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ORIGINAL ARTICLE

Mini dose bupicaine-buprenorphine vs bupicane for spinal anesthesia in orthopedic surgery.

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ABSTRACT… Objective: To compare the effect of adding buprenorphine with small dose of isobaric bupivacaine on hemodynamics and duration of analgesia with bupivacaine alone in spinal anesthesia. **Study Design:** Randomised Controlled Trial. **Setting:** Allied and Abwa Hospital Faisalabad. **Period:** September 2019 to March 2020. **Material & Methods:** Sixty elderly pts. ASA III or IV undergoing hip surgery were selected randomly and divided into two groups A and B. pts received either small dose of isobaric bupivacaine 3.5 mg along with 120 micrograms buprenophine or 10 mg isobaric bupivacaine alone. Pts. were given 250 ml normal saline prior to spinal anesthesia administration. Level of block noted. Blood pressure, Heart rate, respiratory rate, Spo2, ECG monitored. BP and HR every 5 min recorded comparison done at 5 min of block and 20 min after block. Duration of postoperative analgesia noted for 24 hrs. **Results:** Comparing the two groups showed that 50% pts. in group B had a drop in systolic Bp at 5 minutes after block while none had in group A. (p value 0.000) agter 20 min. 43.3 % pts had a drop in systolic BP in group B while only 3.3 % had it in group A. (p value 0.005). Duration of postoperative analgesia was upto 18 hrs in group A with minimum till 12 hrs. While in group B it was maximum 8 hrs with minimum 5 hrs. **Conclusion:** Addition of buprenorphine with small dose bupivacaine results in stable hemoynamics and prolonged post-operative analgesia compared to large dose of bupivacaine alone.

Key words: Analgesia, Bupivicane, Minidose, Spinal Anaesthesia.

INTRODUCTION

Spinal anesthesia is a well-known and best type of anesthesia in patients undergoing lower limb orthopedic procedures. It has many advantages over general anesthesia, as to avoid risk of aspiration, use of single drug, avoiding any difficulty in maintaining a difficult airway.[1]

Bupivacaine is the local anesthetic used in spinal anesthesia, as it has longer duration of action than other local anesthetics i.e. 90-120 minutes. Despite of advantages there are side effects of spinal anesthesia as well. The most common of which is hypotension which is due to sympathetic blockade and needs to be treated with the help of vasopressors or fluid resuscitation.[2]

Additions of adjuncts which are safe to be given intrathecally reduce the dose of local anesthetic so that unwanted hemodynamic effects can be avoided. Among adjuncts Opioids are the commonly used agents which produce synergestic effect to local anesthetic.[3] Buperenorphine is a synthetic derivative of thebaine, acts as mu receptor agonist and when given intrathecally it enhances the sensory block of local anesthetic without enhancing the sympathetic blockade.[4,5,6]

In orthopedics surgery where large no. of patients are presenting for DHS, or AMP surgery after hip fractures are elderly, having multiple co –morbid, and poor cardiovascular reserves. Choice of anesthesia is mostly spinal for such patients but at the risk of sympathetic blockade leading to hypotension which these patients cannot tolerate. And if the duration of surgery is prolonged effect of block starts to wear off. Here comes the role of adjuncts. Use of intrathecal

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opioids play a synergistic role and make it possible to have safe anesthesia with minimum hemodynamic changes as well as prolong the duration of block.[7,8,9] As opioids are increasingly used intrathecaly as adjuncts so, there are many studies on other opioids as intrathecal use but less on buprenorphine and with such a small dose of bupivacaine.[10]

We did this study to compare a good block with hemodynamic stability with use of low dose local anesthetic- buprenorphine to conventionally used dosage of local anesthetic.

MATERIAL & METHODS

A randomised controlled trial was conducted to evaluate hemodynamic effects of mini dose bupivacaine with addition of buprenorphine in comparison to bupicaine alone.

The study was carried out in Allied and Abwa Hospital Faisalabad. The study duration was 6 months from 1st September 2019 to 1st March 2020.

