

Comparison of Intra-Articular Injection of Lidocaine versus Intravenous Sedation and Analgesia for Reduction of Anterior Dislocation of Shoulder in Terms of Mean Pain Reduction using VAS Score

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^{1,2,3}Conception of study

^{1,2,3}Experimentation/Study conduction

^{1,2,4}Analysis/Interpretation/Discussion

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^{3,4}Critical Review

^{2,3,5,6}Facilitation and Material analysis

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Article Processing

Received: 21/04/2022

Accepted: 15/10/2022

Cite this Article: Rahman Rasool Akhtar, Muhammad Umair, Qammar, Riaz Ahmed, Adnan Arif, Armaghana Qamar Khan, Maria Liaquat. Comparison of intra-articular lidocaine versus intravenous sedative and analgesic for reduction of anterior shoulder dislocation in terms of mean pain reduction using vas score

<https://www.journalrmc.com/index.php/JRMC/article/view/2027>

DOI: <https://doi.org/10.37939/jrhc.v26i4.2027>

Conflict of Interest: Nil

Funding Source: Nil

Abstract

Introduction: The most common dislocation presenting to emergency department is anterior shoulder dislocation. Posterior dislocations and inferior dislocations are rare. Dislocations of the anterior shoulder mostly occur with the position of the arm is abducted and externally rotated. This results in injury of the humeral head, labrum, capsuloligamentous structures and glenoid. Such patients experience severe pain, therefore prompt reduction is necessary to ameliorate the pain. Intravenous analgesia combined with sedation or intra-articular injection of lidocaine can be used to reduce the anterior dislocation of shoulder by closed method. Due to its side effects, Intra-articular lidocaine (IAL) is recommended for use as a probable alternative to intravenous sedation-analgesia particularly for those patients in which the intravenous sedation-analgesia is contraindicated.

Objective: To compare intra-articular injection of lidocaine versus intravenous sedation and analgesia for management of anterior dislocation of shoulder in terms of mean pain using VAS during reduction of shoulder joint.

Materials and Methods:

Study Design: Randomized controlled trial (RCT).

Setting: In Patient department, Orthopedic Surgery, Benazir Bhutto Hospital, Rawalpindi, Pakistan.

Duration: 6 months (November 22nd, 2017 to May 21st, 2018).

Sample Size: 60 patients (30 in each group).

Results: We included sixty patients in my study. 19 (31.7%) were females and 41 (68.3%) were male patients. Out of all the patients 38 (63.3%) had right sided shoulder dislocation, while the rest 22 (36.7%) patients had left sided shoulder dislocation. Patients mean age was 33.27±10.535 years and mean pain score of all the patients was 4.966±1.930. Group A mean pain score was 4.200±1.648, while the Group B mean pain score was 5.733±1.910 (p value = 0.002. Stratification was done according to gender and age group of the patients, and post-stratification t-test was applied.

Conclusion: Intra-articular lidocaine is better option in pain control during closed reduction of anterior dislocation of shoulder.

Keywords: Intra venous analgesia, Intra-articular injection of lidocaine, Anterior dislocation of shoulder.

Introduction

Most common dislocation presenting to emergency department is anterior shoulder dislocation. Only 2% to 4% of cases present with posterior dislocations while inferior dislocations are rarely seen. Two age groups are commonly affected by shoulder dislocation, first is seen in younger adults age around 20-30 years. The second population affected are elderly women with prevalence of 17 per 100000. The incidence rate of anterior shoulder dislocation is 1.7% in the general population. Dislocations of the anterior shoulder mostly occur with the position of the arm is abducted and externally rotated. This results in injury of the humeral head, labrum, capsuloligamentous structures and glenoid.

Such patients experience severe pain, therefore prompt reduction is necessary to ameliorate the pain. Different methods have been used for the reduction of anterior dislocation of shoulder.

