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Management of Upper Limb Weapon Injuries at SOMINE Dolo Hospital in Mopti in 2025: Epidemiological, Injury and Therapeutic Aspects

Kone S[1,3]*, Sangare A S[2-6], Kone S[1], Diallo S[6], BERETE K D[4], Coulibaly I[3], Diarra K[2], Fomba O[2], Keita D[5], Keita C T[1], Tambassy S I[6], Keita G[1], Fofana Y[1], Traoré D[8], Sanogo S[5]

[1]SOMINE Dolo Hospital, Mopti
[2]Hôpital du Mali
[3]Camp DASIRI Medical Centre
[4]Kati Hospital
[5]Le Luxembourg Mother and Child Hospital
[6]Kati Armed Forces Medical and Surgical Centre (CMCAK)
[7]Gao Role 2 Medical Facility
[8]National Institute of Public Health (INSP)

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***Corresponding author:** Dr Kone Salif
SOMINE Dolo Hospital, Mopti

Abstract **Original Research Article**

Introduction. Weapon injuries to the upper limbs are potentially serious emergencies because of the risk of bone, vascular, nerve and tendon injuries, as well as functional sequelae. ***Objective.*** To investigate the epidemiological, injury and therapeutic aspects of upper limb weapon injuries managed at Sominé Dolo Hospital in Mopti in 2025. ***Methods.*** This was a retrospective descriptive study of 67 patients. The variables analysed were age, sex, weapon type, injury type, anatomical injury site, diagnostic modalities, treatment type and immediate outcome. ***Results.*** The mean age was 30.3 ± 8.6 years, with a median of 29 years. Men accounted for 98.5% of cases. Projectiles were involved in 74.6% of cases. Ballistic trauma accounted for 53.7% of injuries, and the forearm was the most frequent site (28.4%). Treatment was surgical in 65.7% of patients. Among documented surgical procedures, debridement accounted for 57.1%, external fixation for 23.8% and amputation for 14.3%. ***Conclusion.*** Upper limb weapon injuries managed in Mopti primarily affect young adult men and frequently require surgery. Improving the recording of injury characteristics, complications and functional outcomes would allow a better assessment of quality of care.

Keywords: Weapon injuries; upper limbs; SOMINE DOLO Hospital, Mopti.

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1. INTRODUCTION

Upper limb trauma caused by firearms, bladed weapons or explosive devices can result in complex injuries simultaneously involving the skin, muscles, tendons, bones, blood vessels and nerves. Severity therefore depends not only on the immediate threat to life but also on the functional prognosis of the limb. [4,7,15]

In regions affected by insecurity and armed violence, these injuries account for a substantial proportion of emergency surgical activity. Projectile injuries are particularly challenging to manage because they may involve multiple tissues, carry a risk of contamination and be associated with open fractures or tissue loss. [5,6,9,11,14]

Several studies have already described weapon-related trauma at SOMINE DOLO Hospital in Mopti. Traore and colleagues studied 44 firearm injuries managed between 2015 and 2017. Sagara reported 250 ballistic injuries in 2019. Sanga subsequently studied 166 ballistic limb injuries in 2021. These studies demonstrate the continuing substantial trauma burden in this area and highlight the role of wound excision and debridement and fracture stabilisation. [1-3]

The present study is distinguished by its specific focus on the upper limb and by an analysis structured around three areas: epidemiological aspects, injury characteristics and treatment modalities.

The overall objective was to investigate the management of upper limb weapon injuries at Sominé Dolo Hospital in Mopti in 2025. The specific objectives were to describe the epidemiological profile of patients, identify the main injury types and sites, and describe the treatments provided.

2. PATIENTS AND METHODS

2.1. Study Design and Setting

This retrospective descriptive study was conducted at Sominé Dolo Hospital in Mopti using the 2025 database of upper limb weapon injuries.

2.2. Study Population

The study population comprised 67 patients recorded in the database. The anatomical sites considered were the shoulder, upper arm, elbow, forearm, wrist and hand.

2.3. Study Variables

The variables were age, sex, weapon type, injury type, anatomical site, diagnostic modality, treatment type, immediate outcome and complications.

