



Anaesthesiology

COMPARATIVE STUDY OF 0.2% LEVOBUPIVACAINE VERSUS 0.2% LEVOBUPIVACAINE WITH DEXMEDETOMIDINE IN ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POST OPERATIVE ANALGESIA IN LOWER ABDOMINAL SURGERIES
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ABSTRACT

Background And Aims: The Transversus Abdominis Plane block is a new rapidly expanding regional anesthesia technique that provide analgesia following Anterior abdominal wall surgeries. The Aim of this study to evaluate effect of adding adjuvant (dexmedetomidine) to 0.2% levobupivacaine in the study of Ultrasound guided TAP block for Post operative Analgesia in lower abdominal surgeries".

Materials & Methods: A prospective, randomised double-blinded study enrolled total 60 patients, of more than 18 years of age and ASA Class I & II of either sex divided into two groups.

1. Group L- TAP Block using Levobupivacaine alone,

2. Group D- TAP Block with Levobupivacaine + dexmedetomidine.

Patients conducted under General Anaesthesia. After the completed lower abdominal surgery they were given Ultrasound Guided Transversus Abdominis Plane block for post operative analgesia.

Results: A total of 60 patients were analyzed, onset time of analgesia was late in group L (12.06±1.94min) Vs group D (9±1.67min) (P<0.0001), duration of analgesia was longer in group D (15.1±1.86 h) Vs group L (9.83±1.66 h) (p<0.0001), the VAS Score at rest was lower in D Group Vs L Group at 8, 12 & 24 hours. patient satisfaction with postoperative analgesia was better in D Group. Number of Rescue analgesia in 24 hours was more in group L (3.53±0.97) Vs D group (1.8±0.88) (p<0.0001).

Conclusion: Addition of Dexmedetomidine into Levobupivacaine in USG guided TAP Block increases the onset quality and duration of analgesia and reduce post-operative analgesic requirements.

KEYWORDS : Transversus abdominis plane block, USG Guided, Levobupivacaine, Dexmedetomidine.

INTRODUCTION

Pain is "an unpleasant sensory and emotional experience associated with actual and potential tissue damage"[1]. One of the main demands for patients in post operative period is adequate analgesia. Adequate post-operative analgesia is likely to contain stress response following surgery, decrease post-operative morbidity, and facilitate improved surgical outcome[2]. Numerous modalities have been used to alleviate pain after lower abdominal surgeries, which include non-steroidal anti-inflammatory drugs, opioids, Dermal patches, multimodal analgesia[3] & Transversus abdominis plane (TAP) block. TAP Block inhibits abdominal neural afferents by introducing LA (Local anesthetics) into the neurofascial plane between the internal oblique and transversus abdominis muscles.

.Transversus abdominis plane block is a widely used modality of postoperative analgesia and it was first described by Kuppavelumane et al in 1993[4]. With the widespread availability of ultrasound for more accurate localisation of TAP (than the 'blind' technique), the TAP block is now established as an important technique for reduction of post-operative pain following abdominal surgeries.[5]

Levobupivacaine is an amide, long acting local anaesthetic, (t_{1/2}) = 3.3 hrs. Levobupivacaine is a safe and efficacious multimodal analgesic regimen for postoperative pain after surgery.

Prolongation of the analgesic effect and duration of block can be achieved by adding adjuvant like Dexmedetomidine, Clonidine etc. Adding adjuvant into local anesthetics increases their efficacy & quality and duration of block without increasing the dose of local anesthetics.

Dexmedetomidine has become one of the commonly used drugs in anesthesia practice

It is a lipophilic α -methylol derivative with a high affinity for α 2 receptors (α 2 : α 1 specificity ratio is 1600:1) and has a short half-life (2-3 h). Dexmedetomidine, a selective α 2 adrenergic agonist. Dexmedetomidine has been also applied in adjunct to peripheral nerve blocks.[6]

The aim of the present study was to evaluate the quality and duration of analgesic effect of Dexmedetomidine mixed with Levobupivacaine in TAP block for lower abdominal surgeries.

MATERIAL AND METHODS

After approval from ethical committee, the study was conducted at S.R.N. Hospital, associated to Moti Lal Nehru Medical College Prayagraj (Allahabad). This study was conducted on the 60 adult patients (30 patients in each group) of either sex belonging to American society of anaesthesiology (ASA)[7] Grade I & II, aged 18 to 65 years, requiring general anaesthesia for elective lower abdominal surgery. During preanaesthetic visit a complete pre anaesthetic checkup was done. After careful explanation and discussion, written informed consent was obtained from each patient or guardian.

After the completed lower abdominal surgery patient were given Ultrasound Guided Transversus Abdominis Plane block for post operative analgesia.

