

CLINICAL CASE

TRAUMATISMO VASCULAR ASOCIADO A REDUCCION CERRADA DE LUXACION DE HOMBRO: CASO CLINICO

VASCULAR TRAUMA ASSOCIATED WITH CLOSED REDUCTION OF SHOULDER DISLOCATION, CLINICAL CASE

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RESUMEN

Las luxaciones de hombro presentan un alta incidencia en las urgencias médicas, con una tasa de incidencia anual que varía entre 23.1 y 23.9 por cada 100,000 personas, lo que representa el 1.7% de la población en general, siendo los adultos jóvenes y las mujeres mayores quienes tienen un riesgo más elevado; Entre las complicaciones asociadas a la luxación traumática de hombro debido a la reducción, se incluyen lesiones vasculares y neurológicas, las primeras son más comunes en pacientes de edad avanzada, ya que sus vasos sanguíneos tienden a ser más rígidos y frágiles, lo que puede afectar la arteria o vena axilar y sus ramas. En este artículo se presenta el caso clínico de un paciente masculino de 59 años con diagnóstico clínico de luxación de hombro derecho secundario a caída desde su propia altura con posterior reducción generando lesión de la arteria axilar y plexo braquial, situación que requirió tratamiento quirúrgico debido a extensión de la lesión mixta y compromiso de articulación desencadenada en desarticulación del miembro superior afectado.

PALABRAS CLAVE Amputación quirúrgica, Luxación de Hombro, Reducción cerrada, plexo braquial, arteria axilar

ABSTRACT

Shoulder dislocations have a high incidence in medical emergencies, with an annual incidence rate that varies between 23.1 and 23.9 per 100,000 people, which

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represents 1.7% of the general population, with young adults and older women being at higher risk; Among the complications associated with traumatic shoulder dislocation due to reduction, vascular and neurological injuries are included, the former being more common in elderly patients, since their blood vessels tend to be more rigid and fragile, which can affect the axillary artery or vein and its branches. This article presents the clinical case of a 59-year-old male patient with a clinical diagnosis of right shoulder dislocation secondary to a fall from his own height with subsequent reduction causing injury to the axillary artery and brachial plexus, a situation that required surgical treatment due to the extension of the mixed injury and joint involvement leading to disarticulation of the affected upper limb.

KEYWORDS Surgical amputation, Shoulder dislocation, Closed reduction, Brachial plexus, Axillary artery

INTRODUCCIÓN

Shoulder dislocation is one of the most frequent joint injuries in clinical practice, accounting for the highest percentage of all joint dislocations. This injury occurs when the head of the humerus is displaced from the glenoid cavity. The main causes are direct trauma, falls, or forced movements. Due to its great mobility, the glenohumeral joint is particularly susceptible to dislocations, especially in young people and athletes. The most common type is anterior dislocation, although posterior or inferior dislocations may also occur, each with specific characteristics and injury mechanisms (Gil et al., 2003).

According to the anatomical structure of the shoulder, in vascular terms, it is noted that the axillary artery extends from the lower border of the first rib to the lower border of the teres major muscle.

It is crossed anteriorly by the pectoralis minor muscle and is divided into three segments: proximal, middle, and distal (Todd, 1998). Therefore, its handling during the reduction of a dislocation must be approached with great caution.

In terms of intervention, closed reduction and immobilization are usually sufficient for initial treatment. However, shoulder dislocation can present complications, among the most significant being vascular injuries, which can compromise the blood supply to the upper limb and

consequently lead to ischemia. Without adequate and timely clinical management, this complication may progress to more severe and rare injuries, such as disarticulation of the entire limb, resulting in loss of functionality and, consequently, limitations in performing vital activities.

Other sequelae may also arise, including recurrent joint instability, nerve injuries, and post-traumatic arthropathy, highlighting the importance of timely diagnosis and appropriate clinical and therapeutic management. The clinical case presented below demonstrates a diagnosis of shoulder dislocation with severe complications, such as vascular injury and, in turn, structural disarticulation.

CLINICAL CASE

Male patient, 59 years old, admitted to the service with a diagnosis of glenohumeral dislocation secondary to trauma to the right shoulder from a fall from his own height, which was reduced in the city of Pamplona. However, due to persistent pain, swelling, and cyanosis of the limb, he was referred to the city of Cúcuta.