Total of 60 patients were taken fulfilling the inclusion criteria i.e. Age 18-75 yrs, ASA III-IV, Lower limb orthopedic surgery. The patients having any coagulopathies, allergic to local anesthetic, refusal for spinal anesthesia has been excluded.

Patients were divided into two groups A and B randomly.

A written informed consent was taken before the procedure. Spinal anesthesia was given to the patients in sitting or lateral decubitus position whichever appropriate to patient.

All patients were given 250 ml N/S prior to administration of spinal anesthesia. Baseline vitals BP and HR recorded.

In group A patients were given 3.5mg bupicaine plain plus 120 micrograms buprenorphine.

In group B patients were given 10mg bupicaine plain.

Hemodynamics i.e. BP and HR were recorded every 5 minutes and a comparison was done at changes at 5 minutes and 20 minutes after giving injection.

Postoperative pain was also monitored using VAS (visual analogue score) and need for analgesia noted within 24 hrs after procedure. A standardized data collection performa was used to collect the data. Data was analysed in SPSS.

RESULTS

A total of 60 patients were included in the study, 30 in each group, A and B. Demographic data are shown in Figure-1 with the highest bar for the age group between 81-85 yrs comprising 31.1 % of the total population. While 63.3% were males and 36.7% were females as shown in Figure-2. All the patients were of ASA III in both groups.

The level of block achieved in group A was T12 in 53.3% patients and 46.7% T10. In Group B 20% patients had T8 level of block while 53.3% had T10 and 26.7% had T12 (Table-I)

In Group A systolic and diastolic BP remain unchanged at 5 minutes and 20 minutes after block. Only 5 patients (16.7%) had a drop in systolic BP up to 100 mmHg which was not more than 20% of baseline after 5 minutes of block. In Group B 15 patients (50%) witnessed more than 20% fall of baseline in their systolic BP just after 5 minutes of block.

As for diastolic BP none of the patient had a drop in group A while 30% patients in Group B had a fall of >10% of baseline. After 5 minutes of block only 1 pt. (3.3%) in group A had systolic BP drop >10%of baseline while in group B 13 pt.(43.3%) had drop in systolic BP >10% of baseline. While none of the patient (0.0%) in group A had a drop in diastolic BP after 20 min of block. And in group B 4 patients (13.4%) had >10% drop in diastolic BP after 20 min. of block.

Only 2 patients (6.7%) in group A required additional analgesia while none required it in group B. As for post operative analgesia is concerned group A patients not required it for

maximum of 18 hrs after the block and minimum was 12 hrs. while in group B maximum duration of post operative analgesia was 8 hrs. with minimum of 5 hrs.

