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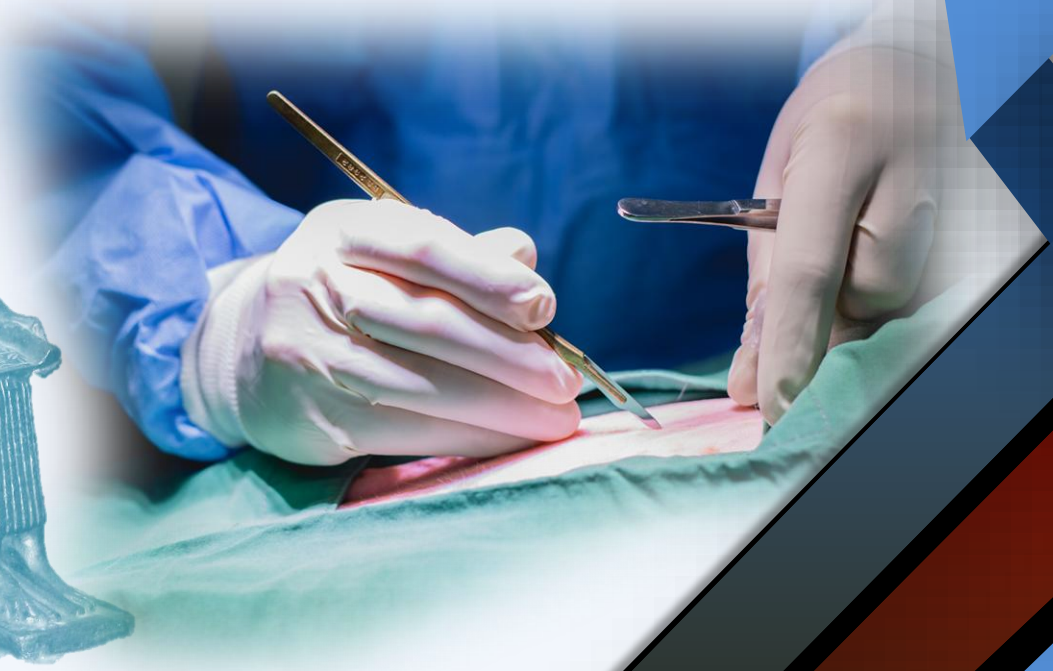

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Original Article

Use of Ultrasound Intra Articular Lidocaine Injection Versus Propofol Sedation for Closed Reduction in Shoulder Dislocation

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ABSTRACT

Background: The shoulder is one of the most often dislocated joints in the human body. Multiple studies have evaluated different pain management techniques for shoulder dislocation reductions, such as intravenous analgesics and sedatives, interscalene blocks, and ultrasound-guided intra-articular lidocaine injections.

The aim of the work: The aim was to Compare ultrasound intra-articular lidocaine injection with Propofol sedation in closed reduction of shoulder dislocation.

Patients and Methods: A randomized clinical trial involved 50 patients with anterior shoulder dislocations at Al-Azhar University Hospital in Damietta. Patients were randomly allocated into two equal groups; Group 1 consisted of 25 patients who got IAL. Group [2]: 25 patients who sedated using Propofol.

Results: We observed a notable decrease in pain severity in group 1; however, group 2 did not exhibit such a change. Pain reduction was not statistically significant, with less Pain in group 1 than in group 2 because of the analgesic effect of xylocaine compared to Propofol. After reduction, the need for analgesics was higher in group 2 [24%] than in group 1 [4%].

Conclusions: he use of intra-articular lidocaine to facilitate reduction is a safe and effective method for addressing acute shoulder dislocations in an emergency care setting.

Keywords: Shoulder Dislocation; Propofol Sedation; Intra Articular Lidocaine; Ultrasound.

INTRODUCTION

The shoulder is one of the most often dislocated joints in the human body. Anterior dislocation constitutes roughly 96% of shoulder dislocations, attributable to the distinctive anatomy of the shoulder joint. It is among the most common causes of emergency department [ED] visits. Dislocations that are not accompanied by fractures or neurovascular injuries are decreased under sedation in the emergency department by emergency medicine specialists or orthopedic surgeons [1].

Multiple previous studies have evaluated diverse approaches to pain management for shoulder dislocation reductions, encompassing various intravenous [IV] analgesics and sedatives, inter scalene blocks, and ultrasound-guided intra-articular lidocaine [IAL] injections [2].

Research assessing inter-scalene blocks has demonstrated the efficacy of this approach, with patients receiving inter-scalene blocks often experiencing reduced emergency department durations. However, the blocks are contingent upon the physician and necessitate a trained practitioner. The prevalent anesthetic procedures employed in the emergency department for shoulder dislocation reductions include ultrasound-guided inter-scalene analgesia and intravenous sedation, collectively termed procedural sedation [3].

