Reduction of Acute Anterior Inferior Glenohumeral Joint Dislocation in the Argentine Health Care System. A National Perspective

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ABSTRACT

Objective: To know the methods used for the initial treatment of the first episode of acute anterior inferior glenohumeral dislocation and to compare the behaviors of physicians between the different levels of specialization. Our hypothesis was that there is great variability in the methods used in Argentina. **Materials and Methods:** A survey was conducted using the Google forms platform. It was disseminated through the morbidity and mortality committee of the AAOT and the Argentinian Association of Shoulder and Elbow Surgery. The questionnaire consisted of 13 questions with multiple choice answers that included the degree of specialization, work environment, maneuvers, anesthesia, complications, position, and immobilization time. **Results:** 429 complete answers were obtained. 52.2% use the Kocher maneuver as their first choice, followed by the Hippocratic method (15.9%). 72% do not use anesthesia to perform the reduction, there is a statistically significant difference between the use of anesthesia and the different levels of specialization (P= 0.046). 85.8% of the 120 surgeons who use anesthesia for the reduction, use general anesthesia or sedation. 74.8% immobilize the patient in adduction and internal rotation. 13.8% reported having complications related to the reduction. **Conclusions:** There is a great variability regarding the methods used to reduce a first episode of LGHAI in the emergency services in Argentina. We believe it is important to reconsider the use of anesthesia, proposing intra-articular anesthesia as the first option, if needed.

Keywords: Anteroinferior glenohumeral dislocation; reduction; anesthesia; complications.

Level of Evidence: IIC

Reducción de la luxación glenohumeral anteroinferior aguda en el sistema de salud de la Argentina. Perspectiva nacional

RESUMEN

Objetivo: Conocer los métodos utilizados para el tratamiento inicial del primer episodio de luxación glenohumeral anteroinferior aguda y comparar las conductas entre los diferentes niveles de especialización. Nuestra hipótesis es que los métodos utilizados en la Argentina presentan una gran variabilidad. **Materiales y Métodos:** Se realizó una encuesta mediante formularios de Google, que se difundió a través del Comité de Morbimortalidad de la Asociación Argentina de Ortopedia y Traumatología y la Asociación Argentina de Cirugía de Hombro y Codo. El cuestionario consta de 13 preguntas con respuesta de opción múltiple que incluyen: grado de especialización, ámbito laboral, maniobras utilizadas, empleo de anestesia, complicaciones, posición y tiempo de inmovilización. **Resultados:** Se obtuvieron 429 respuestas completas. El 52,2% utiliza la maniobra de Kocher como primera elección, seguida del método hipocrático (15,9%). El 72% no utiliza anestesia inicialmente para la reducción; se halló una diferencia estadísticamente significativa entre el uso de anestesia y los diferentes niveles de especialización (p = 0,046). De los 120 médicos que sí la emplean, el 85,8% recurre a la anestesia general o la sedación. El 74,8% inmoviliza al paciente en aducción y rotación interna. El 13,8% de los participantes refiere haber tenido alguna complicación relacionada con la reducción. **Conclusiones:** Existe una gran variabilidad en los métodos utilizados para la reducción de un primer episodio de luxación glenohumeral anteroinferior en los servicios de emergencia de la Argentina. Consideramos oportuno replantear el uso de la anestesia, y proponer la anestesia intrarticular como primera opción.

Palabras clave: Luxación glenohumeral anteroinferior; reducción; inmovilización; anestesia; complicaciones.

Nivel de Evidencia: IIC

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INTRODUCTION

Glenohumeral joint dislocation is a frequent condition, it represents approximately 50% of all dislocations,[1-4]and it has an incidence of between 8 to 48 cases per 100,000 inhabitants per year.[5,6]

The anterior inferior variant is the most frequent and represents between 90% and 97% of all cases.[1] The usual mechanism of injury is a combination of abduction, external rotation, and extension.[7]

Numerous techniques and reduction maneuvers have been described and widely used for the treatment of these dislocations, among the most widespread in our field, we can mention: Kocher,[7-9] Stimson,[10] Hippocratic method,[10] Spaso,[7] Milch,[10] FARES,[10,11] traction/countertraction.[11]

Prompt reduction and a correct maneuver are essential to prevent vascular and neurological complications or fractures.

