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COMPARATIVE STUDYOF LEVOBUPIVACAINE 0.25% AND ROPIVACAINE 0.25% IN USG GUIDED B/L TAP BLOCK IN ABDOMINAL SURGERIES

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ABSTRACT

Introduction: A substantial component of pain experienced by patients after surgery is derived from incision made in the abdominal wall. **Aim:** To compare levobupivacaine 0.25% and ropivacaine 0.25% in USG guided B/L TAP block in abdominal surgeries for post operative analgesia. **Methods:** a Prospective randomized, comparative study conducted on 40 patients of ASA grade I and II of age 18 to 60 years undergoing elective abdominal surgery under general anaesthesia in Department of Anaesthesia, Sardar Patel Medical College and A.G. of hospitals, Bikaner during July 2022 to December 2022 after taking approval from institutional ethical committee and valid written informed consent from patient and their close relatives. At the end of the surgery USG guided TAP block was performed bilaterally in supine position via midline approach with probe placed transversely to the abdominal wall between the costal margin and iliac crest. Post operative pain will be assessed using the VAS score & was recorded at the 30th min,60 min, 90 min, 3rd hour, 6th hour, 9th hour, 12th hour, 24th hour both at rest & when coughing. **Results:** demographic factors like patient age, weight, gender, and ASA status were all comparable across both the study groups. Mean heart rate showed a statistically significant(p=0.0001) increase in mean heart rate (beats/min) of 90.4 ± 18.79 in Group R at 6 hrs post-operative period. Total analgesia required was significantly more in group R than group L (75±54.11 vs 120±37.69) (p=.004). The mean VAS score of both the groups did not show any significant difference except at the time period of 6 hrs and 24 hrs at rest, and mean patient satisfaction score (out of 10) was 8.3±0.80 in group L and 7.1±0.85 in group R (p value of 0.0001). **Conclusion:** levobupivacaine in present study had superior postoperative analgesia compared to ropivacaine in terms of longer duration of analgesia, with reduced analgesia requirement and better patient satisfaction in terms of pain relief.

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Keywords: levobupivacaine, ropivacaine, postoperative analgesia.

Introduction: Regardless of amelioration in perioperative care, major surgical operations are still followed by sequelae such as pain, organ dysfunction and prolonged convalescence. Pain is the most dreaded problem which a person fears after any surgery. A substantial component of pain experienced by patients after surgery is derived from incision made in the abdominal wall. The transversus abdominis plane (TAP) local anaesthetic block is an analgesic technique that has become increasingly popular over the last decade and involves the infiltration of local anaesthetic in the plane between the internal oblique and transversus abdominis muscles.[1] TAP block was first introduced by Rafi et alas a landmark guided technique.[2] Over last few years, the most popular development that has occurred is the use of ultrasound guidance to improve the accuracy for drug deposition into the correct plane. The use of ultrasound for the same improves not only the success rate but accuracy of the block as well as simultaneously preventing potential complications.

The proposed benefits of TAP block include the avoidance of neuraxial analgesic techniques and their associated risk, as well as a reported reduction in opioid & NSAIDs consumption.[3]

With increase use of TAP block over time we have seen a significant difference with use of local anaesthetic and the concentration of local anaesthetic in the effects & outcome of the block. As seen with Bupivacaine which is when used in TAP block provides longer duration of action but has been shown to have selective cardiac effects related to the slow rate at which it dissociates from the sodium channel, which poses a concern. An important aspect of this toxicity is that it involves a significant degree of stereo- specificity, i.e. 'R' isomer is more cardiac toxic than 'S' isomer(levobupivacaine). Ropivacaine is another local anaesthetic which is used in TAP block,it is a new amino amide local anaesthetic and it exists as an S-enantiomer. It has low systemic toxicity than Bupivacaine. Hence, we have decided to evaluate and compare 0.25% levobupivacaine & 0.25% ropivacaine in USG guided B/L TAP block for postoperative analgesia in abdominal surgeries.

AIM : To Compare levobupivacaine 0.25% and ropivacaine 0.25% in USG guided B/L TAP block in abdominal surgeries for post operative analgesia.