For clinical evaluation of patient detailed history and physical examination are mandatory. Both shoulders should always be compared. Active and passive range of motion in all directions should be noted. Neurovascular evaluation and radiographic examinations should be performed before and after the reduction. The main factor for the reduction of shoulder joint is the moderate relaxation of muscles around the shoulder joint. Intravenous analgesia combined with sedation or intra-articular injection of lidocaine can be used to reduce the anterior dislocation of shoulder by closed method.

Intravenous sedation-analgesia (IVSA) can cause nausea, vomiting, post reduction lethargy and it can trigger the central nervous system and can cause depression of cardio-respiratory system, which requires careful monitoring. Intra-articular lidocaine (IAL) is recommended as an alternative to intravenous sedation-analgesia particularly for those patients in which the intravenous sedation-analgesia is contraindicated. The favorable aspects of intra-articular lidocaine include decrease pain, low cost and early patient discharge. As per Parvin et al using sample size of 104 it was found that mean intensity of pain during shoulder reduction in intra-articular lidocaine (IAL) was 0.29 ± 0.67 and 2.92 ± 1.82 (<0.001) in (IVSA) group.

The rationale of my study is that shoulder dislocation is common problem in our society, and since our hospitals are overburdened, an effective analgesia like

intra-articular lidocaine should be used which reduces the pain of the patient, reducing the hospital stay.

Materials and Methods

Study design: Randomized controlled trial (RCT).

Setting: Benazir Bhutto Hospital Rawalpindi, Department of Orthopedic Surgery.

Duration: Six months (November 22nd 2017 to May 21st 2018)

Sample size: (as calculated by W.H.O calculator)

Level of confidence= 95%

Level of significance= 5%

Power of test= 95%

Population mean= 0.29

Test value of population mean= 2.92

SD= 1.2

Sample size (n)= 30 in each group.

Sampling technique: Consecutive sampling (Non probability)

Sample Selection:

Inclusion Criteria:

Patients with age 15-50 years presenting in Accident & Emergency within 24 hours with clinical and radiological diagnosis of anterior shoulder dislocation will be included in the study.

Exclusion Criteria:

- Anterior shoulder dislocation older than 24 hrs
- Fracture dislocation
- Anesthetics allergy
- Pregnancy
- Patients using analgesics including sedatives, consumption of narcotics, alcohol, psychotropic drugs or active psychotic drugs in the previous two weeks.
- Patients not giving consent for procedure.

Data Collection Procedure: The study was started after approval from the ethical committee of hospital. Patients of age 15-50 years with anterior shoulder dislocation admitted through A&E department were included in the study. Written informed consent was taken from selected patients. Patients were divided in two groups randomly on basis of lottery method. In group A, patient's reduction was done after using intra-articular lidocaine. In group B, patient's reduction was done after intravenous sedation. Pain score (based on visual analog scale ranging from 0 to

10 points) was recorded and compared between the two groups during the reduction procedure.

Data Analysis: Data analysis was done by using SPSS version 21. Qualitative variables such as gender were expressed in terms of percentage and frequency. Mean and standard deviation was calculated for quantitative variables such as pain score and age of patient. Mean pain score was compared between the two groups using independent sample t-test. p value ≤ 0.05 was taken as significant. Effect modifier such as age and gender were controlled by stratification. Post stratification independent sample t-test was applied; p value of less than 0.05 was taken as significant.

Results

Sixty patients were enrolled in this study that was divided into two groups by lottery method. Out of these sixty patients 19 (31.7%) were females and 41 (68.3%) were male patients. The patients were also divided according to age, there were 21 (35%) patients who were below 30 years of age and 39 (65%) patients who were elder than 30 years of age. Out of all the patients 38 (63.3%) had right sided shoulder dislocation, while the rest 22 (36.7%) patients had left sided shoulder dislocation.

The mean age was 33.27 ± 10.535 years and the mean pain score of all the patients was 4.966 ± 1.930 . The mean pain score of the two groups was calculated separately and compared between the two groups using t-test. Group A mean pain score was 4.200 ± 1.648 , while the Group B mean pain score was 5.733 ± 1.910 . After applying t-test the p value was 0.002. Stratification was done according to gender and age group of the patients, and post-stratification t-test was applied.