The Inclusion Criteria:

1. Patients of either sex undergoing lower abdominal surgery.
2. Age: 18-65 yrs.
3. ASA physical status: I & II

The Exclusion Criteria :

1. Patient refusal/Un-cooperative patients.
2. Bleeding disorder/coagulopathy
3. Allergy to any of the study drugs.
4. Local infection at the site of injection.
5. Hepatic or renal insufficiency

All patient were randomly allocated into two groups, 30 members in each with 1:1 allocation ratio using computer-generated random numbers. Group L : Patients is given 20 ml Levopivacaine 0.2% with 1ml normal saline (total 21ml). Group D : Patients given 20ml Levobupivacaine 0.2% with 0.5 mcg / kg Dexmedetomidine (total 21ml).

A pre-operative visit was conducted to collect patient history.clinical

examination was performed,including complete blood count (CBC),coagulation profile,Liver function tests,renal function tests,chest x-ray PA view and electrocardiography.patients were counselled how to assess pain using visual analogue scale(VAS[8].The patient were assessed thoroughly and explained about the anaesthetic procedure in pre-operative room, I.V. access secured and Intravenous Fluid started. On arrival in the operation theatre, base line monitors were attached .

Patients were premedicated with Inj. Glycopyrrolate 0.01 mg/kg, Midazolam 0.02 mg/kg ,fentanyl 1µg/kg,ondansetron 4mg iv .Preoxygenation for 3 minutes and Intravenous induction with Inj. Propofol 2.0 mg/kg i.v., muscle relaxant Succinylcholine 1.5mg/kg iv for endotracheal intubation.intermittant positive pressure ventilation started. Loading dose of non-depolarising muscle relaxant vecuronium (0.08 mg/kg) i.v. is given. Anaesthesia was maintained with Oxygen and Nitrous oxide with Isoflurane 1-1.5% and Vecuronium (0.01mg/kg).The ventilator settings were adjusted to keep Etco2 between 35 & 40 mmhg. After completion of surgery, patient was reversed with appropriate dose of Neostigmine (0.05 mg/kg) with Glycopyrrolate (0.01 mg/kg) i.v following that tracheal extubation was done, patient was placed in lateral position, cleaning & draping was done and under all aseptic conditions, the ultrasound guided (SonoSite, micromaxx) transverses abdominis plane block was given.

The Technique :

A linear ultrasound probe (Micromaxx L38e/5-10 MHZ) was placed transversely on abdomen between costal margin and iliac crest in the mid-axillary line . The probe were slided anteriorly or posteriorly in a cephalo-caudal direction until a clear image of the three lateral abdominal muscle (external oblique, internal oblique and transverses abdominis) and transverses Abdominis plane were visualized. An 18G Tuohy needle was introduced from antero-medial position to the posterior& lateral direction with entry point in the skin being 2cm away from the probe. The needle trajectory proceeded in a antero-posterior direction using in- plane technique ,after confirming the transverses abdominis plane,in Group-L patient use 20 ml 0.2% Levobupivacaine plus 1 ml normal saline (Total 21 ml) was injected in Real time.

In Group-D patient, using same technique with 20 ml 0.2% Levobupivacaine with 0.5 mg/kg Dexmedetomidine (Total 21 ml) injected in plane.

The above drugs will be used to compare the onset, quality and duration of postoperative analgesia in patients undergoing lower abdominal surgeries. The Monitoring of heart rate, ECG , blood pressure and SpO2 continuously preoperatively and intraoperatively at 5 minutes interval.All the patient were observed in postoperative recovery room for post operative sedation and for duration of analgesia upto 24 hour. The patient were assessed for pain based on VAS score. Tramadol, 2 mg/kg i.v. was used as a rescue analgesic in patients who had VAS score >4_ postoperatively.Comparability of groups was analyzed using student “t” test. Microsoft Excel 2010 and statistical software plug-ins used appropriate to test the significance of data. For all statistical analysis, the value of P<0.05 was considered significant and value of P<0.001 was considered highly significant.

OBSERVATION :

The observations were tabulated as follows:

- 1- Demographic data of patients
- 2- Heart rate
- 3-Mean arterial blood pressure
- 4-Onset of Analgesia
- 5.Duration of analgesia
- 6.Visual Analogue Score At 8,12 & 24 Hours
- 7.Number Of Rescue Analgesia In 24 Hour

Universal pain assessment tool

This pain assessment tool is intended to help patient care providers assess pain according to individual patient needs. Explain and use 0–10 scale for patient self-assessment. Use the faces or behavioral observations to interpret expressed pain when patient cannot communicate his/her pain intensity.