IAL is being utilized in clinical settings to reduce manual closure of anterior shoulder dislocation. IAL is typically advised for manual closed reduction of anterior shoulder dislocation due to its therapeutic benefits, which encompass diminished systemic side effects, superior anesthetic efficacy, lower overall expenses, and, notably, enhanced success rates in reduction compared to PS [4].

Nonetheless, the facts originate from trials utilizing drugs that are no longer preferred for pain management, specifically opioids and benzodiazepines. Consequently, employing shorter-acting medicines like propofol may enhance the safety and efficacy of PS [5].

Propofol is a potent sedative that induces fast effects and has a brief duration of sleepiness. These features lead to a reduction in the time required to realign the dislocated joint, monitor the patient, accurately titrate the medication, and shorten the length of stay. The antiemetic characteristic of propofol is clinically significant concerning the risks of apnea and aspiration during the surgery. It is also applicable in cases of liver and kidney insufficiency. Consequently, propofol is a suitable agent for procedural sedation and analgesia in emergency dislocated shoulder cases [6].

THE AIM OF THE WORK

This study aimed to compare ultrasound intra-articular lidocaine injection versus propofol sedation for closed reduction in shoulder dislocation.

PATIENTS AND METHODS

This randomized controlled trial involved 50 patients who presented to the Emergency Department with anterior shoulder dislocations at Al-Azhar University Hospital in Damietta. The Local Ethics Committee approved the study protocol, and written informed consent was acquired from each patient during recruiting. This study includes Adults with Shoulder dislocation. Patients with shoulder fractures, Polytrauma, Coagulopathy, or Allergy to the used medications were excluded.

Sample size: Based on the results of Zitek et al. [5], at a 95% two-sided confidence level, with a power of 80% and an error of 5%, by Epi Info STATCALC, 50 Patients were randomly assigned into 2 equal groups.

All patients underwent comprehensive history taking, physical examination, and routine laboratory testing. Joint dislocation was confirmed using X-ray in anteroposterior and lateral views. Patients were assigned to the group [1] received 10 mL of 2% lidocaine administered into the glenohumeral joint via a posterior route utilizing ultrasound guidance. In group [2], a bolus of propofol was titrated [1.5 - 2.5 mg/kg by slow IV].

Surgical Procedures: The groove between the acromion and the humeral head was recognized, and the skin was sterilized with chlorhexidine gluconate [3.15%] and isopropyl alcohol [70%]. Approximately 3 mL of 2% lidocaine was injected subcutaneously using a needle. A spinal needle was inserted through the lateral sulcus into the joint area with ultrasound guidance and adhering to sanitary techniques. Ten milliliters of 2% lidocaine were administered into the glenohumeral joint area.

Outcome measures:

- The efficacy of both procedures and postoperative pain duration and requirements of analgesia.
- Patients' satisfaction.

Statistical analysis: Statistical analysis was conducted using SPSS statistical software, version 26 [IBM, Chicago, Illinois, USA]. The Kolmogorov-Smirnov test was employed to assess the normality of the data. Qualitative data were expressed as numerical values and percentages and analyzed using the Chi-square test or Fisher's exact test. Quantitative data were expressed as means and standard deviations and were analyzed using the independent t-test or Mann-Whitney U test. The p-value will be deemed significant at a threshold of <0.05.

RESULTS

Our study covered a total of 50 patients. The participants' personal qualities and types of dislocation were presented in Tables 1 and 2. Reduction-related data, post-reduction, and the need for analgesia were summarized in [Table 3]. In group 2, we found a non-significant reduction in the severity of pain post-reduction. Pain was less in group 1 than in group 2 [Table 4]. According to the patient's satisfaction, 96% of the patients in group 1 were satisfied after reduction. On the other hand, 3 [12%] patients in group 2 were not satisfied. The statistical difference in satisfaction between the two groups was not significant [P = 0.23] [Table 5]. None of the patients in group 1 complained of nausea or vomiting. About 2 patients [8%] in group 2 had nausea and vomiting after anesthesia [P = 0.33]. The risk of aspiration was statistically significantly higher in group 2 [20%] than group 1 [0%]. [P=0.04].

Table [1]: Personal data of the studied participants.

		Group 1 [IAL]	Group 2 [Propofol]	P value
Age [years]	Mean ± SD	30.5 ± 7.7	32.1 ± 7	0.6
	Range	19 – 45	20 – 45	
Sex. N [%]	Males	21 [84%]	22 [88%]	0.5
	Females	4 [16%]	3 [12%]	

Ta**ble]2[:** Type of injury of the studied patients.

