Original Article

ERA'S JOURNAL OF MEDICAL RESEARCH VOL.9 NO.2

DOI:10.24041/ejmr2022.25

HEMODYNAMICS EFFECT OF BUPIVACAINE AND LEVOBUPIVACAINE IN PAEDIATRIC ABDOMINAL SURGERIES

Vinod Devidasrao Digraskar, Prem Raj Singh, Sukriti Xess, Akansha Jain, Dnyanesh Kashikar

Department of Anaesthesiology

King George's Medical University, Lucknow-226003

Received on : 02-03-2022
Accepted on : 21-10-2022

Address for correspondence

Dr. Vinod Devidasrao Digraskar
Department of Anaesthesiology
King George's Medical University,
Lucknow-226003.
Email: digraskarviny01@gmail.com
Contact no: +91-8999593861

ABSTRACT

Regional analgesia features a prime role within the multimodal analgesia approach for surgical pain management. currently each day it's common apply of using transverses abdominis plane block (TAP Block) with numerous sorts of native anaesthetics and adjuvants, as a multimodal pain relieving remedy used worldwide for intra and postoperative pain management in several surgeries. However, only a few studies are done wherever hemodyanamics effects when bupivacaine versus levobupivacaine have compared. Aim of this study to examine the consequences of bupivacaine vs levobupivacaine in patients undergoing lower abdominal surgeries and their effects on hemodynamics (the blood pressure, HR, and SpO2). Method: A randomised double-blind management study conducted when approval from IEC Ref. code-92nd IIB Thesis / P4 . The study has fifty patients, with ASA I – II physical status, as well as each sex and 2-10 years cluster age and who set up for abdominal surgery notably lower abdominal . 25 patients set in every group and every which way allotted: cluster Bupiva and Levobupiva . All patients were well well-read regarding the procedure, drugs, and effects of drugs, and untoward complications. well-read written consent was taken from each patient before involving them within the study. primary objective is to examine the impact of those medicine on Blood pressure, HR, and SPO2 & Secondary objective was to check rescue physiological condition reduction within the surgical period. After the comparison between these 2 clusters, The mean SBP of group Bupiva was found below that of group Levobupiva . and located to be important at fifteen min, one hour, a pair of hr, and four hr and insignificant at baseline zero min, thirty min, half dozen hr (p=0.092), twelve hr, eighteen hr, and twenty four h.differences is insignificant in comparison the DBP at any purpose of your time from baseline to 24 hr. On comparing the center rate, variations were found insignificant from baseline (p = 0.897), 0 min (p = 0.651), 30 min (p = 0.096), 1hr (p = 0.192), 2 hr (p=0.390), four hour (p=0.525), half dozen hr (p=0.469), twelve hr (p=0.443), eighteen hr (p=0.288) to twenty four hr (p=0. 390) except at fifteen min (p=0.010) that was the mean pulse rate of cluster Bupiva is over that of group Levobupiva at one,5 min. On comparison the SPO2differences were insignificant at baseline (p = 0.620), 15 min (p = 0.108), thirty min (p=0.353), 1 hr (p = 0.789), 2 hr (p = 0.364), 4 hr (p = 0.292) and 6 hr (p = 0. 198) however important at 0 min (p = 0.002), 12hr (p = 0.012), 18hr (p = 0.002) and24 hr (p = 0.028) wherever the mean SPO2 of cluster Bupiva was abundant below the group Levobupiva. Stable hemodynamics for a extended period were provided by Levobupivacaine as compared to Bupivacaine.

KEYWORDS: Bupivacaine , Levobupivacaine, Hemodynamic, Transversus Abdominus.

