ORIGINAL ARTICLE

Effect of Different Concentrations of Bupivacaine on Level of Subarachnoid Block

TAHIR HAMEED DAR, RIAZ HUSSAIN, TAHIR NAZEER, *MUHAMMAD YOUNIS, MUHAMMAD ASLAM ASIM, MAQSOOD ALI*

ABSTRACT

Objective: To determine the level of anaesthesia with different concentrations but same dose (15mg) of bupivacaine in subarachnoid block.

Material and methods: In this study 100 patients of ASA class P_1 & P_2 status of age 20 to 40 years and weight 50 to 80 kg undergoing lower abdominal surgery electively of both sex were included. Quincke needle of size 25G at level of L_4 and L_5 was used and bupivacaine concertation 0.5% and 0.75% was given intrathecally. Immediately patients were placed in supine position and after 10 minutes height of sensory block was noted by pin prick.

Results: After statistical analysis and using chi square test the calculated valve of X2 was 24.12 and 25.67 and it was falling in critical region.

Conclusion: Normal distribution is not good to the data. Different concentrations of bupivacaine (0.5% and 0.75%) but same dose (15mg) did not affect the level of spinal anaesthesia.

Keywords: Bupivacaine, regional anaesthesia, level of block.

INTRODUCTION

An increasing interest in spinal anaesthesia has necessitated the demand for new local anaesthetic agent with better control and duration. At present bupivacaine[1] is commonly used, other drugs are levobupivacaine[2], 2-chloroprocaine[3], Lidocaine[4] and Ropivacaine[5]. Spinal anaesthesia is used mostly, in adult elective cases, pediatric patients[6,7] and emergency cases for example in emergency cesarean section[8]. Bupivacaine is also used in intraincisional infiltration[9]. During spinal anaesthesia crystalloids, colloids[10], ephedrine[11], methylergonovine[12] and phenylephrine[13] is used to prevent hypotension. Neuraxial anaesthesia is an extremely rare cause of spinal epidural hematoma[14]. Different drugs are also used to increase the effect and duration of spinal anaesthesia intrathecally like fentanyl[15], neostigmine[16], midazolam[17], morphine[18] and also intravenously like dexmedetomidine[19].

MATERIAL AND METHODS

After the approval of study from the hospital ethics committee 100 patients of ASA class P_1 and P_2 status, age 20 to 40 years of both sex undergoing spinal anaesthesia for elective surgery of below umbilical level were included in this study. Informed consent was taken from all patients on preoperative visit. These patients were divided into two groups, each comprising fifty selected randomly. In group A 0.5% bupivacaine and in group B 0.75% bupivacaine used. Spinal needle Quincke size 25G used. On ------

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Correspondence to: drtahirnazeer@yahoo.com

operative day IV line with 18G cannula and monitoring with NIBP, pulseoximeter and ECG. After preloading with Hartmans solution 15ml/kg body weight spinal anaesthesia was given at $L_3 – L_4$ level. In group A, bupivacaine (0.5%) 3ml was given and in group B bupivacaine (0.75%) 2ml was given and dose of total drug was 15 mg in each group. Immediately patients were placed in supine position. After 10 minutes, height of sensory block was noted by pin prick. Chi square test was applied to analyze the data and P value <0.5 was considered significant.

RESULTS

In group A calculated value of X^2=24.12 and in group B calculated value of X^2=25.67. Both falls in the critical region so we reject our null hypothesis and conclude that normal distribution is not good to data.

Table A: Age

Years	Group A (0.5%)	Group B (0.75%)
20 – 30	29	21
31 – 40	29	21

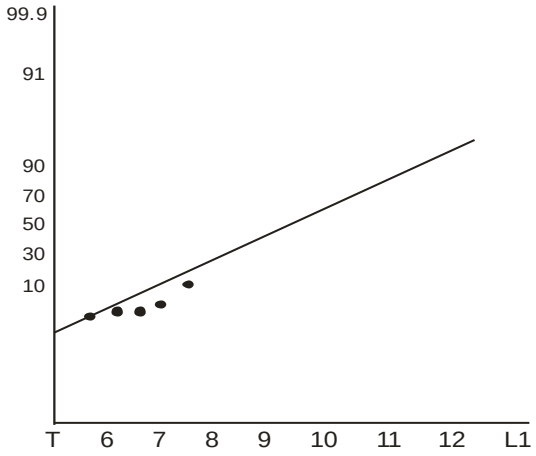
Table B: Weight

Range Kg	Group A	Group B
50-60	11	13
61-70	28	27
71-80	11	10

Table C: Height

Range Cm	Group A	Group B
150-160	14	10
161-170	20	20
171-180	16	20

Group A: (0.5%)



