

Wounds from sharp objects of the upper limb (About 504 Cases)

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Abstract

Introduction: Assaults by stabbing constitute a growing problem, leading to serious trauma to the upper limb. This study examines the characteristics, management and consequences of upper limb wounds caused by such attacks.

Material and methods: This is a retrospective study of 504 cases of wounds of the upper limb caused by stabbing, collected over four years at the IBN ROCHD University Hospital in Casablanca. Data were collected from medical records and included information on injuries, surgical management, complications, and functional outcomes.

Results: The lesions predominated on the left upper limb, mainly affecting the hand, wrist, and forearm. The injuries were varied, often involving tendons, nerves, muscles, bones, and vessels. Surgical management was carried out according to established principles, with specific repair techniques. Postoperative complications were common, including sensorimotor disorders, infections, and joint stiffness.

Discussion: The results highlight the extent of upper limb trauma caused by stabbing attacks. The complexity of the lesions requires multidisciplinary care. Postoperative complications highlight the ongoing challenges faced by patients. In addition, the psychological consequences of aggression are significant and require special attention.

Conclusion: This study highlights the importance of understanding and treating upper limb wounds caused by stabbing attacks. The results provide essential information to improve management strategies and prevent long-term complications, while highlighting the medical and psychological challenges associated with these traumas.

Keywords: Wound; Assault; Upper Limb; Knife; Sharp; Aggression

1. Introduction

In our country, violence by aggression has become increasingly common in trauma. As defined by Shaw et al., aggression is intentional acts intended to harm or frighten another person. These acts can range from sarcastic remarks to serious armed attacks, resulting in various types of injuries, including wounds to the upper limb.

In our study, we focus on upper limb wounds caused by stabbing. These injuries, whether superficial or penetrating, can be complex and serious, compromising the functionality of the limb or even the life of the injured person. Our goal is to optimize the patient's functional and aesthetic prognosis while minimizing infectious risks.

Few studies have been carried out on the management of upper limb wounds caused by armed attacks. To fill this gap, our work aims to identify the types of lesions, evaluate the initial treatment methods, and study the functional, psychological, and medicolegal consequences.

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2. Material and methods

This is a retrospective, descriptive study of 504 cases, collected over a period of 4 years (from June 2019 to December 2023) within the trauma and orthopedics department (WING 4) of the IBN ROCHD University Hospital in Casablanca, during which we counted 1372 cases of open wounds and fractures of the upper limbs.

We included in this study all cases of wounds to the upper limbs caused by stabbing that required specialized emergency treatment in the operating room.

3. Results

The anatomopathological study highlighted a strong predominance of lesions in the left upper limb, with 326 (64.68%) cases, compared to 163 (32.35%) patients for the right limb, while bilateral lesions were less frequent, present only in 15 (2.97%) patients. The anatomical regions most affected were the hand, wrist, and forearm, suggesting a propensity for attacks to target these particularly vulnerable areas.

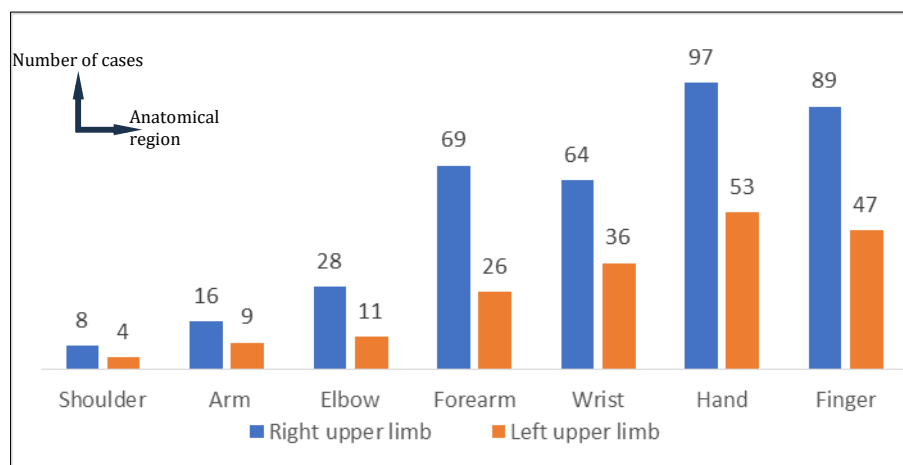


Figure 1 Distribution of cases according to limb and anatomical region

Further analysis revealed that the injuries were varied and complex, with a marked prevalence of tendon damage found in 339 patients (67.39%), followed by nerve damage 144 patients (28.57%), muscle damage 120 patients (23.91%), osteoarticular 118 patients (23.6%), and vascular 94 patients (18.63%). This diversity in the types of lesions highlights the destructive nature of stabbing attacks and the need for multidisciplinary care to treat the damage caused to different anatomical structures.

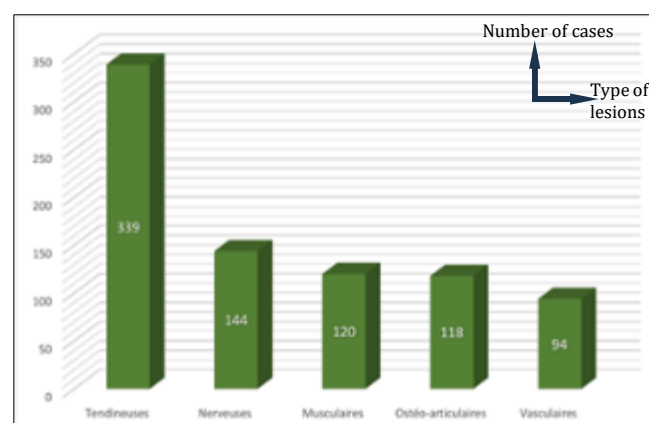


Figure 2 Distribution of lesions according to type

Surgical repair was conducted according to well-established principles, aimed at restoring functionality to the affected limb. Pinning has been widely used for the fixation of bone fractures, with preference for cross or intramedullary

pinning depending on the case. Soft tissue repair involved specific techniques adapted to each type of lesion. Vascular repairs were carried out by end-to-end arterial or venous sutures in cardinal points using non-absorbable PROLENE 8-0 suture.