METHOD: This study was a Prospective, randomized , comparative study conducted on 40 patients of ASA grade I and II of age 18 to 60 years undergoing elective abdominal surgery under general anaesthesia in Department of Anaesthesia, Sardar Patel Medical College and A.G. of hospitals, Bikaner during July 2022 to December 2022 after taking approval from institutional ethical committee and valid written informed consent from patient and their close relatives. Patient Scheduled for elective abdominal surgery, American Society of Anesthesiologists (ASA) Physical Status 1-II and whose Age is greater than or equal to 18 years to 60 years were included. Patients who refused to give their consent , Chronic opioid use (opioid use in the past 3 months) Patient on SSRIs, SNRIs, gabapentin, or pregabalin , Inability to communicate pain scores or need for analgesia, Infection at the site of procedure, Intolerance or allergy to local anesthetics, Neurologic deficit or disorder, Blood thinning disorder or taking anticoagulant medication were ruled out. Patients were randomly assigned into two groups. After taking valid informed written consent all eligible patients were interviewed about their demographic details, assess for general, physical & systemic examination, vital parameters and lab investigation. Routine investigations were done. Pre-anaesthetic check up was done a day prior

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to surgery for all the cases. Patient is kept nil by mouth for minimum of 6-8 hours before surgery. Visual analogue scale (VAS) for pain was explained to every patient at the time of pre-anaesthetic evaluation and was recorded. All patients were taken up for general anaesthesia. All Patients vital parameters were monitored patients were pre medicated with I/V Glycopyrrolate & Inj. Fentanyl 2 mcg/kg. Peri operative vitals were recorded. Induction was done. Peri- operative vitals were recorded. At the end of the surgery USG guided TAP block was performed bilaterally in supine position via midline approach with probe placed transversely to the abdominal wall between the costal margin and iliac crest. Post operative pain will be assessed using the VAS score & was recorded at the 30^{th} min,60 min, 90 min, 3^{rd} hour, 6^{th} hour, 9^{th} hour, 12^{th} hour, 24^{th} hour both at rest & when coughing.

Statistical analysis: The data was compiled in MS Excel and was analyzed in SPSS version 26. Chi square test and fisher exact test was used for analysis of categorial variable and students t test used for analyzing grouped data. The p - value of <0.05 was considered to be significant.

RESULT:

The mean age of patients was 39.6 (± 14.48) in Group L and 44.88 (± 13.12) in Group R respectively (p=0.234). Both male and female participants were included in our study with an equal distribution of male and females with ratio being 1:1.

Table 1: Age wise distribution of cases

Age (Year)	**Group L**		**Group R**		**P value**
	No.	%	No.	%	
18 – 30	6	30.00%	5	25.00%	0.237
31 – 40	4	20.00%	4	20.00%	
41 – 50	4	20.00%	5	25.00%	
51 – 60	6	30.00%	6	30.00%	
Mean ±SD	39.6 ± 14.48		44.88 ± 13.12		

The mean BMI (Kg/m^2) of patients was 24.85 (± 2.29) in Group L and 23.83 (± 2.10) in Group R respectively (p>0.05). We included both ASA-I/II in our study. 60% of ASA-I in Group L & 65% ASA-I in Group R. In group L mean duration was 174 ± 3.69 min. whereas 180 ± 6.66 min. in group R (p>0.05)

Table 2 : Distribution of cases according to duration of surgery

Duration of surgery (in min.)	**Group L**	**Group R**
Mean ± SD	178 ± 3.69	180 ± 6.66
p Value	0.247	

