

## Successful reductions of anterior shoulder dislocations using intra articular lidocaine injection

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### ABSTRACT

**Objective:** To find out the frequency of successful reductions in acute anterior shoulder dislocations after the use of intra-articular lidocaine injection.

**Methodology:** This study (case series) was conducted in Emergency Department of Civil Hospital Karachi from July 2009 to January 2010. Patients with acute anterior shoulder dislocation (diagnosed with examination and X-Rays) were reduced in emergency department by Hippocratic method after infiltration of 1% Lidocaine in the affected shoulder joint. Reduction was confirmed by post reduction shoulder X-Rays. Frequency of successful reduction and complications were recorded.

**Results:** Majority of the patients (34.3%) were between 18-30 years of age group with mean age of 40.14 ( $\pm 15.14$ ) years. Males were affected more than females with male to female ratio being 2.9:1. They commonly had predominant right shoulder dislocation (71.4%). Successful reduction was achieved in 32 (91.4%) patients after infiltration of 1% lidocaine injection. No complication was recorded.

**Conclusion:** Use of intra-articular lidocaine for reduction of shoulder joint appears to be a safe and effective method and associated with successful reduction in majority of cases.

**KEY WORDS:** Shoulder dislocation, Intra-articular injection, Reduction.

Pak J Med Sci July - September 2012 Vol. 28 No. 4 691-694

### How to cite this article:

Ahmed MW, Ghulam-Mustafa KK, Solangi NA, Ishtiyaque M. Successful reductions of anterior shoulder dislocations using intra articular lidocaine injection. Pak J Med Sci 2012;28(4):691-694

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- \* Received for Publication: May 20, 2012
- \* Revision Received: June 4, 2012
- \* Revision Accepted: June 5, 2012

### INTRODUCTION

Shoulder joint dislocation is amongst the most common dislocations in the body presenting in the emergency room.<sup>1</sup> Incidence approximates 17 per 100,000 per year and most of them (97%) are anterior dislocations.<sup>2</sup> Reductions are commonly performed as an emergency procedure in emergency room. Various methods have been applied for reduction; starting from Hippocrates and followed by other methods like Kocher<sup>3</sup>, Milch<sup>4</sup>, Stimpson<sup>5</sup> etc. Hippocratic method employed the basis of traction and counter traction mechanism.<sup>6</sup> All of these methods are effective in reducing the dislocation but are associated with significant pain. Traditionally intravenous benzodiazepines alone or in combination with opiates are used to reduce dislocations.<sup>7</sup>

These drugs have the potential to produce serious adverse effects including central nervous system depression and respiratory depression.<sup>8</sup> Administration of such drugs requires close monitoring of the patient even after completion of the procedure. This led to the search for a new alternative method which is relatively safe, equally effective; eliminate the need of prolonged monitoring thereby reducing the workload of a busy emergency department. Lippitt et al in 1991 first described the use of intraarticular lidocaine for reduction of shoulder dislocation.<sup>9</sup> Its use has not been associated with serious adverse outcomes and resulted in successful reductions of shoulder dislocations (89.9%).<sup>7</sup>

The purpose of this study was to evaluate the efficacy and success of this technique in our institution.

## METHODOLOGY

This study was conducted at Emergency Department of Civil Hospital, Karachi. Between July 2009 and January 2010, patients of age 18 and above presenting with acute shoulder dislocation after a trauma were included in this study. The exclusion criteria included patients with associated fractures, poly trauma, neurovascular injury, recurrent dislocation, and patients presenting more than 12 hours after the injury.

The diagnosis was made by clinical examination, which showed hollowness of shoulder joint contour and confirmed with antero-posterior and lateral radiographs of the shoulder joint. Informed consent was taken prior to the procedure from all the patients.

It is a well described technique in the literature. It is based on an FCPS-II dissertation and its synopsis was approved by Research & Monitoring Cell of College of Physicians & Surgeons Pakistan. All the patients were informed about the benefits of this technique over intravenous sedation and informed consent was taken.