Currently, there is no consensus or national protocol for the management of anterior inferior glenohumeral dislocation (AIGHD) in the emergency services. Nor have we found any bibliographic data on the reduction techniques and methods chosen by doctors in the emergency services of Argentina.

The main objective of this study was to know the most commonly used methods for the initial treatment of the first episode of acute AIGHD in the emergency services of Argentina. The secondary objective was to analyze the information obtained and compare the behaviors between the different levels of specialization. Our hypothesis was that there is great variability in the methods used to reduce a first episode of AIGHD in emergency services in Argentina.

MATERIALS AND METHODS

We carried out an analytical, observational and cross-sectional study between June and November 2021 to determine the treatment used for the reduction of a first episode of AIGHD.

For this purpose, we designed and carried out a survey using the Google forms platform (Mountain View, California, USA) After a pilot test with 40 participants, it was approved by and disseminated through the Morbidity and Mortality Committee of the *Asociación Argentina de Ortopedia y Traumatología* (Argentine Association of Orthopedics and Traumatology) and the *Asociación Argentina de Cirugía de Hombro y Codo* (Argentine Association of Shoulder and Elbow Surgery). The survey is aimed at traumatologists and residents/concurrent traumatologists who work directly or indirectly in the emergency services of Argentina. The questionnaire consists of 13 questions with multiple choice answers that include the degree of specialization, the work environment, the reduction maneuvers used, the use of anesthesia, complications, position and time of immobilization (Annex).

Considering that the *Asociación Argentina de Ortopedia y Traumatología* has 5,900 members, the sample size necessary to achieve a confidence level of 95% and a margin of error of 5% is 362.

Statistical analysis

Categorical variables are presented as frequency and percentage. The chi-square test for independent samples or Fisher's exact test was used to compare categorical variables. For all statistical conclusions, a significance level of 5% was used. The analysis was performed with the statistical program IBM SPSS Statistics for Windows, version 26 (IBM Corp., Armonk, NY, USA).

RESULTS

429 complete responses were obtained, of which 33 (7.7%) correspond to residents; 329 (76.7%), to specialists in traumatology; and 67 (15.6%), to subspecialists in shoulder and elbow surgery. 13.1% of those surveyed worked in the public sector; 38.9%, in the private sector; and 48%, in both.

Faced with a first episode of AIGHD, 52.2% (224 respondents) stated that the Kocher maneuver was the first choice for reduction. Figure 1 details the percentages of the different maneuvers. No significant differences were found between the first reduction maneuver and the work environment. In both the private and public sectors, the most commonly used maneuver is the Kocher maneuver (54.5% in private and 46.4% in public hospitals, $p = 0.262$).

72% do not initially administer anesthesia for glenohumeral reduction. Of the 120 physicians who do use it, 85.8% (103 respondents) use general anesthesia or sedation and 14.2%, intra-articular local anesthesia.

When comparing the use of anesthesia with the degree of specialization, it was observed that 12.1% of residents, 28% of traumatologists, and 35.8% of specialists use anesthesia for the first reduction attempt, with a statistically significant difference between them ($p = 0.046$).