Group B: (0.75%)

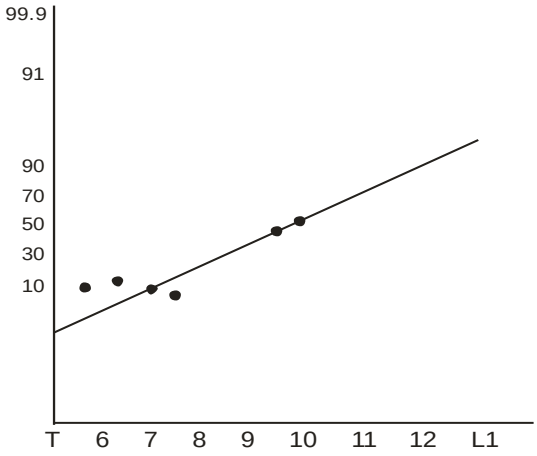


Table D: Block height

Levels	Group A (0.5%)	Group B (0.75%)
T6	3	4
T7	3	2
T8	4	2
T9	3	-
T10	20	25
T11	14	10
T12	3	7

Levels	Obs. Freq	%	Cumul.	From Graphe	%	Exp. Freq
T5	0	0	0	0.1	0.1	0.05
T6	3	6	6	4	39	1.95
T7	3	6	12	12	8	4
T8	4	8	20	28	16	8
T9	3	6	26	56	28	14
T10	20	40	66	79	23	11.5
T11	14	28	94	92.5	13.5	6.75
T12	3	6	100	99.2	6.7	3.35
L1	0	0	100	100	0.8	0.4

O1	E1	(O1 – E1	$(O1 – E1)^2$	$(O1 – E1)^2/E$
6	6	0	0	0
4	8	-4	16	2
3	14.95	-11.95	142.8	9.55
20	10.55	9.45	89.3	8.46
17	10.45	6.35	42.9	4.11

Computation

Level	Obs. Freq	%	Cumu. Freq	From Graph	%	Exp. Freq
T5	0	0	0	0.1	0.1	0.05
T6	4	8	8	3.4	3.3	1.65
T7	2	4	12	9.9	6.5	3.25
T8	2	4	16	24.2	14.3	7.15
T9	0	0	16	48.0	23.8	11.9
T10	25	50	66	74	26	13
T11	10	20	86	88.8	14.8	7.4
T12	7	14	100	96.8	8	4
L1	0	0	100	99.9	3.1	1.55

O	E	(O – E)	$(O – E)^2$	$(O – E)^2/E$
8	12.1	-4.1	16.81	1.40
0	11.9	-11.9	141.61	11.90
25	13	12	144	11.08
10	7.4	2.6	6.76	0.914
7	5.55	1.45	2.1	0.37
		0.05		**25.6**

DISCUSSION

Among the regional anaesthetic technique spinal anaesthesia is most common. In our study we use 2ml of 0.75% and 3ml of 0.5% bupivacaine intrathecally. The main factors determining the effect of agent used in spinal anaesthesia are amount of drug, density, positioning of patient and speed of injection. In this study the time of onset of maximal spread of analgesia was similar with each volume, while degree of spread varied little. In group A 20 patients achieved T_{10} level and in group B 25 patient achieve T_{10} level while needle size and puncture site were same.

CONCLUSION

Normal distribution is not good to the data i.e., different concentration of anaesthetic agent did not effect the level of block.