Nerve repairs were carried out through epi-perineural sutures with 8-0 PROLENE non-absorbable suture.

Tendon lesions were repaired with non-absorbable PROLENE 4-0 suture, mainly by the KESSLER technique in 74.04% of repairs. The use of the TSUGE technique was in 17.7% of cases. These techniques were sometimes reinforced by anterior hemi-overlock. A pull-out of the flexor tendons was necessary in 28 cases (or 8.26%) to ensure tendon reinsertion.

The muscle lesions were sutured with absorbable VICRYL 2 sutures.

The patients in our series benefited from immobilization with a cast splint for 3 weeks followed by early rehabilitation.

The course was marked by a certain number of complications, affecting approximately a quarter of patients. Sensory-motor disorders were the most common (31.57%), followed by healing disorders (24.81%), joint stiffness (23.3%) and infections (22.55%). These complications highlight the persistent challenges faced by patients after a stab wound, requiring careful monitoring and long-term follow-up to prevent functional and aesthetic sequelae.

The overall functional prognosis was considered favorable for most patients (61.67%), reflecting the effectiveness of surgical interventions and rehabilitation in restoring the functionality of the affected limb. However, a minority of patients reported psychological disorders associated with aggression.



Figure 3 Image of a wound on the ulnar edge of the left wrist of one of our patients showing a total section of the ulnar tripod (ulnar artery, ulnar nerve, and tendon of the anterior ulnar muscle) and flexor digitorum muscle.



Figure 4 Image of an open fracture of the right olecranon of one of our patients, treated by metal fixation.

4. Discussion

The prevalence of stabbing varies depending on the geographic context. Although epidemiological data are limited, it is estimated that these injuries are uncommon in France, representing approximately 10 to 15% of all injuries. On the other hand, in some countries such as the United States, the frequency of penetrating trauma is much higher, reaching up to 70%, with firearm wounds predominating. [1, 2]

Traumatic injuries to the limbs caused by aggression primarily concern men because of their natural exposure to violence. However, certain series report an identical prevalence of men and women due to the frequency of conjugal violence [3]. Young people are most frequently affected [4, 5, 6]. This seems linked to the particularly high unemployment rate, the low socio-economic level and the propensity for drug consumption and alcoholism, particularly in poor suburbs.

The anatomopathological study of the different series [7-10] analyzing traumatic lesions finds a predominance of lesions on the left upper limb. This observation can be attributed to the fact that this limb is often used as a shield by right-handed individuals during aggression, thus leaving the dominant limb free for a possible counterattack. Furthermore, the results show a marked preference for the distal parts of the upper limb, such as the hand, wrist, and forearm, compared to the proximal parts such as the shoulder and arm. This trend suggests a strategy of protecting the face, probably through the ulnar shield, thus accentuating the lesions in this region.

Concerning the nature of the injuries caused by stab weapons are often multiple and complex. Tendon and muscle injuries are the most affected. This observation highlights the importance of the deep and widespread damage inflicted by these weapons. Additionally, although less common, nerve damage and fractures are also present, reflecting the diversity of potential damage induced by bladed weapons. On the other hand, vascular lesions are less frequent in all the series examined. [8 -9]

The time it takes to consult patients after an attack is critical, with most patients consulting after a delay of six hours, which can pose a problem, particularly in cases of arterial lesions or amputations where the viability of the limb is threatened [11].

Assaults with bladed weapons lead to various functional consequences, such as infections, nerve palsies, fracture displacements and joint stiffness, among others. In our study, complications represented 26.38% of cases, dominated by sensorimotor disorders and infections. What is close to the results can be found in the literature. Flexor tendon

injuries also have a significant impact on functionality, often compounded by poor socioeconomic conditions and limited access to medical care [12].

The psychological consequences of assault include minor disorders such as anxiety and anxiety, as well as major disorders such as depression and post-traumatic stress disorder (PTSD). In our study, 6.15% of patients presented psychological disorders, with a higher prevalence in women. These psychological disorders are particularly common among victims of amputations and can affect their social and professional reintegration [13].

The duration of total incapacity for work (ITP) is an important medicolegal criterion, with implications for the legal classification of offenses. In our study, 71% of cases had an ITP of more than 20 days, highlighting the seriousness of the injuries sustained [14].

The rate of permanent partial incapacity (PPI) reflects the permanent reduction in the functional capacity of victims. In our study, most cases had a PPI of 1% to 10%.

Based on the clinical and radiological results, we were able to establish an overall functional prognosis of our series. Overall, 61.67% of cases had a good prognosis, while 15.83% had a poor prognosis. These results vary between studies but highlight the importance of appropriate management to optimize the functional results of victims of aggression. [15].

5. Conclusion

This study highlighted the complex characteristics of upper limb wounds caused by stab wounds, as well as the challenges associated with their management and the frequent postoperative consequences. By improving our understanding of these traumas, this research will contribute to optimizing treatment and rehabilitation strategies, aimed at improving the quality of life of victims and reducing the impact of stabbing attacks on society.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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