INTRODUCTION

Pain throughout and when surgery in any people ought to be treated. Pain is an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage defined by IASP. Morbidity during this age group is high as inability to specific the severity and sort of pain by childrens. Nerve block techniques by PNS and USG target-hunting block are being done to manage these conditions. anaesthesia may be a epoch would like and is being practiced worldwide in each paediatric and adult anesthesia providing higher quality and longer period of pain free while not the risk of respiratory depression. 1 block nerves activity the area to be operated on may be a convenient approach for analgesia. block the nerve of the anterior wall by anesthetic within the trasnvrses plane provides stable hemodynamics postoperatively. McDonnell et al. in 2004,2 initial describes tap block and Hebbard et al.3described sonography (USG)-guided technique. In lower abdominal surgeries USG-guided tap block have higher pain relief .4 This block is introduced by Rafi the in 2001,by the triangle of Petit.5 that was a landmark target-hunting technique where target is

space between transversus abdominis and internal oblique muscle. As sensory nerves to the anterolateral abdominal wall by T6-L1 Spinal roots that originate and runs in tap plane.6 Drug spreads and block neural afferents and providing pain free period. Ultrasound-guided tap block is currently a selection because of its period imaging, safety outcome, and reliability. As we will try this accurately by characteristic structures, positioning the needle, and drug spread, which improves success rate of block, speedy result , and fewer medicine volume. 7-9 Levobupivacaine is an alternate which may be a comparatively safe and smart quality drug for multimodal analgesia which facilitate to keep up stable hemodynamics than bupivacaine. 10 In present study we are going to attempt to compare hemodynamic result of those medicine on within the paediatric age group.

MATERIALAND METHODS

A randomised Double-Blind control trial that was administrated by the Department of anesthesia, conducted in paediatric surgery operation theater, at KGMU, Lucknow. to match the hemodynamics impact Bupivacaine and Levobupivacaine once given under USG guide in tap plane in those that are planned for Lower Abdominal Surgery under 2-10 years age bracket. Patient with ASA I & II , age group 2-10yr . Patients parents, relatives are well advised concerning study medicine as all patients are paediatric. Written consent was taken patient before together with them into the study.

Study duration:

- 1 year (August 2018 to July 2019).

Study design:

- Randomized control trial- Double Blind.
- Compares the hemodynamic effects of Bupivacaine and Levobupivacaine in 2- ten years age cluster population who set up for lower Abdominal Surgery with the utilization of USG. TAP block.

Primary Objective:

- Compare the effect these two drugs on Blood pressure,HR, SPO2 **Secondary objectives:**
- Necessary of rescue analgesia in the postoperative period.

OBSERVATION & RESULTS

Sample Size - 50

(25 in each group)

25 subjects Group-Bupiva (Bupivacaine used)

25 subjects- Group-Levobupiva (Levobupivacaine used)

Results found:

For cluster Bupiva mean age 5.16±1.97 years whereas for group Levobupiva 5.22±1.93 years. Insignificant distinction within the mean ages of the 2 teams (p - 0.914). No important difference in mean weights (p- 0.814).The mean weight for group Bupiva was 18.60 ± 6.25 weight unit while for the group-L was 19.04 ± 6.86 kg.

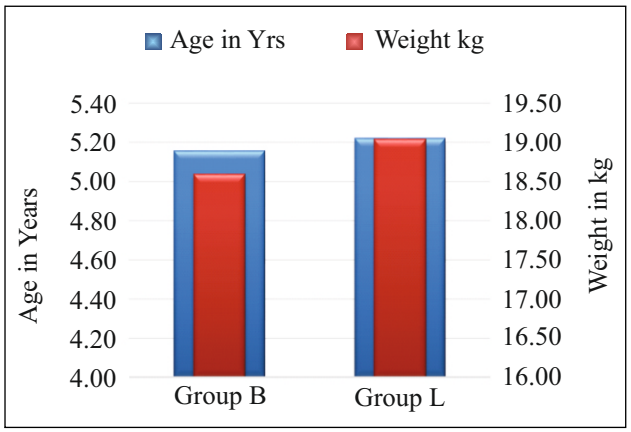

Fig. 1: Showing Distribution of Cases According to Age & Weight

HR	Bupiva		Levobupiva		t-value	p-value
	Mean	SD	Mean	SD		
Pre Op	92.32	7.78	92.56	4.94	-.130	.897
0 min after TAP block	124.88	11.32	123.56	9.09	.455	.651
15 min	111.20	9.05	103.88	10.33	2.665	.010
30 min	101.60	7.59	98.04	7.21	1.700	.096
1 hrs	99.24	7.29	94.56	16.10	1.324	.192
2 hrs	97.04	7.63	95.20	7.38	.867	.390
4 hrs	96.40	7.88	95.04	7.10	.641	.525
6 hrs	92.80	18.04	95.72	8.69	-.729	.469
12 hrs	101.52	8.05	99.80	7.68	.773	.443
18 hrs	105.16	7.47	102.72	8.56	1.074	.288
24 hrs	106.64	7.49	104.64	8.77	.867	.390