REFERENCES

1. Atef H, Elkasaby Ael D, Omera M, Badr M. Optimal dose of hyperbaric bupivacaine 0.5% for unilateral spinal anesthesia during diagnostic knee arthroscopy. Middle East J Anesthesiol. 2012; 21: 591-8.
2. Turkmen A, Moralar DG, Ali A, Altan A. Comparison of the anesthetic effect of intrathecal levobupivacaine and fentanyl and bupivacaine and fentanyl during cesarean section. Middle East J Anesthesiol 2012; 21: 577-82.
3. Goldblum E, Atchabahian A. The use of chloroprocaine for spinal anaesthesia. Acta Anaesthesiol Scand 2013; 16:30.
4. Komatsu T, Takenami T, Nara Y, Yagishita S, Kurashige C, Okamato H, Yago K. Epinephrine administered with lidocaine solution does not worsen intrathecal lidocaine neurotoxicity in rats. Reg Anesth Pain Med 2012; 26: 18-20.
5. Alabdulhadi O, Biehl D, Ong B, Boker A. Hyperbaric spinal for elective cesarean section ropivacaine vs bupivacaine. Middle East J Anesthesiol 2007; 19: 385-96.
6. Lopez T, Sanchez FJ, Garzon JC, Muriel C. Spinal Anestheisa in pediatric patients. Minerva Anestesial, 2012; 78: 78-87.
7. Kokki H. Spinal Blocks. Paediatr Anaesth 2012; 22: 56-64.
8. Ebirim LN, Lagiri B, Buowari YD. Progression of pre-eclampsia to eclapsia under spinal anaesthesia. Adv Biomed Res 2012; 1: 74.
9. Jabalameli M, Sofavi M, Honarmand A, Saryazdi H, Moradi D, Kashefi P. The comparison of intraincisional injection tramadol, pethidine, and bupivacaine on postcesarean section pain relief under spinal anesthesia. Adv Biomed Res 2012; 1: 53.
10. Jabalameli M, Saltani HA. Hashemi J, Soleimani B. Prevention of Post-spinal hypotension using crystalloid, colloid and ephedrine with three different combinations: A double blind randomized study. Adv Biomed Res 2013; 1: 36.
11. Aldaymunz E, Palacioabizanda F, Dediego PR, Gilsanzrodriguez F. Ephedrine vs phenylephrine by intravenous bolus and continuous infusion to prevent hypotension secondary to spinal anesthesia during cesarean section: a randomized comparative trial. Rev Esp Anestesiol Reanim 2011; 58: 412-6.
12. Anvaripour A, Shahryari H, Ahmadi S, Ghasemi S, Mirzaei K. Comparison the effects of oxytocin and methylergonovine, in elective cesarean section under spinal anaesthesia. Arch Gynecol Obstet 2012; 19:36.
13. Veeser M, Hofmann T, Roth R, Klohr S, Rossaint R, Heesen M. Vasopressar for the management of hypotension after spinal anesthesia for elective cesarean section systematic review and cumulative meta-analysis. Acta Anaesthesiol Scand 2012; 56: 810-16.
14. An JX, Fang QW, Sullivan EA, Williams JP. Spine surgery may cause more spinal epidural hematomas than spinal puncture. Clin Med J 2013; 126: 286-9.
15. Akinwale MO, Sotunmbi PT, Akinyemi OA, Analgesic effect of intrathecal neostigmine combined with bupivacaine and fentanyl. Afr J Med Sci. 2012; 41: 231-7.
16. Jain A, Jain K, Bhardawaj N. Analgesic efficacy of low dose intrathecal neostigmine in combination with fentanyl and bupivacaine for total knee replacement surgery. J Anaesthesiol Clin Pharmacol 2012; 28: 486-90.
17. Safari F, Dabbagh A, Sharifnia M. The effect of adjuvant midazolam compared with fentanyl on the duration of spinal anaesthesia with 0.5% bupivacaine in opium abusers. Korean J Anesthesiol 2012; 63: 521-6.
18. Lehavi A, Abecasis P, Weissman A, Winterstern A, Katz YS. Subarachnoid block with hyperbaric bupivacaine and morphine shorten PACU stay after cesarean delivery. J Perianesth Nurs 2010; 25: 371-9.
19. Jung SH, Lee Sk, Lim KJ, Park EY, Kang MH, Lee JM, Lee JJ, Hawang SM, Hong SJ. The effects of single dose intravenous dexmedetomidine on hyperbaric bupivacaine spinal anesthesia. J. Anesth 2013; 10: 25-30.