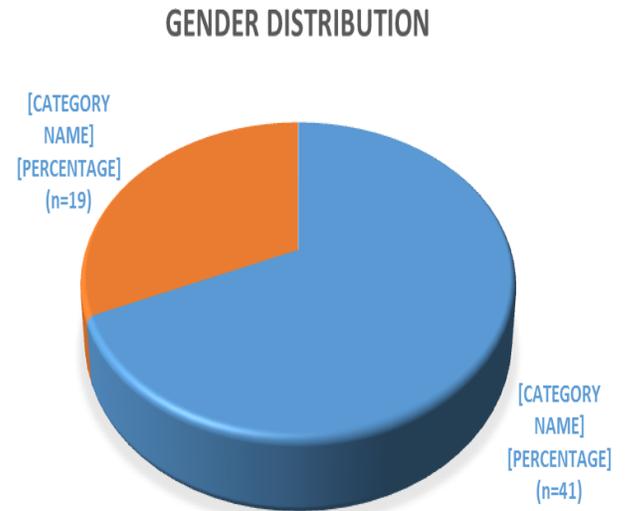


Figure 1: Pie chart showing distribution according to the gender of the patients

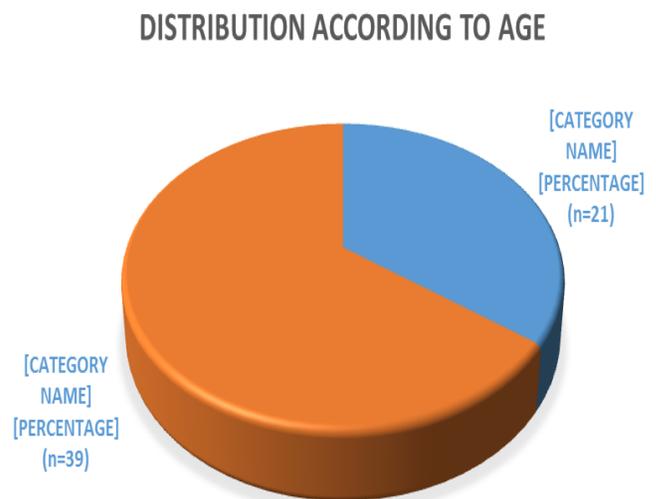


Figure 2: Pie chart showing distribution according to the age of the patients

DISTRIBUTION ACCORDING TO THE SIDE OF SHOULDER DISLOCATION

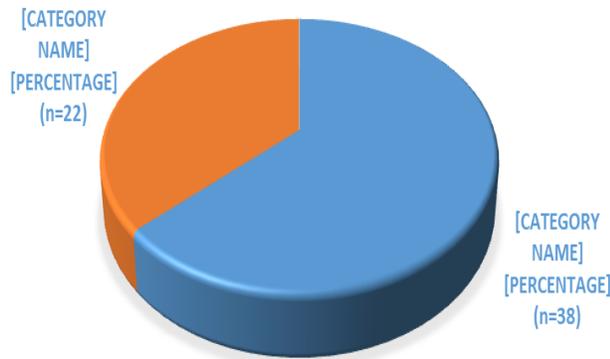


Figure 3: Pie chart showing distribution according to the side of shoulder dislocation of the patients

Table 1: Table showing comparison of mean pain score between the two groups

		Number of the patients	Mean pain score	Std. Deviation	P value
Group of the patients	Group A	30	4.200	1.648	0.002
	Group B	30	5.733	1.910	
Total		60			

Table 2: Table showing comparison of mean pain score between the groups according to the age of the patients

		Group of the patient	Number of the patients	Mean pain score	Std. Deviation	P value
Less than 30 years	Group A		11	4.04	1.52	0.01
	Group B		10	5.38	1.76	
More than 30 years	Group A		19	4.36	1.72	0.01
	Group B		20	5.92	2.01	
Total			60			

Table 3: Table showing comparison of mean pain score between the groups according to the gender of the patients

