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Effectiveness of hematoma block versus general anesthesia in close reduction of distal radius fractures

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Abstract

Objective: To compare effectiveness of hematoma block versus general anesthesia in close reduction of distal radius fractures.

Study design: Randomized control tjrial.

Place and duration of study: Department of Orthopedic Surgery, Lady Reading Hospital, Peshawar from June 2017 to December 2017.

Material and Methods: Patients meeting the inclusion criteria and presenting to Accident and Emergency department were included in the study. Patients were randomly allocated to group-A (hematoma block) and group-B (general anesthesia) by randomization block method. Written informed consent was also obtained from all patients. Patient history and radiological assessment was done before anesthesia. Venous catheter was placed for all patients. Vital signs stability was evaluated in terms of pulse rate, respiratory rate, blood pressure, and oxygen saturation. General anesthesia was induced in all patients using propofol 1.5 - 2 mg/kg, and sevoflurane (1% - 1.5%) in-oxygen was applied during general anesthesia. In hematoma block method, 10 mL of lidocaine 1% was injected into the fracture after aspiration of fracture hematoma. 10 mL of lidocaine 1% was injected into styloid radius and ulnar side as pinning locations. The maximum dose of 5 mg/kg was used for patients. The area was sterilized using povidone iodine 7.5% before injection. All patients were asked to fast for at least 6 hours. Manipulation through ligmentotaxis was carried out 15 minutes after hematoma block and immobilization by cast elbow in ulnar deviation was performed for all patients. For the patients in both groups, acetaminophen–codeine (500 mg/15 mg) tablet was prescribed for the pain after procedure, and 30 mg intravenous ketorolac was injected in case of severe pain. Pain intensity in patients was graded and based on visual analogue scale (VAS) in which the score 0 shows no pain and the score 10 indicates the worst imaginable pain. VAS-based pain grades and reduction was assessed after 6 hours of surgery.

Results: As per effectiveness, in group-A, 34(68%) showed effectives results whereas in group -B, only 14(28%) patients showed effective results.

Conclusion: We concluded that hematoma block is more effective than conscious sedation in close reduction of distal radius fracture in term of pain reduction.

Keywords: Hematoma block, conscious sedation, distal radius fracture

Introduction:

In the times of Hippocrates and Galen, distal radius fractures (DRFs) were thought to be wrist dislocations. Pouteau first varied from this tradition when he described a variety of forearm fractures in the French literature, including a DRF. In current practice, as a result of greater knowledge of the varieties of fracture configurations, eponyms tend to be avoided, and a direct description of the fracture is preferred. The ultimate aim of treatment is to restore each patient to his or her prior level of functioning. The specific goals,

Table-1: Descriptive statistics (n=100)

Numerical Variables	Mean and SDs		
	Group A (n=50)	Group B (n=50)	Overall (n=100)
Age	52.5+12.50	51.5+12.25	52.3+12.35
VAS Score	5.5+2.7	5.3+2.8	5.4+2.6
Duration of Hospital Stay	4.5+1.6	3.2+1.4	4.1+1.5

Table-2: Frequency and percentages for age (n=100)

Age Group	Group A (n=50)	Group B (n=50)	Overall (n=100)
18-40 Years	5 (10%)	5 (10%)	10 (10%)
41-60 Years	15 (30%)	15 (30%)	30 (30%)
61-80 Years	30 (60%)	30 (60%)	60 (60%)

therefore, will not be the same in all patients. For example, a 21-year-old athlete wants to resume competition, but an 82-year-old person usually only wants to return to activities of daily living (ADLs).[1,2] The pathophysiology of a fracture is rather obvious: more load is imparted to a bone than the bone can sustain. Osteoporotic bone can break with very low impact. However, the patient should always be questioned regarding the circumstances of the injury, especially if he or she is older. Heart attacks or transient ischemic attacks can cause a DRF and should not be overlooked. In addition, more problems may be involved with the injury than just the fracture. A useful perspective is that a DRF is a soft-tissue injury surrounding a broken bone, and the immediacy of the radiographic diagnosis should not distract the surgeon from carefully assessing systemic issues or forearm soft-tissue issues.[3] DRFs are among the most common types of fracture, and many authors state that they are the single most common type. DRFs have a bimodal distribution. The mechanism of injury is unique to each group, with high-energy injuries being more common in the younger group and low-energy injuries being more common in the older group. Despite the large number of papers published each year on DRFs, no consensus has been reached on treatment, and there is nothing in the literature to suggest that a consensus might be developing. Indeed, with one approach advocating immediate motion using a fixed-angle volar plate and another advocating immobilization for 3-months using an internal joint-spanning plate, treatment options seem to be diverging rather than converging.[4,5]

Material and Methods:

This study was carried out in Orthopedics Unit, Lady Reading Hospital, Peshawar from June 2017 to December 2017. Total of 100 patients were included in the study. Patients were randomly allocated to group-A (hematoma block) and group-B (general anesthesia) by randomization block method. Written informed consent was obtained from all patients. Patient's history was taken before anesthesia. Loss of reduction was assessed prior to the surgery. Venous catheter was placed for all patients. Vital signs stability was evaluated in terms of pulse rate, respiratory rate, blood pressure, and oxygen saturation. General anesthesia was induced in all patients using propofol 1.5 - 2 mg/kg, while sevoflurane (1% - 1.5%) in-oxygen was applied during general anesthesia. In hematoma block method, 10mL of lidocaine 1% was injected into the fracture after aspiration of fracture hematoma. 10 mL of lidocaine 1% was injected into styloid radius and ulnar side as pinning locations. The maximum dose of 5mg/kg was used for patients. The area was sterilized using povidone iodine 7.5% before injection. All patients were asked to fast for at least 6 hours. Manipulation through ligmentotaxis was carried out 15 minutes after hematoma block and immobilization by cast elbow in ulnar deviation was performed for all patients. For the patients in both groups, acetaminophen–codeine (500/15mg) tablets was prescribed for the pain after procedure, and 30mg intravenous ketorolac was injected in case of severe pain. Pain intensity in patients was graded and based on visual analogue scale (VAS) in which the score 0 shows no pain and the score 10 indicates the worst imaginable pain. VAS-based pain grades and reduction was assessed after 6 hours of surgery.

Results:

As per descriptive statistics, in group-"A" mean and SD for age was recorded as 52.5+12.50, mean and SD for VAS Score was recorded as 5.5+2.7, mean and SD for hospital stay was recorded as 4.5+1.6. In group-B, mean and SD for

Table-3: Frequency and percentages for gender (n=100)

Gender	Group A (n=50)	Group B (n=50)	Overall (n=100)
Male	35 (70%)	35 (70%)	70 (70%
Female	15 (30%)	15 (30%)	30 (30%)

Table-4: Frequency and percentages for reduction achieved (n=100)

Reduction achieved	Group A (n=50)	Group B (n=50)	Overall (n=100)
Yes	34 (68%)	14 (28%)	48 (48%)
No	16 (32%)	36 (72%)	52 (52%)
Total	50 (100%)	50 (100%)	100 (100%)

Table-5: Frequency and percentages for complications (n=100)

Complications	Group A (n=50)	Group B (n=50)	Overall (n=100)
Nausea	04 (25%)	10 (27.77%)	14 (26.92%)
Vomiting	04 (25%)	15 (41.66%)	19 (36.53%)
Swelling	08 (50%)	11 (30.55%)	19 (36.53%)
Total	16 (100%)	36 (100%)	52 (100%)

Table-6: Frequency and percentages for effectiveness (n=100)

Effectiveness	Group A (n=50)	Group B (n=50)	Overall (n=100)
Yes	34 (68%)	14 (28%)	48 (48%)
No	16 (32%)	36 (72%)	52 (52%)
Total	50 (100%)	50 (100%)	100 (100%)

Table-7: Stratification of effectiveness with age (n=100)

Age	Effectiveness	Group A (n=50)	Group B (n=50)	P Value
18-40 Years	Yes	03 (6%)	01 (02%)	0.196
	No	02 (4%)	04 (08%)	
41-60 Years	Yes	12 (24%)	05 (10%)	0.009
	No	03 (6%)	10 (20%)	
61-80 Years	Yes	19 (6%)	08 (5.3%)	0.004
	No	11 (22%)	22 (44%)	

Table-8: Stratification of effectiveness with gender (n=100)

Age	Effectiveness	Group A (n=50)	Group B (n=50)	P Value
Male	Yes	25 (50%)	08 (16%)	0.196
	No	10 (20%)	27 (54%)	
Female	Yes	09 (18%)	06 (12%)	0.009
	No	06 (12%)	09 (12%)	

age was recorded as 51.5+12.25, mean and SD for VAS Score was recorded as 5.3+2.8 , mean and SD for duration of hospital stay was recorded as 3.2+1.4. (table no. 1.)

As per age wise distribution, in group-A, 5(10%) patients were recorded in 18-40 years age group, 15(30%) patients were recorded in 41-60 years age group and 30(60%) patients were recorded in 61-80 years age group. In the same manner, in group-B, 5(10%) patients were recorded in 18-40 years age group, 15(30%) patients were recorded in 41-60 years age group and 30(60%) patients were recorded in 61-80 years age group. (table No. 2).

As per gender wise distribution, in group-A, 35(70%) were recorded as male patients, 15(30%) patients were recorded as female patients whereas in group-B, (70%) were recorded as male patients, 15(30%) patients were recorded as female patients. (table no. 3). As reduction achieved, in group-A, 34 (68%) achieved reduction while in group-B, only 14 (28%) patients had achieved reduction. (table no. 4).