Table 1: Comparison of Heart Rate

Significant distinction was found to be at fifteen min (p- 0.010) wherever the mean rate of cluster Bupiva was more than the group Levobupiva and insignificant variations found at baseline (p- 0.897), 0 min (p- 0.651), thirty min (p- 0.096), 1hr (p-0. 192), a pair of 60 minutes (p- 0.390), four hr (p- 0.525), half dozen hr (p- 0.469), twelve hr (p- 0.443), eighteen hr (p- 0.288) and twenty four hr (p- 0.390). This shows Levobupivacaine has higher haemodyanamic stability when block than Bupivacaine.

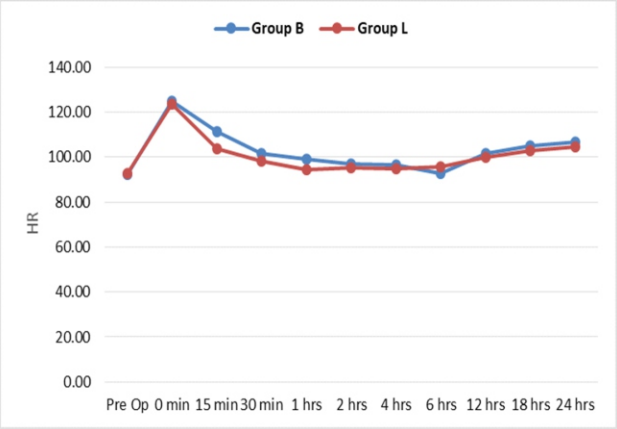

Fig. 2: Showing Comparison of Heart Rate

SBP	Bupiva		Levobupiva		t-value	p-value
	Mean	SD	Mean	SD		
Pre Op	107.08	9.33	109.12	8.42	-.812	.421
0 min after TAP block	119.64	15.36	125.20	11.46	-1.451	.153
15 min	110.20	10.07	117.48	12.12	-2.309	.025
30 min	104.20	7.83	108.52	9.50	-1.755	.086
1 hrs	99.48	8.97	105.08	9.73	-2.116	.040
2 hrs	97.44	8.70	104.00	8.74	-2.659	.011
4hr	97.32	9.36	102.80	9.04	-2.106	.040
6 hrs	98.52	10.31	103.40	9.76	-1.719	.092
12 hrs	100.76	11.86	104.96	12.96	-1.195	.238
18 hrs	103.24	11.81	108.48	14.71	-1.389	.171
24 hrs	105.56	11.92	111.32	15.16	-1.494	.142

Table 2: Comparison of SBP

significant distinction found at fifteen min (p- zero.025), one 60 minutes (p- 0.040), two hr (p- 0.011), four hr (p- 0.040) wherever the mean SBP of cluster Bupiva was a lot of below the group Levobupiva ,non important variations at baseline (p- 0.421), 0 min (p- 0.153), thirty min (p- 0.086), vi hr (p- 0.092), twelve hr (p- 0.238), eighteen hr (p- 0. 171) and twenty four hr (p- 0.142). .This conjointly shows the steadiness of haemodynamic with Levobupivacaine.