Type of injury	Group 1 [IAL]	Group 2 [Propofol]	P value
Domestic	11 [44%]	12 [48%]	0.03*
Spontaneous	3 [12%]	0 [0%]	
Sport	10 [40%]	6 [24%]	
Motor vehicle accident	1 [4%]	7 [28%]	

Table]3[: Dislocation reduction-related data.

Variables		Group 1 [IAL]	Group 2 [Propofol]	P value
Reduction technique	External rotation	9 [36%]	11 [44%]	0.5
	Tract-counter traction	16[64%]	14 [56%]	
Procedure time [mins]	Median [IQR]	10 [9–2]	9 [7 – 11]	0.3
	Range	7 – 15	7 – 13	
Reduction success	Succeed	25[100%]	25 [100%]	0.9
	Failed	0 [0%]	0 [0%]	
Post-reduction analgesic use in the first hour	No	24 [96%]	19 [76%]	0.055
	Yes	1 [4%]	6 [24%]	
Complications	No	25[100%]	20 [80%]	0.99
	Yes	0 [0%]	5 [20%]	

Table [4]: Pain assessment of the studied patient

VAS	Group 1 [IAL]	Group 2 [Propofol]	P value
Pre-VAS	6 [3.25 – 6]	6 [4 – 6]	0.8
Post VAS	1 [0 – 2]	3 [0]	0.6
P value	0.001*	0.1	-

Table [5]: Patient satisfaction

Satisfaction	Group 1 [IAL]	Group 2 [Propofol]	P value
Satisfied	24 [96%]	22 [88%]	0.23
Not satisfied	1 [4%]	3[12%]	

DISCUSSION

A shoulder dislocation entails a total loss of joint congruence between the humeral head and the glenoid articular surface. This dislocation is the most prevalent of major joint dislocations, accounting for nearly 50% of all dislocations treated in emergency departments [7]. Various approaches offer analgesia to aid with reduction, including intravenous sedation with propofol and localized anesthetic procedures [8]. Intra-articular administration of local lidocaine enhances analgesia and ensures sufficient muscle relaxation. It facilitates an increased success rate in the reduction procedure, minimizes discomfort, and permits immediate patient discharge upon successful reduction. This method can also be executed in emergency rooms, and its associated costs are minimal [4].

This study aims to evaluate ultrasound-guided intra-articular lidocaine injection with propofol sedation for the closed reduction of shoulder dislocation.

The justification for employing ultrasound-guided intra-articular lidocaine injection rather than general anesthesia is the potential for consequences such as respiratory depression and seizures, necessitating subsequent cardiorespiratory monitoring after the administration of these agents [9].

In terms of safety, both procedures appear to be safe, and we did not report any adverse events in either study group. However, in a study by Taylor et al. [10], They sought to compare propofol with midazolam/fentanyl for the treatment of anterior shoulder dislocations. They reported adverse events for propofol, including Respiratory depression [22.9%], Pain at the IV site [6.3%], and vomiting [2.1%].

The current investigation corroborates existing data indicating that IAL is safe and associated with few adverse effects [11].

The evaluation of IAL efficacy has been constrained by the challenges in accurately positioning lidocaine within joint space, a process that is not as readily verifiable as the administration of medications via a patient's IV line in the propofol method.

Previous investigations indicated that the suction of a hematoma from the shoulder joint was not a reliable method for confirming the accurate placement of lidocaine injection into the articular region. Nonetheless, even when positioned accurately, capsular tears may hinder the efficacy of the IAL due to potential anesthetic leaking from the joint area [12].

In our study, we used ultrasonography in group 1 to be sure that the injection correctly reached the joint, and we found that the success rate of reduction was 100%. Group 1 exhibited a substantial reduction in pain severity, while Group 2 showed no statistically significant pain reduction, with Group 1 experiencing less Pain than Group 2 due to the analgesic effects of xylocaine in comparison to propofol. After reduction, the need for analgesics was higher in group 2 [24%] than in group 1 [4%]. This may be due to the analgesic effect of lidocaine in the first hour after injection. After reduction, 88% of the patients in group 2 were satisfied in comparison to 96 % of the patients in group 1. However, those patients who were unsatisfied in group 2 were due to more moderate to severe Pain during and reduction with the presence of a few cases of nausea, vomiting, and aspiration. In group 2, the success rate was 100% with reported complications of nausea, vomiting [2 patients or 8% in group 2], and aspiration [5 cases or 20% in group 2].

Rungsinaporn *et al.* [11] discovered that there were no disparities between the groups for pain alleviation from pre-injection to post-injection. No changes in emergency department duration of stay were observed, and no problems were reported in either group throughout the two-week follow-up period.

Koneri *et al.* [13] found that, In the cohort assigned to the IAL group, the average ED length of stay was 133 minutes, in contrast to 124 minutes for the procedural sedation group. The average patient satisfaction levels were comparable for the IAL and procedural sedation groups, respectively.