2.4. Statistical Analysis

The data were analysed descriptively. Categorical variables are presented as counts and percentages. Age is described using the mean, standard deviation, median, interquartile range and minimum and maximum values. For incompletely recorded variables, percentages were calculated using the number of valid records.

2.5. Ethical Considerations

The supplied database contained no direct identifiers. Information on institutional authorisation and ethics committee approval must be completed by the authors before submission.

3. RESULTS

3.1. Epidemiological Aspects

The mean age was 30.3 ± 8.6 years, with a median of 29 years, an interquartile range of 25–33 years and a range of 16–66 years. Patients aged 25–34 years accounted for 55.2% of the sample.

Table 1: Distribution of patients by age group

Age group	Number	Percentage
15–24 years	15	22.4 %
25–34 years	37	55.2 %
35–44 years	11	16.4 %
≥45 years	4	6.0 %

Men predominated, accounting for 66 cases (98.5%).

Table 2: Distribution of patients by sex

Sex	Number	Percentage
Male	66	98.5 %
Female	1	1.5 %

Projectiles were the main weapon type, accounting for 50 cases (74.6%), followed by bladed weapons (17.9%) and improvised explosive devices (7.5%).

Table 3: Distribution by weapon type

Weapon type	Number	Percentage
Projectile	50	74.6 %
Bladed weapon	12	17.9 %
Improvised explosive device (IED)	5	7.5 %

3.2. Injury Characteristics

Ballistic trauma was the most frequent injury category, with 36 cases (53.7%). Contusions accounted for 19.4% and extensive tissue injuries for 11.9%.

Table 4: Distribution by injury type

Injury type	Number	Percentage
Ballistic trauma	36	53.7 %
Contusion	13	19.4 %
Extensive tissue injury	8	11.9 %
Tendon and ligament injury	5	7.5 %
Vascular injury	3	4.5 %
Nerve injury	2	3.0 %

The forearm was the most frequently affected anatomical site, with 19 cases (28.4%), followed by the hand (19.4%).

Table 5: Distribution by anatomical injury site

Injury site	Number	Percentage
Shoulder	10	14.9 %
Upper arm	10	14.9 %
Elbow	10	14.9 %
Forearm	19	28.4 %
Wrist	5	7.5 %
Hand	13	19.4 %

The diagnostic modality was recorded for 66 patients. Radiological imaging was the most frequently documented modality (68.2%), followed by clinical assessment (30.3%). [10]

Table 6: Distribution by diagnostic modality

Diagnostic modality	Number	Percentage
Clinical assessment	20	30.3 %
Radiological imaging	45	68.2 %
Ultrasound	1	1.5 %

Valid denominator: 66.

3.3. Therapeutic Aspects

Surgical treatment was provided to 44 patients (65.7%). Non-operative orthopaedic treatment accounted for 25.4% and medical treatment for 9.0%.

Table 7: Distribution by treatment type

Treatment type	Number	Percentage
Medical	6	9.0 %
Non-operative orthopaedic	17	25.4 %
Surgical	44	65.7 %

The surgical procedure was recorded for 42 patients. Debridement was the main procedure (57.1%), followed by external fixation (23.8%), amputation (14.3%) and intramedullary nailing (4.8%). No plate fixation was recorded in this database.

Table 8: Distribution by surgical procedure

Surgical procedure	Number	Percentage
Debridement	24	57.1 %
External fixation	10	23.8 %
Intramedullary nailing	2	4.8 %
Plate fixation	0	0.0 %
Amputation	6	14.3 %

Valid denominator: 42.

The immediate outcome was recorded for 66 patients. It was favourable in 92.4% of valid records. The "complication" variable was not recorded for any patient; therefore, a complication rate cannot be calculated.

Table 9: Distribution by immediate outcome

Outcome	Number	Percentage
Favourable	61	92.4 %
Unfavourable	5	7.6 %

Valid denominator: 66.