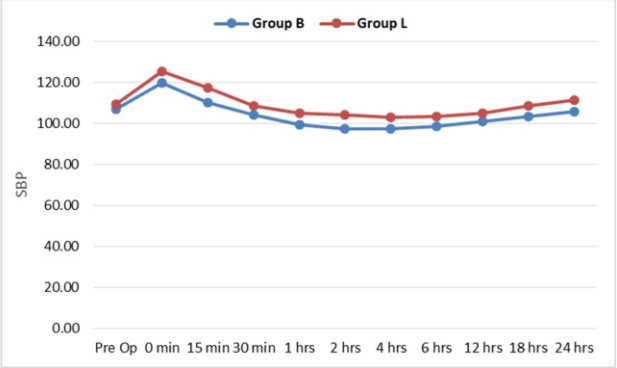

Fig. 3: Showing Comparison of SBP Between the Groups

DBP	Bupiva		Levobupiva		t-value	p-value
	Mean	SD	Mean	SD		
Pre Op	63.36	5.43	63.12	7.35	.131	.896
0 min after TAP block	68.16	9.17	69.40	9.15	-.479	.634
15 min	62.80	6.42	67.20	7.58	-2.215	.032
30 min	60.48	6.94	63.60	7.64	-1.511	.137
1 hrs	58.24	6.60	61.12	7.39	-1.453	.153
2 hrs	56.04	6.89	59.24	6.91	-1.640	.108
4 hrs	55.68	7.55	57.20	6.75	-.750	.457
6 hrs	55.88	7.33	58.44	7.71	-1.203	.235
12 hrs	56.28	7.75	60.56	7.82	-1.943	.058
18 hrs	59.20	6.43	61.20	7.55	-1.008	.318
24 hrs	58.84	5.97	61.92	8.27	-1.510	.138

Table 3: **Comparison of DBP between the Groups**

comparing DBP , non important variations at baseline (p- 0.896), 0 min (p- 0.634), thirty min (p- 0.137), one hour (p- 0.153), two hr (p- 0.108), four hr (p- 0.457), vi hr (p- 0.235), twelve hr (p- 0.058), eighteen hr (p- 0. 318) and twenty four hr (p- 0.138) and distinction becomes significant at fifteen min (p - 0.032) wherever the mean DBP of cluster Bupiva was under the group Levobupiva.

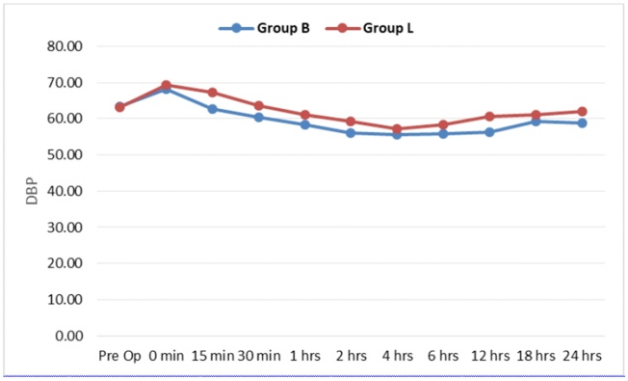

Fig. 4: Showing comparison of DBP

SPO2	Bupiva		Levobupiva		t-value	p-value
	Mean	SD	Mean	SD		
Pre Op	99.60	0.65	99.68	0.48	-.499	.620
0 min after TAP block	96.84	1.25	98.12	1.51	-3.269	.002
15 min	97.52	0.82	97.96	1.06	-1.640	.108
30 min	97.76	1.01	98.04	1.10	-.938	.353
1 hrs	98.64	1.08	98.72	1.02	-.270	.789
2 hrs	98.84	1.14	99.08	0.64	-.916	.364
4 hrs	95.20	17.81	99.00	1.04	-1.065	.292
6 hrs	98.28	1.31	98.72	1.06	-1.306	.198
12 hrs	97.84	1.25	98.68	1.03	-2.596	.012
18 hrs	97.64	0.99	98.52	0.87	-3.326	.002
24 hrs	97.72	0.89	98.24	0.72	-2.266	.028

Table 4: Comparison of SPO_2 Between the Groups

Comparison of the SPO2, distinction found vital at zero min (p- 0.002), one2hr (p- 0.012), 18hr (p- 0.002) and twenty four hour (p- 0.028) wherever Bupiva cluster have less mean SPO2 than the group Levobupiva . And non significant variations were found at baseline (p- 0.620), fifteen min (p- 0.108), thirty min (p- 0.353), 1 hr (p- 0.789), a pair of hr (p- 0.364), 4 hr (p- 0.292) and half-dozen hr (p- 0. 198) showing Levobupivacaine maintains higher vital organ that bupivacaine.