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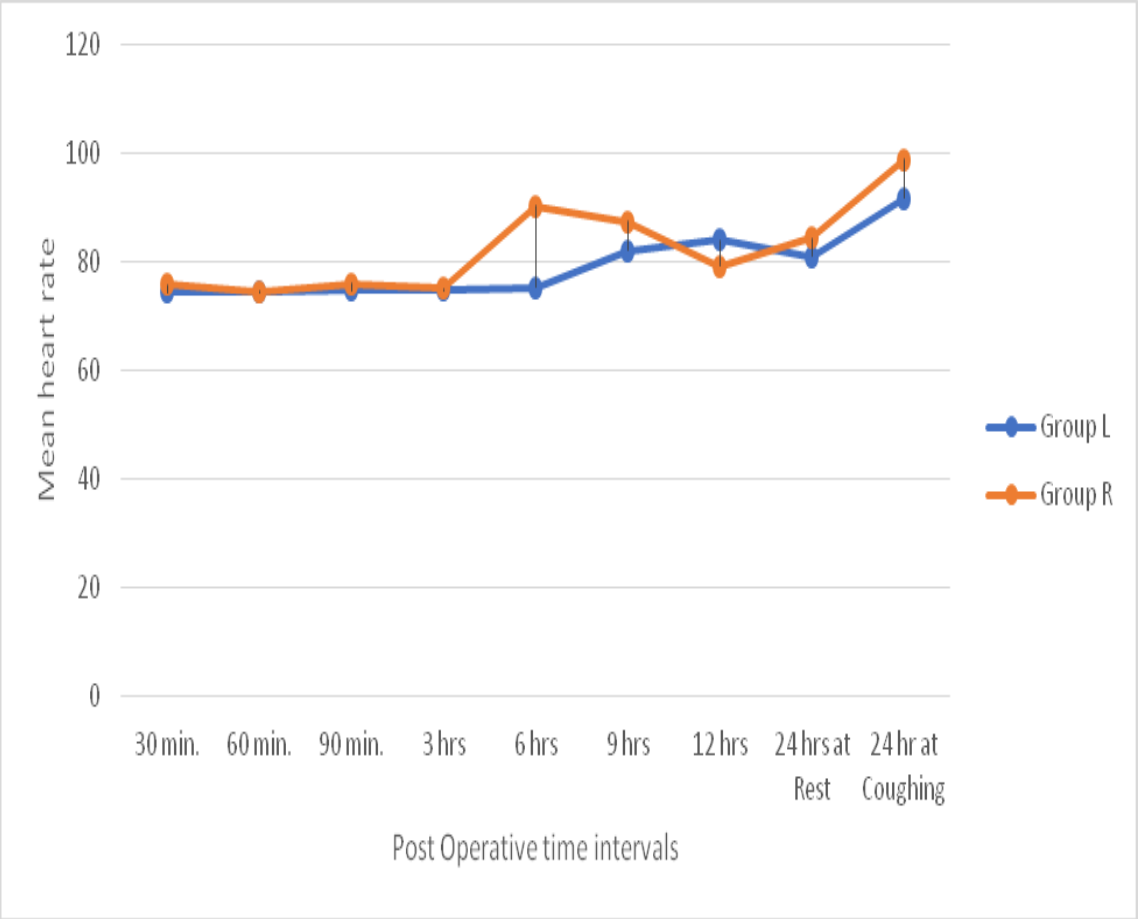
On comparing mean MAP intraoperatively the results were statistically insignificant. An increase from baseline is seen at the time of intubation but the change is <20%. No significant difference was seen between intraoperative Mean Heart Rate and SpO2 among both groups at different time intervals.

Mean heart rate showed a statistically significant(p=0.0001) increase in mean heart rate (beats/min) of 90.4 ± 18.79 in Group R at 6 hrs post-operative period . Over the time period mean heart rate in both the groups increased from baseline, maximum being at 24hrs at rest and coughing though statistically insignificant (p< 0.05)

Fig.1 Mean heart rate



The mean arterial pressure in the post operative period was compared in both the groups L & R over 24 hours. And we observed an increase in mean value of MAP at 6 hrs from baseline for Group R i.e. 81.3 ±8.57 which is statistically significant when compared with Group L 74.55±2.874 , p value=0.002.Also there was an increase in mean values of MAP from baseline at 24 h on coughing with mean MAP of Group L is 80.55 ± 7.81 & 87.7 ±11.59 for Group R with p=0.028.