Cheok *et al.* [14] concluded that IAL proved to be more economical than the IVS approach. IAL offered sufficient analgesia and reduced complications, making it a feasible choice for pain management during the reduction of acute shoulder dislocation.

Hames *et al.* [15] found that The median duration from first physician evaluation to patient discharge did not differ between the IAL [170 minutes] group

and the IVS [145 minutes] group [Δ -25 minutes; 95% CI -32, 70; p = 0.46]. The IAL group exhibited a markedly reduced rate of successful closure reduction [48%] compared to the IVS group [100%] with statistical significance [p < 0.001]. Patient satisfaction and physician ease of reduction were significantly greater in the IVS group than in the IAL group [p < 0.05]. No problems were noted in either group at the time of reduction or during follow-up.

Kashani *et al.* [16] found that A notable disparity was observed in pain intensity reduction within the IAL group [p < 0.001]; complications such as nausea, apnea, hypoxia, and headache were exclusively reported in the IVSA group, with no adverse effects noted in the IAL group; heightened patient satisfaction was recorded in the IVSA group [p = 0.007]; both groups exhibited comparable success rates on the initial reduction attempt, while the IAL group experienced a shorter discharge time [p < 0.001].

Miller *et al.* [17] found that The lidocaine cohort exhibited a markedly reduced duration of stay in the emergency room. No substantial difference existed between the two groups concerning Pain, the efficacy of the Stimson technique, or the duration needed for shoulder reduction.

In a study by **Moharari *et al.*** [18], both groups [IAL and propofol] exhibited a comparable substantial reduction in Pain following injection. No significant problems were identified in either group.

Orlinsky *et al.* [19] found that IAL was less efficacious than IVMD in alleviating prereduction pain, although similarly beneficial in providing overall pain alleviation. IAL had greater efficacy than IVMD in expediting recovery.

A systematic evaluation of 6 randomized controlled trials and 283 patients revealed no statistically significant differences in the success rates of shoulder reduction or patients' pain perception between the two treatments [IAL vs IVS]. Nevertheless, the cohort administered IV sedation had elevated complication rates and an extended emergency department duration compared to the group treated with IAL block [12].

Conclusion: The application of intra-articular lidocaine to aid with reduction is a secure and efficacious approach for managing acute shoulder dislocations in an emergency department context. IAL gives the patients postoperative analgesia for one hour, which increases their satisfaction.

Conflict of interest: none

Financial disclosure: None to be disclosed.

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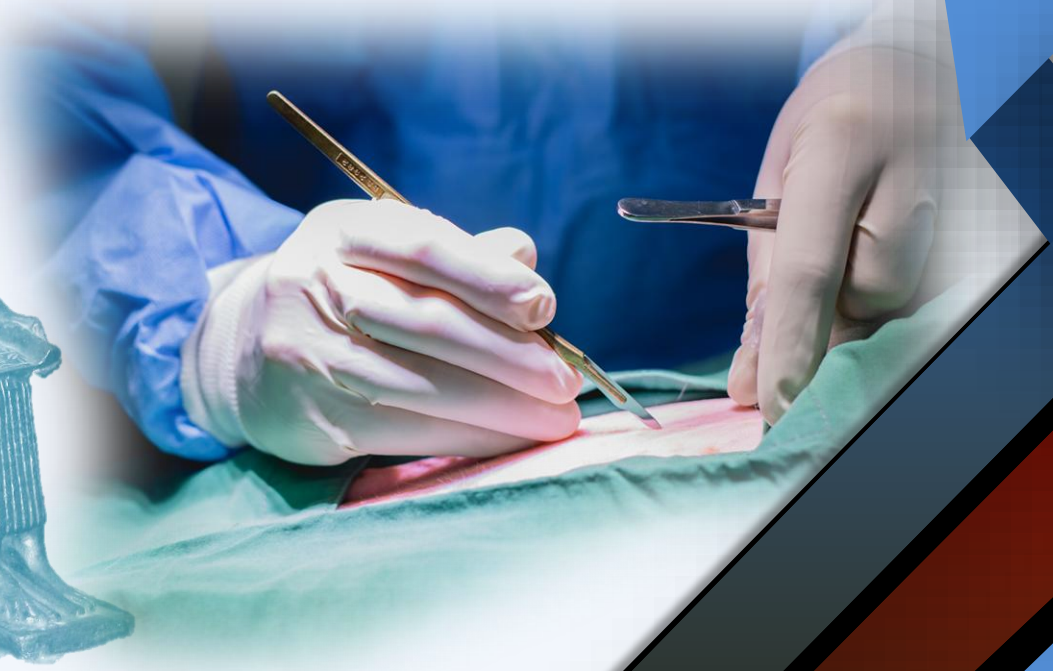

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