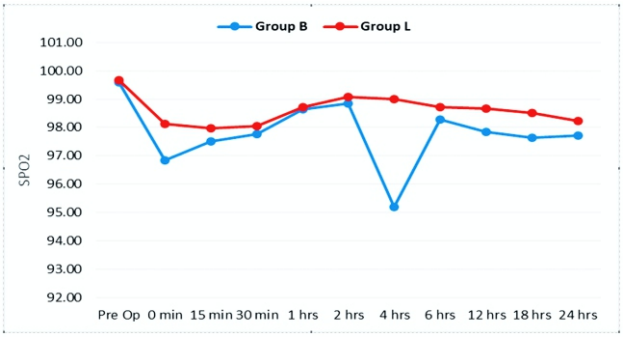

Fig. 5: Showing Comparison of SPO2

Rescue analgesia was required at six 60 minutes and afterwards. the specified proportion of rescue analgesia in Bupiva cluster at 6 hr and twelve hr is above Levobupiva group, and therefore the distinction at 12 hr was found to be important (p- 0.001). that shows Levobupivacaine has higher analgesia than Bupivacaine.

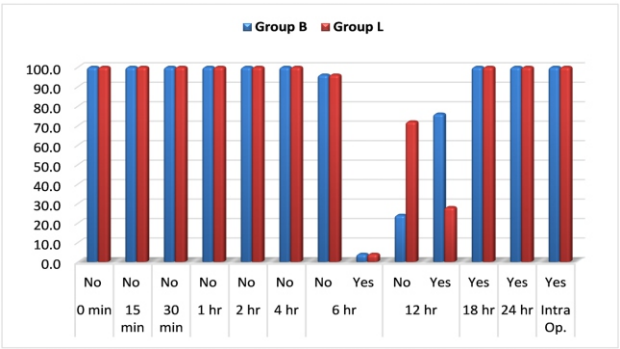

Fig. 6: Time interval for Analgesia After Block

DISCUSSION

This is often run randomized control trial study conducted by the Anaesthesiology Department, King George's Medical college, Lucknow cases drained the department of paediatric Surgery. Primary aim of the study is to match the hemodynamic parameters once Levobupvacaine associate degreed Bupivacaine in tap block and secondary to examine a reduction in rescue analgesia. tho' general anesthesia is deeply used technique in pediatric and adults but anaesthesia is an adjuvant each} intraop. and post operation pain analgesia.3 Caudal epidural block was one in every of the safest and most generally used techniques in pediatric analgesia for each infraumbilical and supraumbilical surgical procedures having the most disadvantage is period of action.4 many studies incontestible that tap block was simply performed with the use of ultrasound and has been delineate as an efficient technique for assuaging operative pain and reduces analgesic consumption post surgery. 5,6,11 the tap block terribly effective in providing postoperative analgesia and reduction in analgesic demand for 1st twenty four h has been shown in adults.5,7 we have a tendency to had done this study to match the analgesic effectiveness of tap block using Bupivacaine and Levobupivacaine in pediatric age group(2-10yr) and to envision its effects on hemodyanamics.. optimum pain free was a vital side of adequate recovery when major surgery. when completion of surgery we have a tendency to inject LA in transversus plane, with the assistance of ultrasound, then, the patient reversed from relaxant and extubated . Then shifted to the post-Anesthesia are unit. within the present study, the post-operative pain was accessed by taking help of FLACC score, with its zero-10 score range, by a unsighted observer at the time of shift from Operation theatre and then at 0 min, one hour, two hr, four hr, half dozen hr and twenty four hr for the primary 24 h post-operative.

