

## Open Trauma of the Abdomen by Weapons at the Reference Health Center of Commune I of Bamako

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DOI: [10.36347/sasjs.2023.v09i09.011](https://doi.org/10.36347/sasjs.2023.v09i09.011)

| Received: 09.08.2023 | Accepted: 15.09.2023 | Published: 20.09.2023

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### Abstract

### Original Research Article

**Purpose:** To analyze the outcomes of the management of open trauma to the abdomen by weapons. **Methodology:** This was a prospective, descriptive study from February 2019 to January 2020. **Results:** We performed 418 surgeries with 7.65% (32 cases) of open trauma to the abdomen by weapons. The average age was 31.38 years with extremes of 7 to 54 years. The male sex was the most represented 90% or a ratio of 9. The majority of our patients were injured overnight at home or in nightclubs. The assault was criminal with knives in the majority of cases. Abdominal pain and evisceration were the main reasons for consultation. Physical examination and X-ray of the unprepared abdomen (ASP) made the diagnosis. Laparotomy was performed in all our patients with simple consequences. **Conclusion:** Since the advent of the socio-political crisis in Mali, the proliferation of weapons has encouraged criminal attacks. Their management is complex often multidisciplinary is still controversial between laparotomy from the outset and non-operative treatment.

**Keywords:** Open trauma, Weapons, Laparotomy.

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## INTRODUCTION

Trauma to the abdomen is said to be open when the causal agent penetrates the skin covering to reach the underlying anatomical structures [1].

Open abdominal trauma is a public health problem. The frequency of open abdominal trauma has increased throughout the world and varies from one country to another, due to the increase in crime, the availability of weapons, the presence of conflicts and economic and demographic development, all of which have resulted in a real unemployment crisis [2].

The prognosis of these injuries depends not only on the extent of haemorrhagic lesions in solid organs and the risk of septicaemia following perforation of a hollow organ, but also on the existence of other lesions forming part of a polytrauma. The diagnosis is clinical and para-clinical and enables the initial lesion assessment to be established.

The management of open abdominal trauma is currently the subject of controversy. The debate is between the classic attitude of systematic exploratory laparotomy [3] and an attitude known as "selective abstentionism" [4].

In the USA, they account for up to 70% of injuries, the majority of which are caused by firearms [5]. In France, open trauma to the abdomen is uncommon, representing 10 to 15% of all injuries in 2012 [6]. Bladed weapons are the main agents involved.

In Marrakech (Morocco) 1037 patients (91.7%) had received non-operative treatment: closed trauma 785 cases (75.7%), open trauma 252 cases (24.3%) in 2016 [7]. In Algeria, Ben Abbas Hassib and Benachour Kenza reported in 2018.

29.7% for open abdominal trauma in 64 patients [8]. In Mali in 2013, out of 697 abdominal injuries, 10% were open abdominal injuries [9].

**Citation:** Diarra, I, Dembélé, K. S, Drame, B. M, Sanogo, M, Sylla, Y, Tounkara, C, Kassogue S, Koné, M, Keita, B, Coulibaly, S, Dembélé, B. T, Kanté, L, Togo, A. Open Trauma of the Abdomen by Weapons at the Reference Health Center of Commune I of Bamako. SAS J Surg, 2023 Sep 9(9): 776-781.

In Mopti (Mali), of 62 cases of abdominal trauma, 32% were abdominal wounds in 2018 [10].

Abdominal trauma has a mortality rate of 10%, and the presence of haemorrhagic shock increases the mortality rate to over 40%.

Few studies have been carried out on open trauma to the abdomen, hence the interest of this study, the aim of which is to study penetrating abdominal wounds caused by weapons and to analyse the results of treatment.

**METHODOLOGY**

This was a prospective, descriptive study running from February 2019 to January 2020, i.e. a total duration of 12 months carried out in the general surgery department of the reference health centre in Commune I of the Bamako district.