	0	1	2	3	4	5	6	7	8	9	10
Vertical descriptor scale	No pain	Mild pain	Moderate pain	Moderate pain	Severe pain	Severe pain	Severe pain	Severe pain	Severe pain	Severe pain	Worst pain possible
Wong-Baker facial grimace scale											
Activity tolerance scale	No pain	Can be ignored	Interferes with tasks	Interferes with concentration	Interferes with basic needs	Interferes with basic needs	Interferes with basic needs	Interferes with basic needs	Interferes with basic needs	Interferes with basic needs	Bedrest required

Table.1.Comparison Of Demographic Characteristics And Duration Of Surgery Between The Groups:

Demographic Characteristics and Duration of surgery	GROUP L	GROUP D	P VALUE
	(n=30)	(n=30)	
Age in years	34.15 ± 11.01	32.78 ± 11.04	0.632
Gender(male/ females)	24/6	21/9	1
BMI(Kg/m2)	23.59 ± 3.67	22.53 ± 3.23	0.239
ASA Grade(I/II)	26/4	28/2	0.615
Duration of surgery(mins)	63.92 ± 13.21	70.65 ± 14.15	0.061

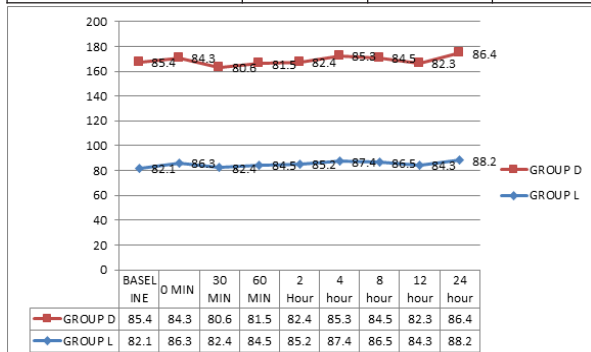


Figure.1. Comparison Of Heart rate between two group:

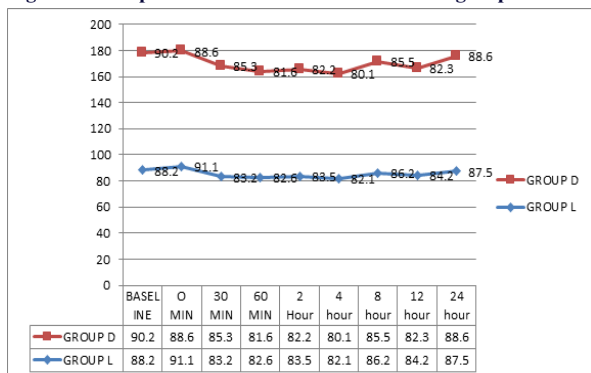


Figure.2. Comparison Of Mean Arterial Pressure Between Two Group

Table.2. Intra-operative opioid consumption, time of onset of analgesia,durationof analgesia,total no of rescue analgesia in 24 hours:

Variable	Group L	Group D	P Value
Intra-operative fentanyl consumption(µg)	139.2± 10.1	132.4±12.2	P=0.0221
Time of onset of analgesia(min)	12.06±2.45	9.0±1.67	P<0.0001
Duration of analgesia (Hours)	9.38±1.66	15.1±1.86	P<0.0001
Number of rescue analgesia in 24 hours	3.53±0.97	1.8±0.88	P<0.0001

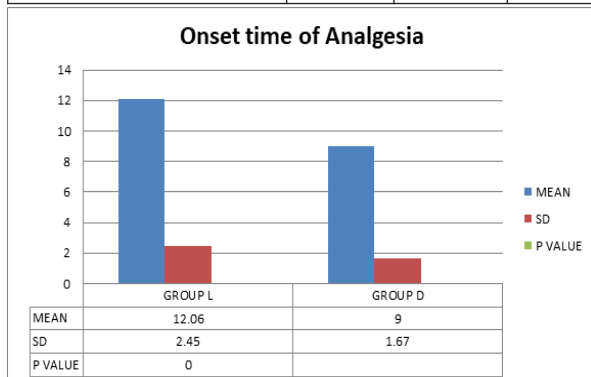


Figure.3. Comparison Of Onset Of Analgesia In Two Group: Inference-onset time of analgesia was more in group L compared to group D, statistically more significant.(P<0.0001)

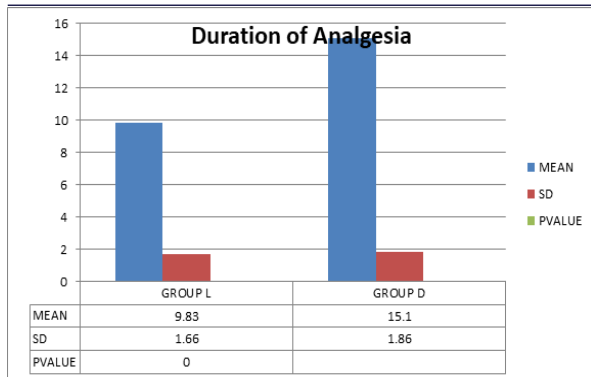


Figure:4. Comparison Of Duration Of Analgesia : Inference-Duration of analgesia was longer in Group D compared to Group L, Statistically highly significant (P<0.0001)