4. Comparison with Previous Publications from Sominé Dolo

Comparisons with previous studies must take differences in study populations into account. Traore and colleagues studied gunshot wounds at all anatomical sites between 2015 and 2017; Sagara studied all ballistic injuries in 2019; and Sanga focused on ballistic limb injuries in 2021. The present study specifically concerns upper limb weapon injuries in 2025. [1-3]

Table 10: Comparison of sample sizes and mean ages with previous studies

Study	Number	Mean age
Traore *et al.,* 2015–2017	44	30 years
Sagara, 2019	250	41 years
Sanga, 2021	166	30.48 years
Present study, 2025	67	30.3 years

Table 11: Comparison of male predominance and selected treatment data

Study	Male predominance	Key treatment finding
Traore *et al.,* 2015–2017	95.5%	Wound excision: 24 cases; external fixation: 9 cases
Sagara, 2019	90.4%	Limb injuries accounted for 68%
Sanga, 2021	Sex ratio 11.77	Debridement in all patients; external fixation in 20 patients
Present study, 2025	98.5 %	Debridement: 57.1% of documented procedures

The age profile observed in 2025 is similar to those reported by Traore and Sanga. Male predominance is also consistent across local series. Regarding treatment, debridement and external fixation remain important techniques, reflecting the frequency of potentially contaminated wounds and injuries requiring stabilisation. [1-3]

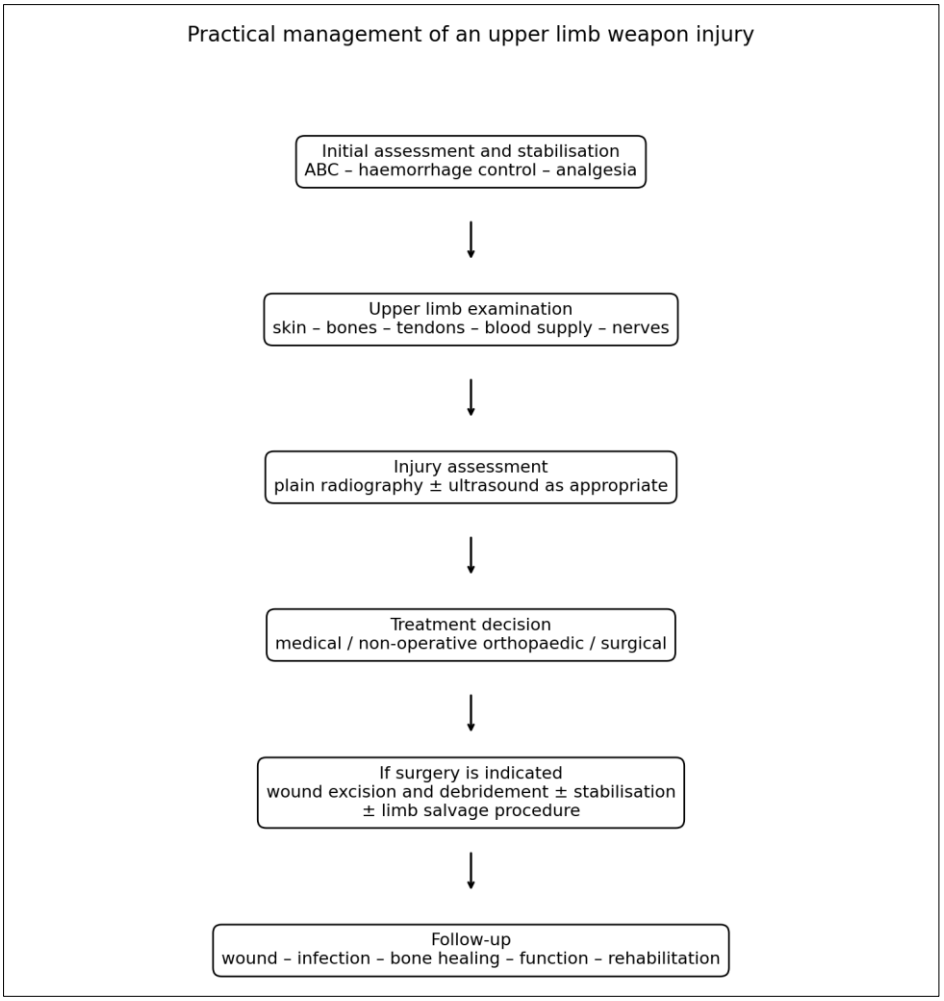


Figure 11: Practical management pathway for an upper limb weapon injury

5. DISCUSSION

5.1. Epidemiological Aspects

Our sample included 67 patients, with a mean age of 30.3 years. This mean is almost identical to those reported by Traore and colleagues (30 years) and Sanga (30.48 years), whereas Sagara reported a higher mean age of 41 years. These differences may be explained by the inclusion criteria and anatomical sites studied. [1-3]