Merkeil *et al*[12] studies show FLACC pain assessing score offers an easy live to quantifying pain in children who are unable to specific presence or severity of pain. vital sign comparison between the clusters, distinction was found vital at fifteen min having p = zero.010. wherever the mean heart rate of group Bupiva have higher mean heart rate than the group Levobupiva and difference is insignificant at baseline (p = 0.897), 0 min (0.651), thirty min (0.096), one hr (0.192), a pair of hr (0.390), four hr (0.525), six hr (0.469), twelve hr (0.443), eighteen hr (0. 288) and twenty four unit of time (zero.390).Pain could also be the rationale for raised vital sign within the Bupiva cluster that may be attributable to time took by the drug to act . Showing bupivacaine take longer to act than Levobupivacaine. Seyedhejazi M et al 13found in their study, the mean heart rate showed statically unimportance distinction in the 2 teams per and post surgery and recovery, thus study neither supports nor opposes this study. scrutiny the SBP , insignificant variations were found at baseline (p=0.421), 0 min (0.153), thirty min (0.086), six hr (0.092), 12 unit of time (0.238), eighteen hr (0.171) and twenty four hr (0.142). the distinction become vital at fifteen min (0.025), one hr (0.040), 2 hr (0.011), and 4 hr (0.040) wherever the mean SBP of cluster Bupiva was below the group Levobupiva .Whereas on scrutiny DBP, difference is insignificant at 15 min (p-0.032) thats DBP mean of group Bupiva was lower than the Levobupiva and this could be

attributable to chance, no significant variations were found at baseline (0.896), zero min (0.634), thirty min (0.137), 1 hr (0.153), 2 hr (0.108), 4 hr (0.457), six hr (0.235), twelve hr (0.058), 18 hr 318) and twenty four unit of time (0.138). however this distinction was vital at fifteen min (p = 0.032). A study by L.Seyedhejazi M et al[13] founds no statistical important variations within the mean heartbeat blood and pulse pressure at completely different times before and once surgery in the 2 clusters. an oversized sample size study is required to validate the blood pressure changes. Shin DJ et fourteen study SBP, DBP, and vital sign found to be hyperbolic considerably after application skull pin head holder that was diminished by Levobupivacaine applied regionally .. Çnar SÖ et fifteen infiltration wound with levobupivacaine after induction as well as postoperatively provide pain and strain free interval after hernia repair. the on top of study supports this study by reducing hemodynamic responses however the route is native infiltration. On examination the SPO2, variations were insignificant at baseline (p 0.620), fifteen min (p 0.108), thirty min (p 0.353), one hour (p 0.789), two hr (p 0.364), four hr (p = 0.292) and vi hr (p = 0.198). however become important at 0 min (p = 0.002), twelve hr (p = 0.012), eighteen hr (p = 0.002), and twenty four hr (p = 0.028) wherever the SPO2 mean of cluster Bupiva were lower than the group Levobupiva which might be due to pain inflicting SPO2 to be in lower facet than in group Bupiva. any work required to be allotted for the same. In the conducted study, time, since rescue analgesia needed in 1st twenty four hour, at half-dozen hr & twelve hr and therefore the the} required proportion in cluster Bupiva was considerably quite the group Levobupiva and the distinction in proportion at 12 hr, was found to be important (p = 0.001). Study conducted by Raghunath P et al, uses 0.25% levobupivacaine for faucet block that provides pain free amount for 8 hrs post surgery and also reduction in analgesic. In Faiz SHR et al and Imani F et al study, faucet block was found to be a good way of treating pain post-surgery. That additionally facilitate to reduces opioid use, that reduces period of hospital stay, infection and costs. Raghunath P et al found within their study , half the concentration of levobupivacaine rather than bupivacaine in tap block for open appendectomy, and reveals opiate requirement and pain scores attenuated in 24hours. Armando j et al got insignificant distinction in terms of decreased opioid consumption. The This study shows Levobupivacaine had been used and located important physiological condition needed in the bupivacaine cluster at 6hrs and 12hrs. In Yildirim A, et al study, wherever they compare the same medication in patients planned for lap chol and located that analgesic demand was same quantity in each groups. The time to the initial analgesics was less in Levobupiva (4.35 ± 6.92 min vs. 34.91 ± 86.26min, p - 0.013). VAS score levels shows insignificant variations terminal Bupivacaine and levobupivacaine showed similar effectuality in laparoscopic cholecystectomy patients. There study oppose this study in terms of VAS score that is higher and there study neither supports nor oppose in terms of the ultimate result as they found no distinction in efficacy in both the drugs. Dalia M E et al2, study shows that necessities of medication like anti-inflammatory and paracetamol were reduced in patients who have tap block. USG guide faucet block having cephalad spread sensory block most likely accounted for the reduction in FLACC scores at 2, 4, 6, 8, 10, 12, 16, 18, 20, and twenty four h postoperatively and lower analgesic requirement.