**Technique:** In sitting position the affected shoulder was prepared with povidone-iodine solution and draped with sterilized towels. Local anesthesia (20 ml of 1% lidocaine) was injected into glenohumeral joint with a posterolateral approach. The direction of needle was toward the glenoid cavity, and after penetration of the capsule, aspiration of blood carried out that indicated the intra-articular position. Then given concentration of lidocaine was injected into the joint through 20-gauge, 35mm needle. Approximately 15 minutes was allowed

for the local anesthetic to take effect before any manipulation of the shoulder joint was attempted. After infiltration of local anesthesia, patient was advised to lie in supine position. The reduction was carried out by "Hippocratic method". All reductions were performed by senior orthopaedic resident medical officer on call. After clinical reduction body bandaged in internal rotation of arm was applied. Immediate post-reduction antero-posterior and lateral radiographic views of shoulder joint were performed to confirm the proper anatomic position of the humeral head in the glenoid cavity. Y-view was taken to examine the shoulder in lateral projection.

Data analysis was done on SPSS version 16 (SPSS Inc). Frequencies and percentages were used to summarize categorical variables like gender distribution, involved shoulder (i.e. right and left) and final or post-reduction outcome (i.e. success or failure). Mean  $\pm$  standard deviations (SD) were computed for numerical variables like age distribution and time taken to present at emergency department. Stratification for involved shoulder joint (i.e. right and left), time lapsed since injury, gender distribution (i.e. male and female) and age distribution was done to evaluate the impact of these variables on outcome of closed reduction.

## RESULTS

There were 35 patients who fulfilled the pre determined inclusion criteria. Mean age was 40.14 ( $\pm 15.14$ ) years. Majority of the patients (34.3%) were between 18-30 years of age (Table-I). Twenty six (74.3%) patients in this study were male whereas nine (25.7%) were female. The time lapse to reach the accident and emergency department ranged from 1 to 10 hours. Mean time lapse since injury was 4.09 ( $\pm 2.83$ ) hours. In this study, seventeen (48.6%) patients visited the hospital between 1 to 3 hours of dislocation. Ten (28.6%) patients visited between 4 to 6 hours, whereas, eight (22.9%) attended the emergency department more than 6 hours of injury (Table-II). Most of the dislocations

Table-I: Age Distribution.

Age of patients (years)	Frequency (n=35)	Percentage (%)
18-30	12	34.3
31-40	08	22.9
41-50	06	17.1
51-60	03	8.6
61-70	06	17.1

Table-II: Time lapsed since injury.

Time (Hours)	Frequency (n=35)	Percentage (%)
1-3	17	48.6
4-6	10	28.6
>6	08	22.9

that were encountered after 3 hours of injury in this study were initially managed at home by local traditional remedies. Right sided joint was involved in twenty five (71.4%) patients while left shoulder joint dislocations were observed in ten (28.6%) patients. The dislocation was successfully reduced in 32 (91.4%) patients with no systemic and local side effects of local anesthesia. Dislocations reporting within first 6 hours after injury were easy to reduce. In three (8.6%) patients failure ensued as they presented late (> 6 hours) after dislocation.

Patients were followed in OPD after one week and 6 weeks interval. At 1 week patients were assessed clinically for signs of infection and none of our patient developed joint infection. Patients with fractures were excluded. Only patients with isolated shoulder dislocation without any associated fracture who gave the consent for this technique were included in this study.

## DISCUSSION

In our study majority of the patients (34.3%) were in younger age group (18-30 years) with a mean age of 40.14 years and 74.3% were male. Late presentation (>6 hours) was associated with increased failure rate. No local or systemic side effects of intra-articular lidocaine were observed.

