

## Comparison of Effectiveness of Xylocaine and Magnesium Sulphate with Xylocaine Alone in Bier's Block

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### ABSTRACT

**Aim:** To compare the effectiveness of xylocaine and magnesium sulphate with xylocaine alone in Bier's block of upper limb.

**Study design:** Randomized control trial.

**Method:** 80 Patients undergoing elective surgical procedure of fracture of radius and ulna were included and divided into two equal groups, A and B by using random number table. Bio data of all patients were noted and informed consent was taken. Each group comprised of 40 Patients. 22G cannula was passed on the hand to be operated. 18G cannula was maintained on other hand for drugs and fluids. After application of Esmarch bandage, dual bladder tourniquet cuff was applied proximal to operative site. In group B 40 ml of 0.5% xylocaine was given. In group A, 40 ml of 0.5% xylocaine and 2 ml of 50% w/v magnesium sulphate was given. Sensory and motor block was evaluated after every 30 seconds and time noted.

**Results:** The onset of sensory and motor blockade time in group A was  $4.30 \pm 1.43$  and  $7.07 \pm 1.49$  minutes respectively. In group B sensory and motor blockade time was  $7.25 \pm 1.5$  and  $10.07 \pm 2.29$  minutes respectively. The frequency of tourniquet pain in group A was 16(40%) and in group B 34(85%).

**Conclusion:** Intravenous regional anesthesia (Bier's block) with xylocaine plus magnesium sulphate has better results as compared to xylocaine alone.

**Keywords:** Xylocaine, Magnesium Sulphate, Intravenous regional Anesthesia (Bier's block).

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### INTRODUCTION

Intravenous regional anesthesia (IVRA) or Bier's block is a technique used for surgery on limbs<sup>1</sup>. It is an effective safe and simple technique<sup>2</sup>. This technique is very common due to reliability, economy and simplicity<sup>3</sup>. In this technique a tourniquet is used which causes pain which limits its use<sup>4</sup>. Different additives e.g., paracetamol, magnesium, dexamethasone and clonidine are added to xylocaine to reduce this pain<sup>5,6</sup>. Magnesium is also used for the treatment of eclampsia and arrhythmia<sup>7,8</sup>. Magnesium is a physiological antagonist of NMDA receptor<sup>9</sup>. Magnesium also blocks calcium channels<sup>10</sup>. Magnesium prolongs the duration of anesthesia and postoperative analgesia<sup>11</sup>. The rationale of study is to find the better drug for Bier's block.

### MATERIAL AND METHODS

After the approval of study form ethics committee of Services Hospital Lahore, 80 patients undergoing elective surgical procedure of fracture radius and ulna were included in this study. Patients were

divided into two equal groups A and B by using random number table. Bio-data of all patients were noted and informed consent was taken. Each group comprised of 40 patients. 22 G cannula was passed on the hand to be operated. 18G cannula was maintained on other hand for drugs and fluids. By the application of Esmarch bandage blood was exsanguinated from limb toward heart by squeezing and wrapping. A dual bladder tourniquet cuff was applied proximal to the operation site. Tourniquet pressure was maintained at 100 mm Hg above systolic pressure of patient. The Esmarch bandage was removed. In group A 40 ml of 0.5% xylocaine and 2 ml of 50% w/v of magnesium sulphate was given, in group B only 40 ml of 0.5% xylocaine was given in operative limb of patient with the help of 22G cannula. Sensory and motor block was evaluated after every 30 seconds with pin prick, movement of fingers and wrist. Complete motor block was declared when there is no voluntary movement in hand and wrist. Time was noted both for sensory and motor block in both groups. At the end of surgery tourniquet was deflated and tourniquet pain was noted in both groups. Minimum tourniquet time was 20 minutes to prevent systemic spread. All data was collected on proforma. The sampling technique was purposive non-probability. For statistical analysis we

Received on 29-03-2019

Accepted on 02-08-2019

used SPSS version 17. Chi-square test and t-test was applied and P-value less than 0.05 was considered significant.

## RESULTS

Age distribution shows that 19(47.5%) in group A and 15(37.5%) in group B were between 18-30 year of age. 21(52.5%) in group A and 25(62.5%) in group B were between 31-50 year of age. Mean age in group A was 30.83±7.66 and in group B was 32.6±8.20 years. In group A 23(57.5%) and in group B 26(65%) were male patients. In group A 17(45%) and in group B 14(35%) were female patients. Regarding sensory blockade in group A time was 4.30±1.43 minutes and in group B time was 7.25±1.50 minutes and P value was 0.00 (significant), similarly the onset of motor blockade in group A was at 7.70±1.49 minutes and in group B it was 10.07±2.29 minutes. P value was calculated as 0.00 (significant), regarding tourniquet pain it was in 16(40%) in group A and 34(85%) in group B. P value was calculated as 0.00 (significant).

Table 1: Age distribution (n=80)

Age (years)	Group A	Group B
18-30	19(47.5%)	15(37.5%)
31-50	21(52.5%)	25(62.5%)
Total	40(100%)	40(100%)
Mean±sd	30.83±7.66	32.6±8.20

Table 2: Gender distribution (n=80)

Gender	Group A	Group B
Male	23(57.5%)	26(65%)
Female	17(42.5%)	14(35%)
Total	40(100%)	40(100%)

Table 3: Comparison of onset of sensory blockade in both group (n=80)

Mean of onset of sensory blockade	Group A	Group B
	4.30±1.43	7.25±1.50

P value = 0.00

Table 4: Comparison of onset of motor blockade in both group (n=80)

Mean of onset of motor blockade	Group A	Group B
	7.07±1.49	10.07±2.29

P value = 0.00

Table 5: Comparison of frequency of pain in both groups (n=80)

Pain	Group A	Group B
Yes	16(40%)	34(85%)
No	24(60%)	6(15%)
Total	40(100%)	40(100%)

P Value = 0.00

## DISCUSSION

The primary goal of anesthesia is pain control. Bier's block is an alternative to peripheral nerve block to some extent and this technique is also used in pain therapy.<sup>12</sup> In our study we compared two groups and found that the Bier's block applied with xylocaine and

magnesium has better results as compared to xylocaine alone. The results of the study of Narang S et al favors the result of my study and in this study the onset of sensory blockade in group M and L group was 3.47 and 12.40 minutes and onset of motor blockade was 6 and 17 minutes respectively<sup>13</sup>. In the study of Omar H he found that intraoperative and preoperative magnesium infusion in epidural with levobupivacaine prolonged post operative analgesia<sup>14</sup>. Similarly in the study of Bamqade OA, he used magnesium in interscalene nerve block and found that magnesium prolonged regional analgesia<sup>15</sup>. In the study of Abdelaziz Ahmed A A he found that magnesium sulfate with bupivacaine has better pain control with pectoral nerve block as compared to bupivacaine alone<sup>16</sup>. In the study of Abd-Elsalam KA et al they found that magnesium prolonged the duration of analgesia and reduced the postoperative opioid requirement<sup>17</sup>. In the study of Lardone E et al has opposite result and in their study they found that addition of epidural magnesium to ropivacaine was not prolonging the analgesic effect and was not effective<sup>18</sup>.

## CONCLUSION

Combination of xylocaine with magnesium sulphate is more effective than xylocaine alone in Bier's block.

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