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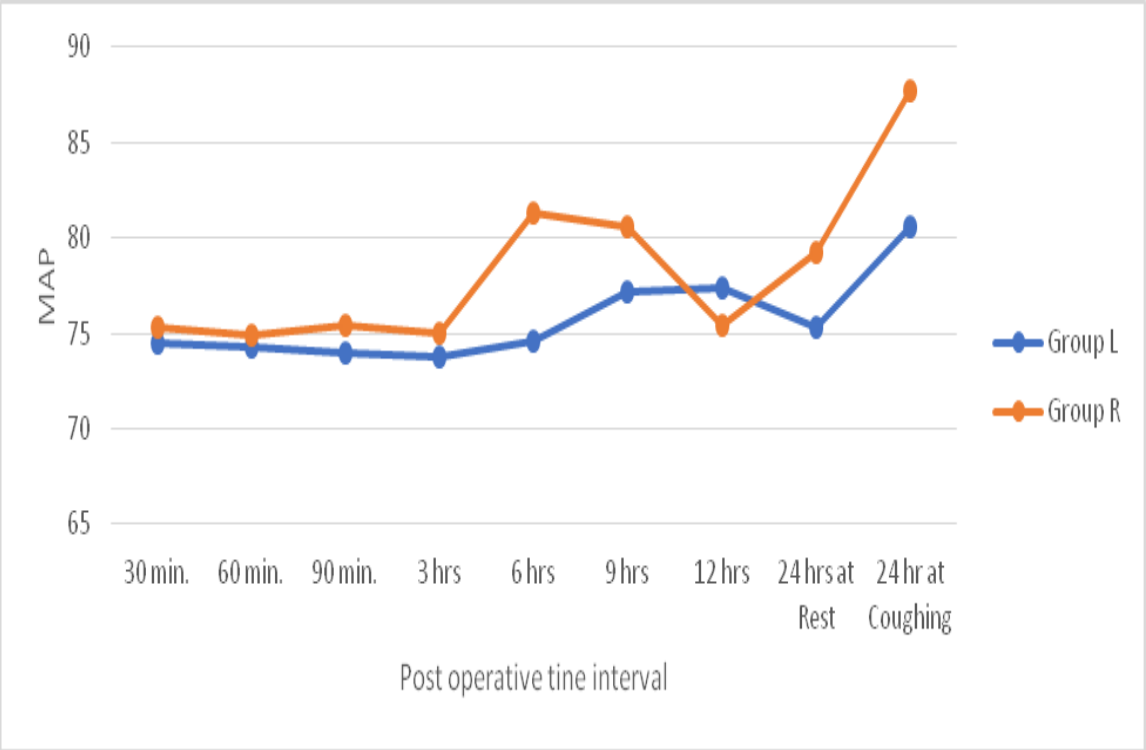
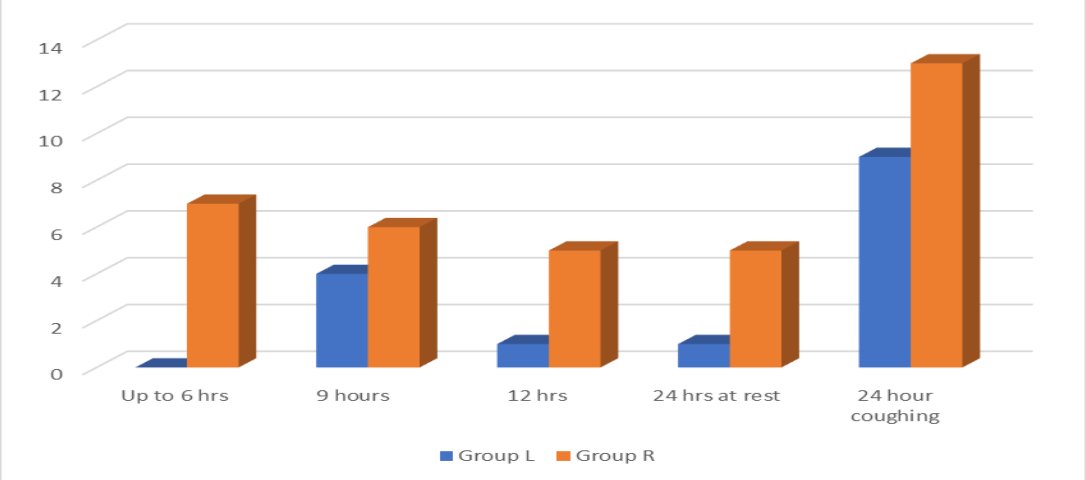
Fig. 2 Mean Arterial Pressure



The mean SpO_2(%) was recorded in both the groups L and R for 24 hours in the postoperative period and we observed no significant change between both the groups .

The requirement of rescue analgesia was greater in group R then L at all the time interval however it was statistically significant at 6 hours.

Fig. 3 Time to Rescue Analgesia



No significant differences was seen between time required for first rescue analgesia between both groups however it was more in group L than group R. Total analgesia required was significantly more in group R than group L (75±54.11 vs 120±37.69) (p=.004).