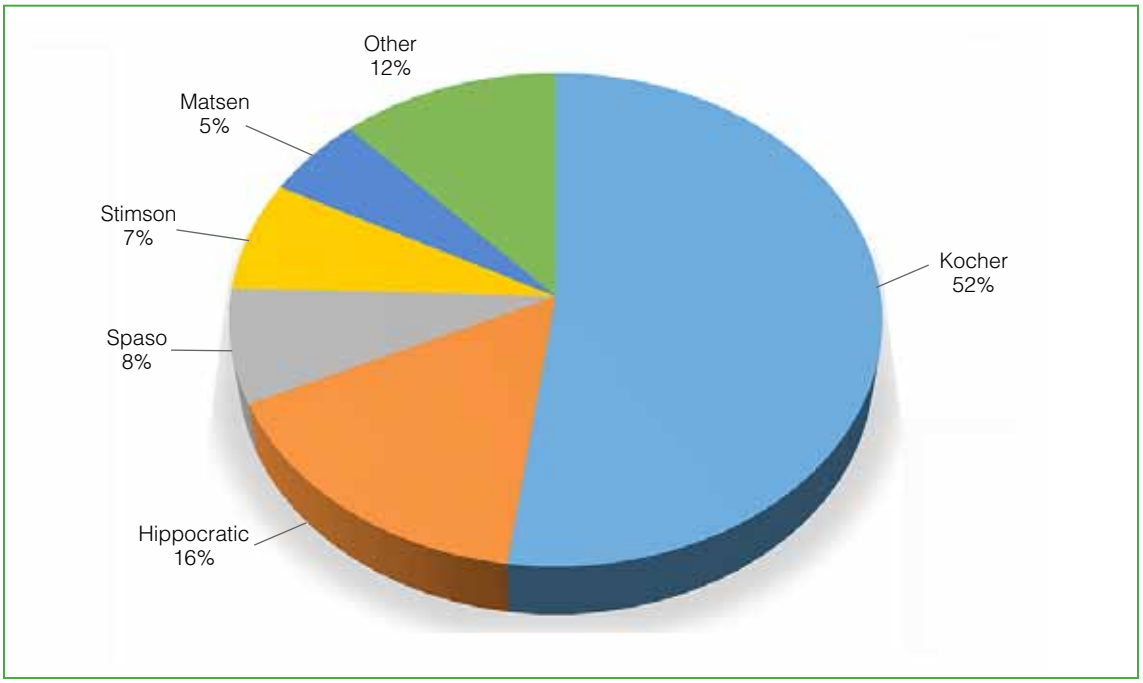

Figure 1. Maneuvers used in a first episode of anterior inferior glenohumeral dislocation. The most used maneuver was Kocher's (52.2%).

No statistically significant differences were found between the use of anesthesia and the work environment. 30.5% of those who work in the private sector and 26.8% of those in the public sector use it (p = 0.594).

Faced with a failure in the initial reduction, 20.8% would repeat the initial maneuver, 49.3% would use another reduction maneuver, 29.5% would administer anesthesia if it had not been used previously, and 0.4% would perform an open reduction for the second reduction attempt.

Among those who would use another maneuver for the second attempt, 34.3% would use the Kocher maneuver; 19.6%, the Hippocratic method; 13.7%, Stimson; 10.8% Milch; 7.8%, the Spaso maneuver; 6%, traction/countertraction and, in lower percentages, the FARES, Mothes, and other techniques.

13.8% of the participants reported having had complications related to the reduction of an AIGHD. Complications are detailed in Figure 2. 44.1% mentioned that they occurred with the Hippocratic maneuver; 39%, with the Kocher maneuver; 10.2%, with the Milch maneuver and 6.8%, with other methods. There was no statistically significant difference between the type of complications reported and the maneuvers performed (p = 0.835).

Regarding the position chosen for immobilization after reducing an AIGHD, 74.8% immobilized the patient in adduction and internal rotation; 23.3%, in adduction and neutral rotation, while 4.4% used another unspecified position.

Figure 3 shows the immobilization time indicated by the respondents. No statistically significant differences were found between the degree of specialization and the immobilization position or the indicated immobilization times (p = 0.227 and p = 0.873, respectively).