CONCLUSION

we concluded that levobupivacaine once utilized in ultrasound, target-hunting transverses abdominus plane is an honest analgesic agent with higher hemodynamic stability than bupivacaine.

REFERENCES

1. Gupta R, Singh S. Challenges in Paediatric laparoscopic surgeries. Indian J Anaesth. 2009; 53(5): 560-566
2. McDonnell JG, O'Donnell BD, Tuite D, et al. The regional abdominal field infiltration (R.A.F.I.) technique: Computerized tomographic and anatomical identification of a novel approach to the transversus abdominis neurovascular fascial plane. Anesthesiology. 2004; 101: A899.
3. Hebbard P, Fujiwara Y, Shibata Y, et al. Ultrasound guided transversus abdominis plane (TAP) block. Anaesth Intensive Care. Anaesth Intensive Care. 2007; 35(4): 616-617
4. Yu N, Long X, Lujan-Hernandez JR, et al. Transversus abdominis-plane block versus local anesthetic wound infiltration in lower abdominal surgery: A systematic review and meta-analysis of randomized controlled trials. BMC Anesthesiol. 2014;14:121.
5. A.N. Rafi. Abdominal field block: a new approach via the lumbar triangle. Anaesthesia. 2001; 56(10): 1024-1026.
6. W.M. Rozen, T.M.N. Tran, M. W. Ashton, et al. Refining the course of the thoracolumbar nerves: a new understanding of the innervation of the anterior abdominal wall. Clin Anat. 2008; 21(4): 325-333.

7. Casati A, Danelli G, Baciarello M, et al. A prospective, randomized comparison between ultrasound and nerve stimulation guidance for multiple injection axillary brachial plexus block Anesthesiology. 2007; 106(5): 992-996.
8. Grau T. Ultrasonography in the current practice of regional anaesthesia. Best Pract Res Clin Anaesthesiol. 2005; 19(2): 175-200.
9. Marhofer P, Greher M and Kapral S. Ultrasound guidance in regional anaesthesia. Br J Anaesth. 2005; 94(1): 7-17.
10. Ishida T, Sakamoto A, Tanaka H, et al. Transversus abdominis plane block with 0.25% levobupivacaine: a prospective, randomized, double-blinded clinical study. Journal of anesthesia. 2015; 29(4): 557-561.
11. Mishra M, Mishra SP. Transversusabdominis plane block: The new horizon for postoperative analgesia following abdominal surgery. Egypt J Anaesth. 2016; 32(2): 243-247.
12. Merkel SI, Voepel-Lewis T, Shayevitz JR, et al. The FLACC: a behavioural scale for scoring postoperative pain in young children. Pediatr Nurs. 1997; 23(3): 293-297.
13. Seyedhejazi M, Daemi OR, Taheri R, et al. Success rate of two different methods of ilioinguinal-iliohypogastric nerve block in children inguinal surgery. Afr J Paediatr Surg. 2013; 10(3): 255-258.
14. Shin DJ, Bae HB, Choi JI, et al. The Hemodynamic Effects of Levobupivacaine Infiltration at the Skull-pin Insertion Site and the Incision Site in Craniotomy. Korean Journal of Anesthesiology. 2006; 51(2): 179-184.
15. Çnar SÖ, Kum Ü, Cevizci N, et al. Effects of levobupivacaine infiltration on postoperative analgesia and stress response in children following inguinal hernia repair. European Journal of Anaesthesiology. 2009; 26(5): 430-434.

Orcid ID:

Digraskar Vinod - https://orcid.org/0000-0001-8997-5098

Prem Raj Singh - https://orcid.org/0000-0001-7752-2198

Sukriti Xess - https://orcid.org/0000-0002-7585-5914

Akansha Jain - https://orcid.org/0000-0002-7380-6545

Dnyanesh Kashikar - https://orcid.org/0000-0002-3828-6740

How to cite this article:

Digraskar V.D., Singh P.R., Xess S., Jain A., Kashikar D. Hemodynamics Effect Of Bupivacaine And Levobupivacaine In Paediatric Abdominal Surgeries. Era J. Med. Res. 2022; 9(2): 150-155.