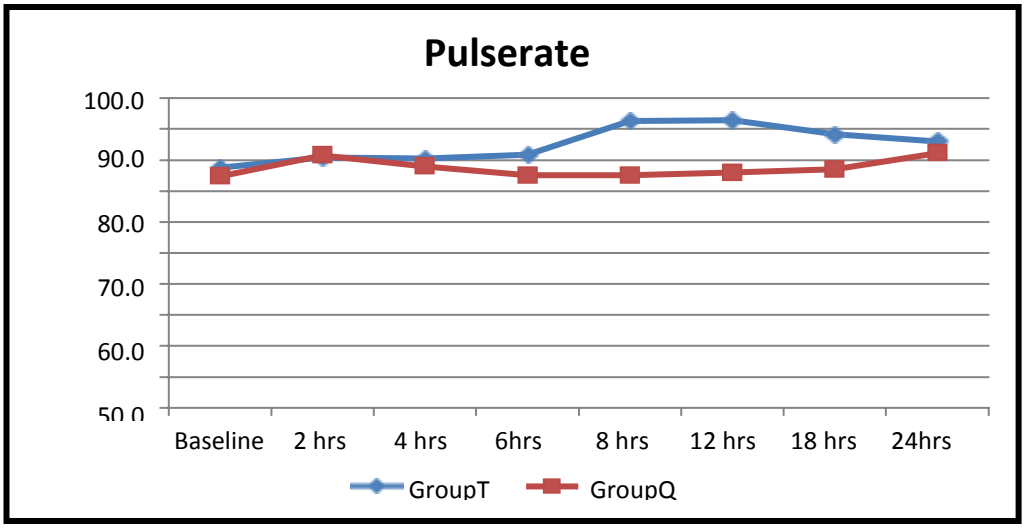
TIME TAKEN AND EASE OF PERFORMANCE OF BLOCK

Variable	Groups	N	Mean	SD	t-value	p-value
Time toPerformBlockIn Min	Group T	29	11.2	1.2	14.646	0.0005 **
	Group Q	29	16.0	1.3		
**HighlyStatisticalSignificanceatp<0.01level						

Table2:ComparisonofTimeto Perform BlockInMinbetweenthe Groups byIndependentsample t-test

The mean duration of performingblockingroupTis11.2±1.2minutes,theme an duration ofperformingblockingroupQis16 ±1.3minutes.Thisshows**highstatistical significance**.
During the study transversus abdominis plane block was considerably easier to perform and took a short duration to administer in comparison to quadratuslumborum block**This is in accordance to a meta analysis by K. El-Boghdadly,N. Desai,S. Halpern,L. Blake,P. M. Odor,S. Bampoe,B. Carvalho,P. Sultan[8].**

HAEMODYNAMIC STABILITY



The Pulse Rate between Groups by Independent sample t-test were Baseline, 2 hrs, 4 hrs shows no statistical significance difference at $p > 0.05$ level whereas in 6 hrs shows statistical significance difference at $p < 0.05$ level and in 8 hrs, 12 hrs, 18 hrs, 24 hrs shows highly statistical significance difference at $p < 0.01$ level.

The SBP between Groups by Independent sample t-test were except Baseline all other time durations shows no statistical significance difference at $p > 0.05$ level and in Baseline shows highly statistical significance difference at $p < 0.01$ level.

The DBP between Groups by Independent sample t-test were except 2 hrs all other time durations shows no statistical significance difference at $p > 0.05$ level and in Baseline shows highly statistical significance difference at $p < 0.01$ level.

This is similar to the study done by Ali Mohamed Ali Esmail in 2020[7]where the hemodynamic stability was comparable in both groups.

SIDE EFFECTS

In terms of side-effects for 24 hours, transversus abdominis plane block and quadratuslumborum block was associated with a reduced incidence of postoperative nausea and vomiting as well as sedation.

This is similar to study conducted by K. El-Boghdadly,N. Desai,S. Halpern,L. Blake,P. M. Odor,S. Bampoe,B. Carvalho,P. Sultan[8].

VII. CONCLUSION

Quadratuslumborum block provides a longer duration of analgesia when compared with transversus abdominis plane with minimal sedation and minimal usage of rescue analgesia with significant changes in hemodynamic parameters without any complications.

Ultrasound guided transversus abdominis plane block was easier to perform when compared to quadratuslumborum block.

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