As per complication, in group-A, 4(25%) patients had nausea, 4(25%) had vomiting and 8(50%) patients had swelling. In group-B, 10(27.77%) patients had vomiting, 15 (41.66%) had vomiting and 11(30.55%) patients had swelling. (table no. 5)

As per effectiveness, in group-A, 34(68%) showed effectives results whereas in group-B, only 14(28%) patients showed effective results. (table no. 6). Stratification of effectiveness with respect to age and gender can be seen at table no. 7 and table no. 8

Discussion:

In one study by Tabrizi A et al, Hematoma block was proved safe and effective method in distal radius fractures of old people and seems to be superior to general anesthesia in emergency departments. The measurement of side effects including nausea and vomiting after surgery showed also significant differences. In 6(17.6%) of hematoma blocked patients, nausea and vomiting were seen. In contrast, these signs occurred in 19(55.8%) cases 6 which as compared to this study where in group-A, 4(25%) patients had nausea, 4(25%) had vomiting and 8(50%) patients had swelling. In group-B, 10 (27.77%) patients had vomiting, 15(41.66%) had vomiting and 11(30.55%) patients had swelling. (table

no. 5)

In another study by Myderrizi N et al, Mema B on 96 patients with displaced fractures of distal radius at mean age 54.3 (19-84) years old, M/F rate 37/59, left/right hand 37/58., from 2005-2008. VAS during reduction was 0 in group-A and 0.97±0.7 in group-B and VAS after reduction was 2.72±0.7 in group-A and 2.25±0.2 in group B. Time to reduction was 2.63±0.96 hr in A and 0.90±0.47 hr in B After a week, 21 fractures lose reduction in group-A and 22 in group-B[7] which as compared to my study where in group-A, 34 (68%) achieved reduction while in group-B, only 14(28%) patients had achieved reduction. (table no. 4). In a study by David MB. 26 patients underwent reduction with either PS or HB. Midazolam was used in addition to HB in 8 patients. One patient was converted from HB to PS due to inadequate block. There was no significant difference in pre-reduction and post-reduction angulation between the groups, and reductions maintained satisfactory alignment. Overall satisfaction and satisfaction with anesthesia were excellent for both groups, with respective means of 9.5 and 9.5 for PS and 9.3 and 9.6 for HB. Patient discomfort was minimal in both groups, with a mean of 1.6 for PS and 2.2 for HB. Length of stay was significantly shorter for HB patients, with patients spending a mean of 2.2 hours less in the ED. 3-patients required further intervention following initial reduction. 1-patient in each group required revision reduction, and 1-PS patient underwent closed reduction and pinning.[8]

Overall, distal radius fracture complications have been found to occur in as little as 6% of patients and as many as 80% of patients, pending on the definition of complication. Complications after distal radius fractures occur for many reasons, and often vary depending on the method of treatment.[9]

In a study by Erika C, the addition of a hematoma block to children undergoing forearm fracture reduction under ketamine/midazolamsedation did not reduce excess sedation time, overall observed pain scores as assessed by the OSBD-R pain scoring tool, or total ketamine dose administered.[10]

In another study by Sardar SA, Out of 48 patients with distal radius fracture, males were 20(41.7%) while females were 28(58.3%) which as compared to this study where in group-A, 35 (70%) were recorded as male patients, 15 (30%) patients were recorded as female patients whereas in group-B, (70%) were recorded as male patients, 15(30%) patients were recorded as female patients. (table no. 3). The mean age of the sample was 47.04±18.45. 9(18.8%) patients were aged up to 20 years, 12(25%) were from 21-50 years and 27(56.2%) were of age more than 50 years which as compared to this study where in group-A, 5(10%) patients were recorded in 18-40 years age group, 15(30%) patients were recorded in 41-60 years age group and 30(60%) patients were recorded in 61-80 years age group. In the same manner, in group-B, 5(10%) patients were recorded in 18-40 years age group, 15(30%) patients were recorded in 41-60 years age group and 30(60%) patients were recorded in 61-80 years age group. (table No. 2).

In 25(52.1%) patients, there was right while in 23(47.9%) patients there was left distal radius fracture. There was highly statistically significant reduction in pain score at all three point intervals after hematoma block ($p<0.001$ at all points).[11]

In another study, effectiveness in group-A among the two groups was 26(68%) while non-effective in 12(32%) patients, whereas was effectiveness in group-B was 11(28%) while non-effective in 27(72%) patients 12 which as compared to this study where in group-A, 34(68%) showed effectives results whereas in group-B, only 14(28%) patients showed effective results. (table no. 6)

Conclusion:

We conclude that hematoma block is more effective than conscious sedation inclose reduction of distal radius fracture in term of pain reduction.

Conflict of interest: None

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Role and contribution of authors:

Dr Aimal Sattar, collected the data, references and did the initial write up.

Dr Muhammad Shabbir, helped in collecting the data and introduction writing.

Dr Muhammad Ibrahim, collected the references and helped in interpretation of the data.

Dr Muhammad Inam, critically review the article and made useful changes

Dr Zeeshan Faisal, critically review the article and made final changes.

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