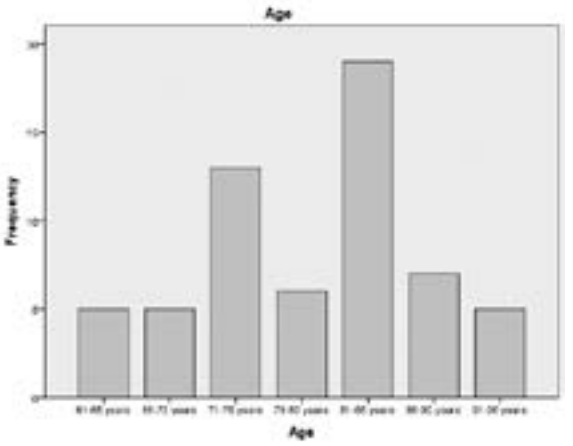

Figure-1

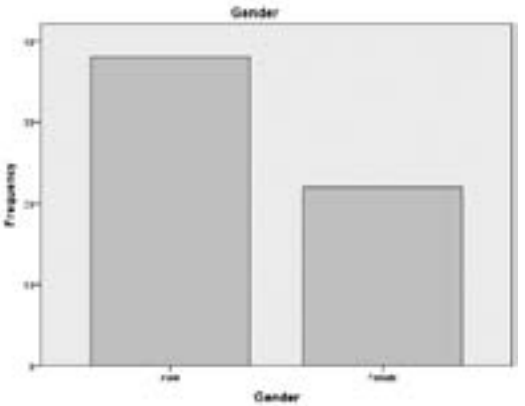

Figure-2

Level of Block	Group A%	Group B%
T8	0.0%	20%
T10	46.7%	53.3%
T12	53.3%	26.7%

Table-I. Level of block

Variable	Group A (n=30)	Group B (n=30)	P-Value
> 10% drop in Systolic BP after 5 min	16.7%	50%	0.000
>10% drop in systolic BP after 20min	3.3%	43.3%	0.001

Table-II. Change in systolic BP

Variable	Group A (n=30)	Group B (n=30)	P-Value
> 10% drop in diastolic BP after 5 min	3.3%	43.3%	0.001
>10% drop in diastolic BP after 20min	0.0%	13.4%	0.001

Table-III. Change in diastolic BP

Variable	Group A	Group B
Additional analgesia	6.6%	0.0%

Table-IV. Additional analgesia:

Variable	Hours	Group A	Group B
Post operative analgesia requirement	18 hrs	16.7%	0.0%
	16 hrs	56.7%	0.0%
	14 hrs	20%	6.7%
	12hrs	3.3%	3.3%
	10 hrs	0.0%	3.3%
	8hrs	0.0%	33.3%
	6hrs	3.3%	43.3%
	5hrs	3.3%	10%

Table-V. Post operative analgesia:

DISCUSSION

Spinal anesthesia in elderly and ASAIII patients presented for hip surgery are at higher risk of sympathectomy induced hypotension. Although use of low dose of spinal anesthesia or unilateral spinal anesthesia causes less hypotension but there is no specific regimen for it. There are patients who suffer profound hypotension with these techniques needing rescue drugs as well, here comes the role of adjuncts.[7,11] Opioids are being used all over the world as adjuncts intrathecally as well as in epidurals.[12,13] Alpha 2 agonists has also been used by MV Arora et al and N Kaur et al which shows prolongation of analgesia but at the cost of wide hemodynamic variations.[15,16] Elderly patients most of the times have co morbids and cannot tolerate hemodynamic instability or larger infusions in order to stabilize BP.[17,181,19] This population is in need of such an adjunct which causes laest hemodynamic instability with profound block.

We, used buprenorphine which is mixed agonist, antagonist as adjunct as many set ups do not have opioids availability so, it was decided to find out if we can have good results with an agent

easily available. We found that it has equally good results.

In this study, it was noted that low dose isobaric bupivacaine along with buprenorphine leads to stable hemodynamics in elderly patient undergoing orthopedic lower limb surgery. While larger doses of isobaric bupivacaine alone are associated with hypotension which is considered as drop in baseline BP >20%. There are not much studies done on this much low dose of bupivacaine (3.5mg) along with buprenorphine.

There was no associated nausea vomiting or post operative respiratory depression. Duration of analgesia was significantly increased with buprenorphine group. Multiple adjuncts has been used with success as adjuncts in spinal anesthesia but none with such a small dose of bupicaine.[14,20] Rabiee SM et al found that duration of analgesia in cessarian section is prolonged upto 18 hrs when buprenorphine is added intrathecally.[21] Agarwal K et al also has similar results in having posy operative analgesia upto 1040 minutes.[22]

Our results also match with these studies. 46.7% patients in our study had pain relief for 18 hrs.

CONCLUSION

Addition of buprenorphine 120 micrograms to 3.5 mg isobaric bupicaine results in stable hemodynamics and better post operative analgesia duration in elderly patients with good quality anesthesia. Further studies are required to find how much dose of buprenorphine is sufficient to give desired results.

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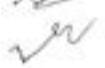
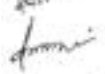
2	Samina Aslam	Paper writing.	
3	Humaira Ahmad	Proof reading	
4	Ayesha Ahmad	Data collection	
5	Amna Tariq	Data collection	
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