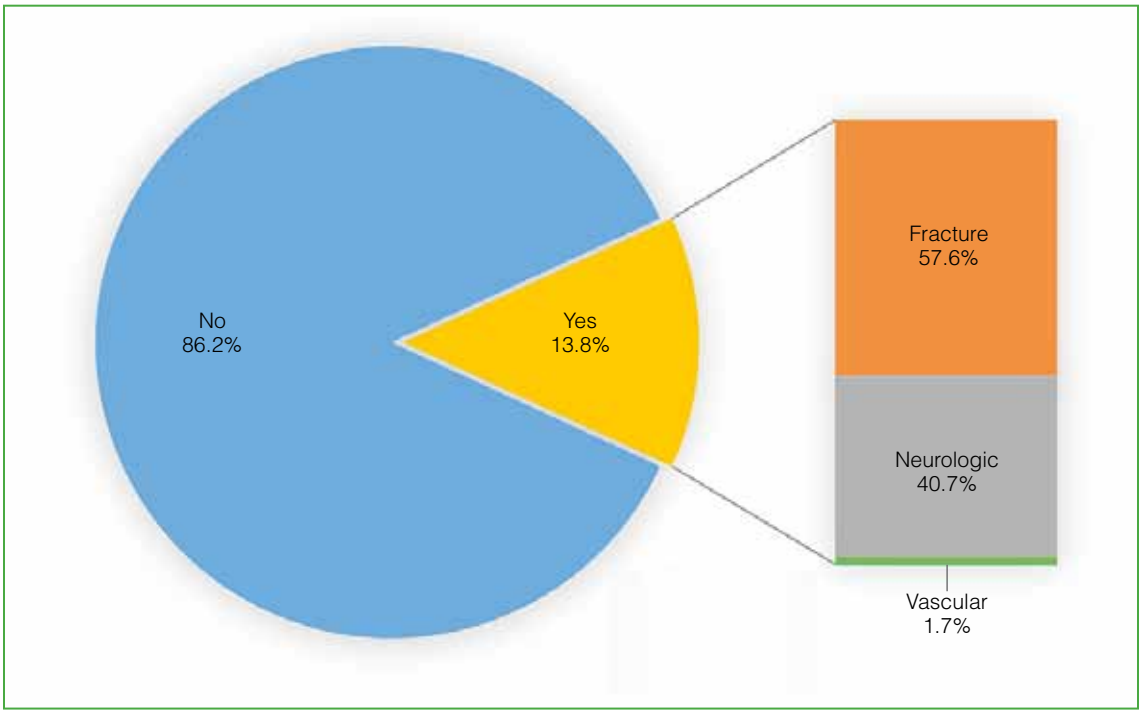

Figure 2. Percentage of respondents using anesthesia and type of anesthesia administered.

Figure 3. Use of anesthesia according to the degree of specialization. The differences between the groups were statistically significant (p = 0.046).

DISCUSSION

The survey revealed that, among traumatologists/residents of the Argentine health system, the maneuvers used to reduce an AIGHD are very varied. Most of those surveyed initially resorted to the Kocher maneuver, probably because they considered that it had the highest success rate. Numerous articles have been published on the effectiveness and efficiency of the different maneuvers.[10,12-15]

In 2017, Alkaduhimi et al. published a systematic review comparing pain, hospital stay, and success rate of classic maneuvers. The reduction success rate was 28% with the Stimson maneuver, 80% with the Milch maneuver, 85% with the Kocher maneuver, 92% with the Spaso and FARES techniques, 95% with traction/countertraction, and 97% with scapular manipulation. The authors concluded that the scapular manipulation maneuver should be used as the first choice followed by the FARES technique.[16]

Position and immobilization time after reduction remain controversial. Even the need to immobilize has been questioned. The immobilization position used by 76.3% of those surveyed is in adduction and internal rotation. An immobilization time of three weeks was chosen by the majority.

Based on a study with 226 patients, Kiviluoto et al. reported that, after the first episode of AIGHD, the rate of a new dislocation was higher in patients immobilized for one week, compared with those immobilized for three weeks.[17] In contrast, Hovelius et al. published a prospective multicenter study in which they evaluated 247 patients immobilized in internal rotation, and found no correlation between immobilization time and recurrence after a 10-year follow-up.[18]

Heidari et al. reported that abduction and external rotation reduced the risk of redislocation when compared to internal rotation; however, compliance rates were significantly lower in the external rotation group, due to more difficulty going through doors, sleeping, and risk of trauma.[19]

Based on a literature review available up to 2007, Itoi et al. concluded that immobilization in external rotation reduces the risk of AIGHD recurrence compared to immobilization in internal rotation.[20] These results were confirmed by Murray et al. in 2018, who maintain that immobilization in external rotation significantly improved the healing of soft tissue injuries (Bankart injury).[21] In contrast, Gutkowska et al. stated that immobilization in external rotation at 10-20° vs. adduction and internal rotation is not superior to pure internal rotation.[22]

In a prospective, randomized study of 30 patients in 1995, Matthews et al. determined that intra-articular anesthesia with lidocaine is a safe and effective method, contributing to successful positioning with less pain and fewer side effects than sedation (respiratory depression, nausea and vomiting).[23] These results were confirmed by Kosnik et al.,[5] and Meyer et al.[24]

79.2% of the physicians surveyed do not initially use anesthesia for the first closed reduction attempt, and only 29.5% use anesthesia for a second attempt when reduction is not achieved with the initial maneuver.