Image No.1: Source: Authors

Reduction of glenohumeral dislocation with evident swelling, ecchymosis, and deformity of the right upper limb.

Upon admission, the patient presented with vital signs within normal limits, with evident grade II edema involving the entire right upper limb, severe pain upon manipulation with complete limitation of the range of motion, sensation of paresthesia, absent pulses, ecchymosis on the anterior aspect of the right shoulder, coldness in the distal extremity, and cyanosis observed from the elbow joint to the fingers.

The patient was evaluated by the orthopedic service, which determined the diagnoses of compartment syndrome in the right upper limb with possible vascular injury in the right shoulder, and closed reduction of right glenohumeral dislocation. Emergency surgical intervention was indicated to perform a fasciotomy in the deltoid

region. During the procedure, a vascular surgery consult was requested. Upon inspection, a complex injury to the axillary and brachial arteries, axillary vein, and arterial and venous trunks of the deltoid region was identified. The corresponding vascular repair procedure was performed.

The patient was transferred to the critical care unit for management of the clinical condition and hemodynamic instability. During the stay, cyanosis persisted, lividity began to appear, and coldness and necrosis of the arm were identified. Due to the condition of the affected upper limb, glenohumeral disarticulation was indicated, and an emergency surgical procedure for disarticulation, irrigation, and debridement was scheduled.

After the surgical procedure, the patient was again transferred to the intensive care unit, requiring a blood transfusion due to severe anemia secondary to acute blood loss. The patient remained under sedoanalgesia, mechanical ventilation, vasopressor treatment, and antibiotic therapy.

After nineteen days in the intensive care unit, the patient was readmitted to the hospitalization ward in stable condition, with vital signs and laboratory results within normal ranges. On physical examination, suture dehiscence was noted, with necrotic signs at the edges of the surgical wound and the presence of foul-smelling purulent discharge. Despite antibiotic coverage, the orthopedic service decided to take the patient back to surgery to perform stump remodeling, along with irrigation and debridement. A vacuum-assisted closure (VAC) system was placed, and a sample of the wound secretion was taken for analysis and culture.

Subsequently, the patient underwent multiple irrigation and debridement procedures, during which cultures were taken. The first culture revealed the presence of *Klebsiella pneumoniae*, and treatment with piperacillin/tazobactam was initiated. During the next irrigation and debridement procedure, a new culture was taken, which reported the presence of *Providencia stuartii*, showing resistance to the previously indicated antibiotic. The patient was

referred to Infectious Disease for evaluation, and treatment with tigecycline and aztreonam was prescribed.

The patient was taken again to debridement and culture sampling, which resulted in a positive identification of *Pseudomonas aeruginosa*. Infectious Disease recommended treatment with ciprofloxacin and metronidazole, completing a 7-day course.

Subsequently, the VAC system was removed, and the patient was evaluated by the plastic surgery team, who described a coverage defect over the stump measuring approximately 8 x 6 cm, which was not suitable for closure. Follow-up continued under the orthopedic service, who performed a control culture due to the satisfactory evolution of the wound. *Pseudomonas aeruginosa* was isolated again, but Infectious Disease determined that it was a colonization and did not warrant further antibiotic coverage.

Finally, due to the adequate progression of wound healing, the patient was taken by the plastic surgery team for a procedure involving

debridement and skin flap coverage to close the defect. The procedure was successful, and a follow-up culture yielded negative results, leading to the patient's discharge.

DISCUSSION

Injuries occur most frequently in the third segment, from which the anterior and posterior circumflex branches and the subscapular branch emerge. (Giannakakis et al., 1998) report that closed trauma has a worse prognosis and is caused by crushing and, to a lesser extent, arterial spasm caused by displacement of underlying bony structures or external blunt force impacts, a point also supported by (López-Narváez, 2019). This can lead to injury of the intimal layer, partial or complete transection, pseudoaneurysm, and secondary thrombosis, which may result in severe ischemia of the upper limb (Maweja, 2002).

Regarding the injury mechanism, it can be established that the dislocated humeral head compresses the axillary artery against the pectoralis minor muscle, producing a pinching phenomenon that results in

arterial damage. Likewise, inadequate reduction maneuvers can exacerbate vascular injury, worsening the clinical picture (Adovasio, 1996; Hope, 2004).