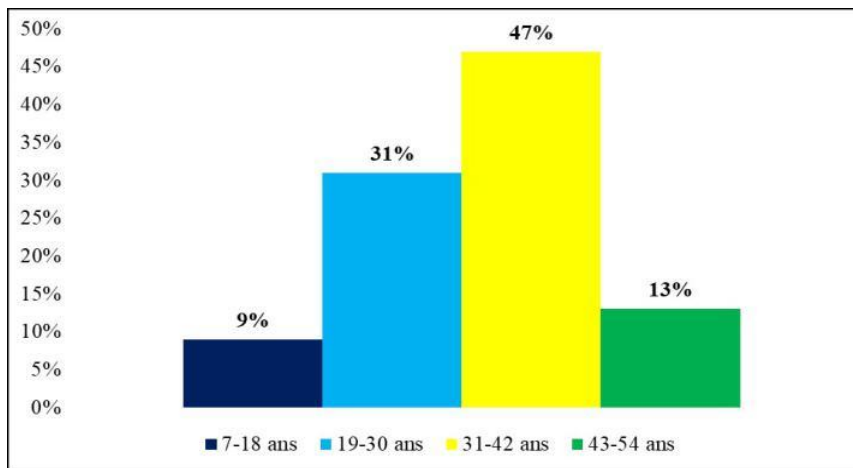
All patients admitted to the general surgery department of CS Réf C1 Bamako for open abdominal trauma were included in the study. Data were entered and analysed using Microsoft Word, Excel 2007 and epi-info. Data were compared using the k2 statistical test with a significance level of P< 0.05.

**RESULT**

**Epidemiology**

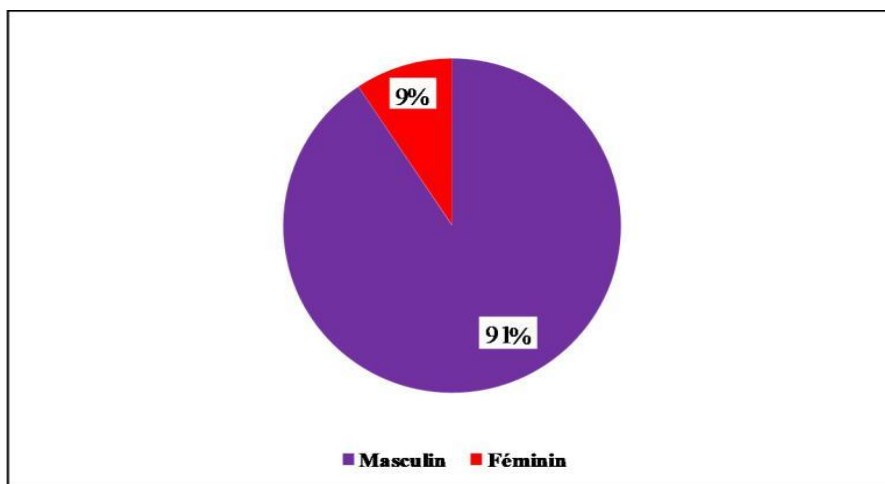
During the study period, 1452 patients were admitted to the general surgery department for abdominal pain. Abdominal trauma accounted for 91 cases, including 32 patients with open abdominal trauma caused by weapons. We performed 418 surgical procedures. Open abdominal gunshot wounds accounted for 7.65% of all operations.

Age:



The 31 to 42 age group was the most represented, accounting for 47% of cases. The mean age was 31 ± 11 years, with extremes of 7 and 54 years.

Gender:



Males accounted for 90% of cases, giving a sex ratio of 9.

Place of attack		
Location	Workforce	Percentage (%)
Bush	3	9,4
Nightclub	10	31,3
Conflict zone	7	21,9
Home	12	37,5
Total	32	100

Most assaults took place at home and in nightclubs (37.5% and 31.1%).

Circumstances of occurrence

Circumstances of occurrence	Workforce	Percentage (%)
Criminal assault	27	84,4
Attempt at autolysis	2	6,3
Hunting accident	3	9,4
Total	32	100

Criminal assault was the most frequent circumstance, accounting for 84.4% of cases. Knives were the most frequently used vulnerable agent, being used in 93.7% of cases.

The majority of our patients (81.2%) were haemodynamically stable. On physical examination, the abdomen was supple in 43.75% of cases.

Sixteen patients (50%) had a subdiaphragmatic gas crescent on unprepared abdominal radiography. All our patients were managed within the first 3 hours.

**Treatment:**

All our patients underwent preoperative resuscitation.

**Approach:**

Median laparotomy above and below the umbilicus was performed in all our patients. The small intestine was the most externalised viscera (75%).