Shoulder dislocation is observed most often in young active individuals with a male predominance. Orlinsky et al<sup>10</sup> also observed male predominance in younger age group (average 36 years) in their case series of 54 patients of anterior shoulder dislocation. Suder and associates<sup>11</sup> encountered 29 males with average age of 45 years in their prospective study of reduction of primary shoulder joint dislocation under local anesthesia, which is nearly comparable to this study. Contrary to this, Paudel and colleagues<sup>8</sup> experienced more females having shoulder dislocation in their study. In this study, among thirty five patients receiving intra-articular lidocaine, successful reduction was achieved in 91.4%. Intravenous sedation was also given in which the procedure was failed with intra articular injection alone. Moreover, dislocations reporting within first 6 hours after injury were easy to reduce.

In three (8.6%) patients failure ensued as they presented late after dislocation. Late presentation increases inflammatory edema, muscular spasm and pain preventing the reduction under local anesthesia. Paudel and associates<sup>8</sup> achieved successful reduction of shoulder joint in 100% of patients in their study by using intra-articular lidocaine injection, Suder et al<sup>11</sup> achieved reduction in 96.9% and Kosnik et al<sup>12</sup> reported success in 82.7% which are nearly comparable to the results of this study.

Shoulder joint dislocations require emergency reduction. The reduction methods should be safe and effective. In majority of cases intravenous sedation and analgesia has been in use to reduce the dislocations.<sup>13</sup> Intra venous sedation requires prolonged monitoring thereby increasing the stay in emergency department<sup>14</sup> as well as the cost of treatment. In a busy emergency department, prolonged stay will increase the workload of medical staff. Anything which reduces the emergency stay will be beneficial and make this facility available for other patients. After description of Lidocaine infiltration by Lippitt et al for reduction of shoulder joint dislocation, a number of authors compared the results by using intravenous sedation versus Lidocaine infiltration.<sup>10-12,15-18</sup> All of these studies showed Lidocaine infiltration as an equally effective method with no local or systemic adverse effects.

Wakai et al<sup>19</sup> did a systematic review including five studies and reported no significant difference in between these two techniques regarding success rate and analgesic effect. Intra articular technique was cheaper and associated with less adverse effects.

Moharari et al<sup>18</sup> reported equal analgesic effect of both methods, however the intra articular injection group required more attempts for reduction but it was not statistically significant. Rapid reduction was observed in intravenous sedation group while intra articular group had shorter stay in emergency room.

Orlinsky et al<sup>10</sup> compared the efficacy of both agents and reported that intravenous sedation was better in pre reduction pain relief (p=0.045) but overall analgesic effect was comparable (p=0.98). However intra articular injection was associated with shorter recovery time.

Miller et al<sup>16</sup> reported the results of 30 patients. Sixteen patients received intra articular injection while 14 received intra venous sedation. Patients in Lidocaine group spent an average of 75 minutes as compared to 185 minutes in sedation group. In addition there was a huge difference in the treat-

ment cost (0.52\$ per patient in Lidocaine group and 97.64\$ per patient in sedation group).

There were certain limitations in this study including small number of patients and lack of any comparison group. It is difficult to give any recommendations; however similar studies with large number of patients will help to evaluate the efficacy and feasibility of this method in our country.

Pakistan is a developing country with limited resources for health care facilities. This method for reducing shoulder joint dislocation in emergency room will decrease the stay thereby decreasing the workload of medical staff and increasing the availability of emergency services to other needy patients. On the other hand this method is associated with low procedure cost<sup>16</sup> as compared to intra venous sedation thereby contributing in conservation of medical facilities. Secondary care and district hospitals lacking specialized monitoring services will get benefit from such techniques which do not require monitoring of patients.

### CONCLUSION

Intra-articular injection of lidocaine appears to be a safe and effective alternative method in reducing acute anterior shoulder dislocation. The use of intra articular Lidocaine is associated with shorter stay in emergency room making it cost effective. Additionally it is not associated with systemic adverse effects which make it an ideal option in a health care facility where advance monitoring services are not available.

### ACKNOWLEDGEMENT

This manuscript is based on a Dissertation for FCPS-II. We are thankful to "The Medical Writers" for providing editing services for this manuscript.

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