There is a significant difference in the application of anesthesia ($p = 0.046$) between residents and specialists. Only 12.1% of the resident doctors use anesthesia to perform the reduction, while 43.3% of the group of specialists in shoulder surgery do administer anesthesia for the first reduction attempt. Contrary to the evidence available to date, if they choose to use anesthesia for reduction, 78% of the sample choose sedation or general anesthesia instead of an intra-articular local anesthetic. The latter option has similar efficacy, lower cost, a lower complication rate, and requires a shorter hospital stay.[5,23-25]

The main limitations of this study are: not knowing the number of traumatologists and residents who work in emergency services and the low number of responses by resident doctors.

To our knowledge, this is the first epidemiological study related to the behavior adopted in the initial treatment of a first episode of AIGHD in Argentina.

CONCLUSIONS

The methods used for the reduction of the first episode of AIGHD are highly variable. There is a relationship between the level of specialization and the use of anesthesia. We highlight the importance of reconsidering the use of anesthesia, and we suggest intra-articular anesthesia as the first option. We propose to modify behavior and use intra-articular local anesthesia, because the complication rate and costs are lower, and the hospital stay is shorter than with sedation and general anesthesia.

As a future line of research, we propose to carry out a prospective study to compare the efficiency, economic cost, and complications of AIGHD reduction between intra-articular anesthesia and sedation and general anesthesia.

This study provides a framework for establishing guidelines aimed at reducing first-episode AIGHD, and outlines areas that lack consensus and require further study.

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Appendix

ORIGINAL SURVEY

Choice for the reduction of an Anterior Inferior Glenohumeral Joint Dislocation (AIGHD).
This questionnaire is anonymous.
Estimated duration: 3 minutes.
Aimed at traumatologists and residents/interns of traumatology and orthopedics who practice in Argentina.

1. You are a... * *(Check only one.)*
☐ Resident/Intern Physician
☐ Traumatologist

2. When did you complete your medical degree? * *(Check only one.)*
☐ Less than 5 years ago
☐ Between 5 and 15 years ago
☐ More than 15 years ago

3. In what field do you work? * *(Check only one.)*
☐ Public
☐ Private
☐ Both

4. Facing a first episode of AIGHD. What is the maneuver you usually use for reduction? *
(Check only one.)
☐ Kocher
☐ Stimson
☐ Hippocratic
☐ Spaso
☐ Milch
☐ FARES
☐ Scapular manipulation
☐ Other .....

5. Do you use anesthesia to perform this maneuver? * *(Check only one.)*
☐ YES *(Skip to question 7)*
☐ NO *(Skip to question 8)*

6. What type of anesthesia do you use? * *(Check only one.)*
☐ Intra-articular local anesthesia
☐ Sedation or general anesthesia

7. Given the failure of the first attempt to achieve the reduction, what would be your second option? *(Check only one.)*
☐ Repeat the previous maneuver (Skip to question 10.)
☐ Choose another maneuver (Skip to question 9.)
☐ Use anesthesia if I have not used it previously (Skip to question 10.)
☐ Open reduction (Skip to question 10.)

8. The second choice maneuver is: * *(Check only one.)*
☐ Kocher
☐ Stimson
☐ Hippocratic
☐ Spaso
☐ Milch
☐ FARES
☐ Scapular manipulation
☐ Other: .....

9. Have you ever had any complications related to the reduction of an AIGHD? * *(Check only one.)*
☐ Yes *(Skip to question 11.)*
☐ No *(Skip to question 13.)*

10. With which of the maneuvers have you had any complications? ** (Select all that apply.)*
☐ Kocher
☐ Stimson
☐ Hippocratic
☐ Spaso
☐ Milch
☐ FARES
☐ Scapular manipulation
☐ Other: .....

11. What type of complication have you had? * *(Check only one.)*
☐ Neurological
☐ Vascular
☐ Fracture
☐ Other: .....

12. What position for immobilization do you typically choose after reduction of an anterior inferior glenohumeral joint dislocation? * *(Check only one.)*
☐ Adduction and internal rotation
☐ Adduction and neutral rotation
☐ Other

13. After reduction. How long do you immobilize the patient? ** (Check only one.)*
☐ 1 week
☐ 2 weeks
☐ 3 weeks
☐ 4 weeks or more
☐ I do not immobilize

Thank you!