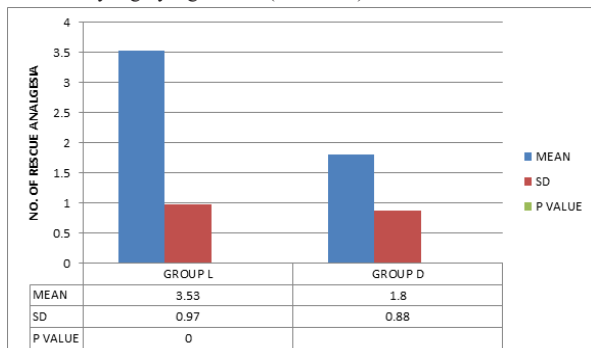


Figure:5. Number Of Rescue Analgesia In 24 Hour Inference-number of Rescue Analgesia in 24 hours was found more in group L (p<0.0001)

Table:3. Comparison of VAS score in both group:

N=30	GROUP L	GROUP D	P VALUE
8HOURS	1.2±0.34	0.89±0.24	P=0.0001
12HOURS	1.82±0.26	1.54±0.36	P=0.001
24HOURS	3.03±0.67	2.47±0.36	P=0.0002

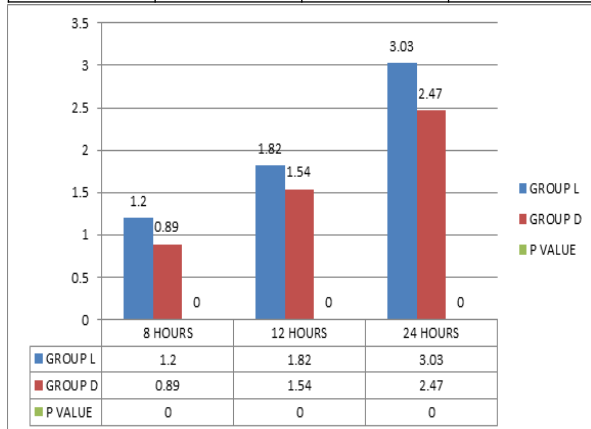


Figure:6. VAS Score at 8,12 & 24 Hour Inference-statistically (p<0.05) significant difference in VAS score among two groups at 8,12 & 24 hours.

RESULT :

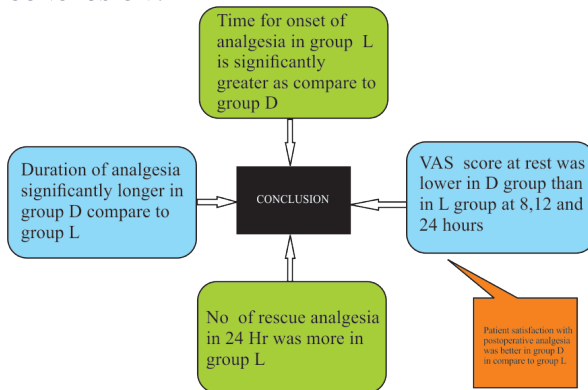
- There was no significant difference seen in demographic parameters.
- The hemodynamic parameters were comparable and found to be statistically insignificant.
- The onset time of analgesia & Duration of analgesia between the groups was significant.
- The difference in VAS and in the analgesic consumption of rescue drug used between the 2 groups was significant in first 8,12 & 24 hrs.
- Patient satisfaction was significantly more among Levobupivacaine and Dexmedetomidine combination in

comparison to Levobupivacaine alone.

DISCUSSION:

- In this study, Quality of analgesia, Time of onset of analgesia, Duration of analgesia, mean VAS score, Time taken for first rescue analgesia were found to be significantly better in group D than group L.
- Abdelaal et al conducted a study evaluated the addition of dexmedetomidine to levobupivacaine in preemptive TAP block for postoperative pain management after abdominoplasty, they reported levobupivacaine group had lower pain score, less need of postoperative 24 hour analgesia, this was similar to our study.
- Singh et al used bupivacaine alone and clonidine with bupivacaine for TAP block following caesarean delivery in 100 women, they reported longer duration of postoperative analgesia, lesser consumption of diclofenac & higher patient satisfaction score found in bupivacaine+clonidine group.
- Mohapatra PI et al in the study of comparison between Levobupivacaine and Levobupivacaine with Clonidine after Ultrasound-Guided Transversus Abdominis Plane Block in Patients Undergoing Lower Segment Cesarean Section, find out The addition of clonidine in levobupivacaine in TAP block significantly increases the duration of postoperative analgesia, decreases postoperative rescue analgesic requirement, and increases maternal comfort compared to levobupivacaine alone, this result was similar to our study.

CONCLUSION :



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