		Group of the patient	Number of the patients	Mean pain score	Std. Deviation	P value
Male	Group A		20	3.72	1.28	0.01
	Group B		21	5.24	1.46	
Female	Group A		10	4.98	1.73	0.01
	Group B		09	6.21	1.92	
Total			60			

Table 4: Table showing mean and Std. Deviation of quantitative variables

	Number of the patients	Mini mum	Maxi mum	Mean	Std. Deviation
Age of the patient	60	15	50	33.27	10.535
Mean pain score	60	2.00	8.00	4.966	1.930

Discussion

One of the most common emergencies which is encountered by an orthopedic surgeon in emergency department is the shoulder dislocation. The affected population is usually young adults which present to the hospital after trauma and road traffic accident. Most common type of dislocation is anterior dislocation. Conservative treatment of closed reduction using different analgesic methods is the favored treatment in the accident and emergency department. Intra-articular injection of lidocaine is a safe and adequate method of controlling pain during shoulder dislocation. The other option of intra venous analgesic and sedative though effective for pain relief, but it has multiple side effects.

In my study intra-articular lidocaine was compared with intra venous sedation and analgesia in terms of pain control in anterior shoulder dislocation. The results of my study showed convincing difference among two options with intra-articular lidocaine being

the superior one. Sixty patients were enrolled in my study that were divided into two groups by lottery method. Out of all the patients 38 (63.3%) had right sided shoulder dislocation, while the rest 22 (36.7%) patients had left sided shoulder dislocation. The mean pain score of the two groups was calculated separately and compared between the two groups using t-test. Group A mean pain score was 4.200 ± 1.648 , while the Group B mean pain score was 5.733 ± 1.910 . After applying t-test the p value was 0.002.

In a study done by Kashani P et al, intra-articular lignocaine was compared to intravenous sedation for shoulder reduction. The patients with anterior dislocation of shoulder were randomly splitted into two groups to receive the intra-articular injection of lidocaine and intravenous sedation and analgesia. Intravenous dose of 0.05 mg/kg midazolam and 1 µg/kg fentanyl was given to first group, while 20 mL intra-articular lidocaine (1%) was given to second group. The doses of lignocaine and IV sedation are similar to my study. The results of that study revealed that patients mean age was 28.75 ± 7.24 years with 86.5% male. A convincing difference was observed with regard to decreased intensity of pain during reduction in intra-articular lidocaine group ($p < 0.001$) and there was also a shorter stay in the hospital in intra-articular lidocaine group ($p < 0.001$). The results of this study validate the results of my study, concluding that intra-articular lignocaine is a safe and effective method of pain control during shoulder reduction.

In another study done by Cheok, intra-articular lignocaine was compared with intravenous analgesia showing 100% success rate in sedation group while the intra-articular lidocaine group showing the 19% (6/32) failure rate ($P=0.024$) with no significant difference regarding relief of pain ($P=0.23$) or patient satisfaction ($P=0.085$) among the two groups. Also, the patients in intra-articular lidocaine group had shorter stay in hospital without any complication as compared to sedation group in which the patients had longer stay in hospital with 29% complication rate. Similarly, the cost of intra-articular lidocaine group was found to be 32 % less than the sedation group. The results of that study showed that intra-articular lidocaine is cost effective method without any known complications. This study results also revealed no difference in control of pain during reduction of shoulder dislocation as contrast to my study in which intra-articular lidocaine was more effective in pain control. Pain control is the utmost important in a patient who presents to the emergency department with shoulder

dislocation. Among different options the most effective method is intra-articular lignocaine injection. The patients felt much less pain than the other group of the patients. They also have shorter hospital stay and early return to normal daily life work. In our setup where our hospitals are overburdened and a lot of patients were presented to the Accident & Emergency department with dislocation of shoulder, intra-articular lignocaine injection is safe and effective method of controlling pain during reduction of dislocation of shoulder.

Conclusion

Intra-articular injection of lidocaine is better option in pain control during reduction of anterior shoulder dislocation.

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