Suture repair of intestinal perforation accounted for 65.6% of the procedures performed. Post-operative care was straightforward in 90.6% of cases. Morbidity was 9.37% and mortality was zero.



4 July 2021 30-year-old 2 images illustrating the homepage and blog



3 April 2022



## DISCUSSION

Open trauma to the abdomen caused by weapons is clearly on the increase worldwide due to the

rise in crime, attacks in civilian practice and the presence of conflicts. In our series, the frequency of 7.65% is statistically comparable to that of Debien Bruno and Kanté. But it differs from that of [7-9]. This

difference can probably be explained by the duration of our study.

Age has an influence on open abdominal trauma. In our series, the patients were mainly young. This has been observed in all series [11,3, 12,13]. This age group suffers the most assaults, which could be linked to their nocturnal activities, their frequentation of bars and nightclubs, and their use of narcotics.

Gender is a risk factor in open abdominal trauma. The majority of patients were male, with a sex ratio of 9.

Middle-income groups such as shopkeepers and low-income groups such as manual workers represented 28.1% and 21.9% of our workforce respectively. These rates differ from the 16% found in France by Monneuse [3]. This difference could be explained by the precarious economic conditions and lack of education in our series, which would expose the perpetrators of these assaults to elegance and criminality.

The time taken to treat the patient is an important factor, with a major influence on prognosis. According to the literature, there is a clear increase in morbidity and mortality after 6 hours in the event of trauma involving weapons [14, 15]. In our study, 5.76% of patients underwent surgery within the first 3 hours.

The literature shows that criminal aggression is the most common aetiological lesion mechanism [6, 9]. There are many reasons for this aggressive phenomenon in society: precarious economic conditions, lack of education and drug use.

In civilian practice, knives are the causal agent most frequently used, as in most series [9, 10].

This could be explained by the easy acquisition and handling of bladed weapons by assailants.

Epiplotele, discharge of digestive fluid and defensiveness were the physical signs consistently found, as in many authors [10, 8].

In our series, 16 patients presented with evisceration. Objective signs such as evisceration (small intestine, colon), abdominal contracture and leakage of digestive fluid through the wound should necessitate emergency exploratory laparotomy.

Ultrasound is used primarily to diagnose intraperitoneal fluid effusion and to quantify its volume [3, 10, 12]. Our rate of ultrasound diagnosis is statistically comparable to that of [3, 12] with  $p > 0.05$ .

The unprepared abdominal X-ray looks for the presence of pneumoperitoneum, a subdiaphragmatic gas crescent and hydroaerosol levels [3, 10, 8].

In our series, we were able to identify 16 cases of subdiaphragmatic gas crossing in the 19 patients whose peritoneal penetration was evident preoperatively, and none of our patients underwent a CT scan because it was difficult to access.

In our practice, we remain faithful to selective intervention for all penetrating abdominal wounds involving weapons. This reduces the high rate of white laparotomy.

Laparotomy is still the standard procedure when the clinical and paraclinical picture is suggestive. All our patients underwent surgery. Our laparotomy rate is higher than those found by other authors [3, 8, 10].

This difference can be explained by the high frequency of penetrating wounds with evisceration in our series.

Treatment of intra-abdominal lesions depends on the size, shape of the lesion and type of organ. Hollow organ lesions appear to be the most common [3]. In cases of perforated bowel, we used sutures whenever possible. In cases where the lesion was very extensive, we performed a segmental resection with end-to-end anastomoses. This approach does not vary greatly from that used by several authors [3, 10].

In our study, two patients presented with colonic lesions in whom we performed a Hartmann colostomy, given the extent of the lesions. For stab wounds with evisceration of the omentum, resection of the omentum was performed.

The prognosis of penetrating abdominal wounds depends on the type of weapon used, the time taken to treat it and the number of viscera affected. In our series, the outcome was 90.6% favourable. No deaths were recorded during our study. Our rate was statistically different from that of Djimdé, which could be explained by the degree of injury and the delay in treatment in their series. We observed 2 cases of parietal suppuration.

## CONCLUSION

Any open trauma to the abdomen should be considered as potentially severe and should therefore lead to clinical monitoring and further investigations.

Treatment is still the subject of controversy between immediate laparotomy and non-operative treatment. In all cases, it must be carried out by specialist multidisciplinary teams.

The prognosis for TOA depends on the circumstances in which it occurs and the speed with which it is treated.

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