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Table 3. Analgesia required and time for rescue analgesia

Variable	**Group L**		**Group R**		**p-value**
	Mean	SD	Mean	SD	
Time for first rescue analgesic(in hours post operatively)	13.20	9.151	12.60	7.823	0.825
Total Analgesia consumption(in mg)	75.00	54.411	120.00	37.697	0.004

The mean VAS score of both the groups did not show any significant difference except at the time period of 6 hrs and 24 hrs at rest, with mean VAS scores of 1.9±0.78 and 3.15±0.74 for group L and R respectively at 6hrs($p = 0.0001$) & 2.3±0.80 and 3.5±0.51 for groups L and R respectively at 24hrs at rest($p = 0.0001$).

Table 4: VAS Score

VAS	**Group L**		**Group R**		**P value**
	Mean	**±SD**	**Mean**	**±SD**	
30 min.	1.15	0.366	1.20	0.4	0.68
60 min.	1.35	0.489	1.55	0.510	0.214
90 min.	1.65	0.587	1.80	0.523	0.399
3 hrs	1.85	0.587	1.95	0.605	0.599
6 hrs	1.90	0.788	3.15	0.745	0.000*
9 hrs	2.65	0.988	2.80	1.105	0.653
12 hrs	2.70	0.979	2.15	0.875	0.069
24 hrs at Rest	2.30	0.801	3.50	0.513	0.000*
24 hr at Coughing	3.40	0.754	3.60	0.503	0.330

The mean patient satisfaction score (out of 10) was 8.3±0.80 in group L and 7.1±0.85 in group R showing a statistically significant better patient satisfaction score in group L with p value of 0.0001.

Table 5 : Post operative patient satisfaction score among the groups

Patient satisfaction score	Group L	Group R	P value
Mean ± SD	8.3 ± 0.80	7.1 ± 0.85	0.0001*

DISCUSSION:

In our study, demographic factors like patient age, weight, gender, and ASA status were all comparable across both the study groups. Furthermore, there was no discernible difference in the duration of surgery; between the two study groups. Additional intraoperative hemodynamic parameters were comparable across the two groups. This is consistent with the study of **Kumar et al.**[4]

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in our study, there was an increase in mean value of MAP from baseline for Group R at 6 hour (p value=0.002) & there was an increase in mean value of MAP in Group R at 24 h on coughing(p=0.028). During the observation in post operative period mean heart rate increased from baseline at 6 hour for Group R (p=0.001), similarly reported by **Goyal et al**[5] and **Sahu et al**[6].

Regarding the postoperative pain it was observed that the mean VAS score of both the groups at the time period of 6 hrs and 24 hrs at rest was statistically significant, with mean VAS scores of 1.9±0.78 and 3.15±0.74 for group L and R respectively at 6 hrs(p = 0.0001) & 2.3±0.80 and 3.5±0.51 for groups L and R respectively at 24hrs at rest(p = 0.0001). We have found the superiority of TAP block in providing immediate postoperative analgesia reflected by a lower VAS score. The results of the study were in accordance with the study done by **Gupta A et al**[7] and **McDonnell et al**.[8] The pain score in a study by **Sahu et al**[6] in Group Levobupivacaine was less than Group Ropivacaine; however, the difference was non significant .

Our study was in accordance with study done by **Sahu et al**[6] that the time to first rescue analgesia was earlier in Group Ropivacaine when compared to Group Levobupivacaine, with 35% of patients in Group Ropivacaine requiring rescue analgesia dose in first 6 hours of post op period, which was statistically significant (p=0.004).

In present study the total analgesia (Inj. Diclofenac dose in mg) required was significantly more in group Ropivacaine than group Levobupivacaine (120±37.69 vs 75±54.11). which is in accordance with findings of **Sahu et al**[6]. The present study found levobupivacaine to have superior analgesia to ropivacaine in terms of longer duration of analgesia, and lesser number of patients requiring earlier rescue analgesia as compared to ropivacaine.

The mean patient satisfaction score (out of 10) was 8.3±0.80 in group L and 7.1±0.85 in group R showing a better patient satisfaction score in group L with a p value of 0.0001. This also has come similar to findings of **Sahu et al**[6]**.**

CONCLUSION: Bilateral TAP block with 0.25% ropivacaine (15ml on each side) or 0.25% levobupivacaine (15 ml on each side) provided adequate analgesia postoperatively in patients undergoing abdominal surgeries. However, levobupivacaine in present study had superior postoperative analgesia compared to ropivacaine in terms of longer duration of analgesia, with reduced analgesia requirement and better patient satisfaction in terms of pain relief.

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