Male predominance was particularly marked (98.5%). This trend is consistent with previous publications from Mopti and may be related to greater

exposure of men to occupational activities, travel and situations involving armed violence in the region. [1-3,11]

Projectiles were responsible for 74.6% of injuries. This proportion confirms the substantial contribution of firearms to local trauma, although our series also includes bladed weapons and improvised explosive devices. [1-3,7,11,14]

5.2. Injury Characteristics

Ballistic trauma was the predominant injury type (53.7%), followed by contusions and extensive tissue injuries. The presence of vascular, tendon and ligament, and nerve injuries highlights the fact that upper limb trauma may involve several anatomical structures simultaneously. [4,7,12,15]

The forearm was the most frequent site (28.4%), followed by the hand (19.4%). Injuries to these segments are particularly concerning because of the role of the forearm in wrist and hand movement and the functional importance of the hand in grasping. [4,15]

Radiological imaging was the most frequently recorded diagnostic modality. This finding is consistent with the need to investigate bone injury or a retained projectile. However, the absence of more detailed data on fractures and neurovascular injuries limits the assessment of injury severity. [10]

5.3. Therapeutic Aspects

Surgical treatment was provided to 65.7% of patients. This frequency reflects the potentially complex and contaminated nature of weapon injuries, particularly when associated with extensive tissue damage or deep injury. [4-9,13]

Debridement accounted for 57.1% of documented procedures. Its central role is consistent with the principles of ballistic wound management, which involve excision of devitalised tissue, irrigation and infection prevention. The use of external fixation in 23.8% of documented procedures reflects the need to stabilise certain complex or open bone injuries. [5,6,8,13]

Six amputations were recorded among documented surgical procedures, representing 14.3%. This finding highlights the potential severity of some injuries and the importance of early management, particularly when limb viability is threatened by vascular compromise, infection or tissue damage. [5,9]

The immediate outcome was favourable in 92.4% of valid records. This finding is encouraging but should not be interpreted as complete functional recovery, as no functional scores or long-term follow-up were available. [1-3]

6. Proposed Practical Management Approach

The management of an upper limb weapon injury should follow a structured approach. After stabilising the patient, limb examination should document the condition of the skin, distal perfusion, pulses, sensation, motor function and tendon structures. Plain radiography is generally the initial imaging examination. Complex injuries may require further investigation. Depending on the case, treatment combines antibiotic prophylaxis, tetanus prophylaxis, immobilisation, wound excision and debridement, bone stabilisation and specialist repair. [4,5,7,10,12,15]

7. Study Limitations

- Single-centre study with a sample limited to 67 patients;
- No data on the precise circumstances of injury or delays in treatment;
- No detailed description of fractures or associated vascular, nerve and tendon injuries;
- No data on antibiotic prophylaxis, length of hospital stay or rehabilitation;
- The “complication” variable was missing for all patients;
- No medium- or long-term functional follow-up.

8. RECOMMENDATIONS

- Establish a standardised registry of weapon injuries recording the mechanism, time to admission, laterality, associated injuries, investigations, surgical procedures and complications.
- Systematically document the vascular and neurological examination of the upper limb on admission. [12,15]
- Include functional indicators in follow-up: joint range of motion, strength, sensation, pain, independence and return to activities.
- Strengthen collaboration between surgery, anaesthesia and intensive care, radiology and rehabilitation teams for complex injuries. [4,5,10]
- Conduct prospective studies to analyse factors associated with complications and functional sequelae.

9. CONCLUSION

In 2025, upper limb weapon injuries managed at Sominé Dolo Hospital in Mopti primarily affected young men. Projectiles were the predominant mechanism. Injuries mainly involved the forearm and hand, and treatment was predominantly surgical. Debridement was the most frequent procedure among documented surgical interventions.

Comparison with previous studies from Sominé Dolo Hospital shows continuity in the epidemiological profile and certain treatment practices. Better documentation of injuries, complications and functional outcomes is needed to strengthen the quality of future studies and guide improvements in care.

DECLARATIONS

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Clinical Photographs



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