It is important to mention that in cases where ischemia is prolonged without timely intervention, compartment syndrome may develop (Fernández et al., 2023), a condition in which increased pressure within the osteo fascial compartment impedes adequate tissue perfusion, causing muscle necrosis and irreversible nerve damage. Although compartment syndrome is more common in the lower limbs, it has been described—albeit rarely—in the context of prolonged ischemia of the upper limb, as in this case (Schmidt, 2017; Olán De los Santos, 2023).

Recent literature from the past five years describing the characteristics of compartment syndrome is scarce. This condition can be caused by multiple etiologies, with trauma being the most frequent, along with burns, fractures, contusions, coagulopathies, post-ischemic edema, or overly tight casts.

In this patient, it is presumed that compartment syndrome was triggered

by prolonged arterial ischemia secondary to axillary artery injury, resulting in increased intra compartmental pressure due to fluid extravasation and microcirculation collapse. Progressive hypoxia favored muscle necrosis and the release of myoglobin, which exacerbated the systemic inflammatory response. Given the lack of response to fasciotomy and the unfeasibility of revascularization, disarticulation became the only viable therapeutic option, preventing progression to sepsis and multiorgan dysfunction.

Early and appropriate management of vascular injuries and compartment syndrome in the context of glenohumeral dislocation is complex because ischemic signs in the acute phase tend to initially diminish after reduction due to the extensive collateral circulation around the axillary artery (López-Narváez, 2019).

Furthermore, a retrospective cohort study (n=164) revealed that patients who developed compartment syndrome without an associated fracture were older, had a higher burden of comorbidities, and

experienced an average delay of 12.4 hours in the initiation of fasciotomy compared to patients with fractures. Therefore, a high index of clinical suspicion is required, along with the involvement of an interdisciplinary team of trained professionals capable of recognizing early signs of ischemia (Mathieu, 2021).

The European Society for Vascular Surgery (ESVS), in its 2025 guidelines, emphasizes the need for a thorough physical examination to identify warning signs such as expanding hematoma, absence of peripheral pulses, altered capillary refill, limb pallor, cyanosis, and paresthesia. Additionally, it recommends the use of CT angiography as the gold standard for diagnostic confirmation. Upon clinical evidence, revascularization should be performed as soon as possible, preferably within the first hour of hospital admission, and fasciotomy is recommended to treat compartment syndrome (Wahlgren, 2025).

Shoulder dislocation reductions are almost always successful (Mejia, 2020); however, they can fail in 5 to

10% of cases (Steynes et al., 2000). Nerve and vascular injuries are even rarer complications after reduction but can occur, especially in elderly patients, if the reduction technique is not correctly applied (Arias et al., 2022). Likewise, case reports over the past decade document approximately 200 cases associated with vascular injury secondary to anterior shoulder dislocations in the literature, with an incidence of 1 to 2% in the axillary artery and 0.47% in the brachial artery (Sparks et al., 2020), while isolated axillary nerve injury is more common, with an incidence of 10 to 40% (Pellicer-Garcia, 2020).

Currently, the literature on the association between shoulder dislocation and vascular injury, as well as compartment syndrome, is scarce. There is a higher frequency of scientific reports on upper limb amputations due to other causes, such as traumatic and surgical origins, as referenced by (Mathieu, 2021). This lack of clinical evidence in the scientific literature complicates the standardization of protocols for the optimal management of these patients and underscores the need for a high

index of clinical suspicion during the initial evaluation, especially in elderly patients (Wahlgren, 2025).

CONCLUSION

The presentation of this case serves as a call for the creation of early diagnostic protocols, optimization of surgical management, and a multidisciplinary approach to improve clinical outcomes and reduce the incidence of catastrophic complications such as compartment syndrome and disarticulation. In the case presented, it is important to emphasize that the evaluation of vascular integrity post-reduction is crucial in shoulder dislocations, especially in high-risk patients.

Furthermore, it highlights the urgent need to implement continuing medical education programs to enhance healthcare professionals' ability to promptly identify these complications and apply appropriate management protocols. This can positively impact the reduction of clinical complications that lead to permanent functional limitations, affecting not only the physical component but also the emotional aspect, as patients must cope with the grief of losing an anatomical structure and, consequently, occupational limitations—understood as the impairment of all roles performed in daily life.

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