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**Original Research Article**

# Goering injuries: epidemiological, lesional and therapeutic aspects in the departments of Borgou and Alibori in Benin

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## ABSTRACT

**Background:** Traumatic lesions by goring constitute a particular entity regarding their lesion mechanism and their types which are different from civil traumatology. Objectives of current study was to investigate the epidemiological, lesional and therapeutic aspects of goring injuries in the departments of Borgou and Alibori in Benin.
**Methods:** This was a prospective and descriptive study covering the period of eighteen months (January 2020 to June 2021) taking into account all patients admitted for goring trauma to one of the reference hospitals.
**Results:** A total of 40 cases were identified. The average age of the subjects was 20.1±14.4 years with extremes of 7 and 65 years. The male subject was the most affected (97.5%) with a sex ratio of 39/1. The age group of 10 to 15 years was the most affected with 19 (47.5%) cases. Goering often took place on pasture (45%) or in the field (35%) and oxen were the most involved animal (90%). The victims were often herdsmen or farmers in respectively 50% and 37.5% of the cases. The trauma was most often located in the abdomen (35%). The treatment depended on the lesions. The average hospital stay was 3.9±3 days with extremes of 1 to 16 days. Two patients had died, so a mortality rate of 5%.
**Conclusions:** The prevention of these traumas passes by the schooling of the children.

**Keywords:** Trauma, Goring, Borgou, Alibori, Benin

## INTRODUCTION

Traumatic lesions by goring constitute a particular entity through their lesion mechanism and their types which are different from civil traumatology. These lesions are common in regions with a bullfighting tradition where the bull is involved in sporting and festive activities. These are Spain, Portugal, Mexico, southern France, some Latin American states and in Africa in Madagascar with the practice of Malagasy bullfighting.[1]

These traumatic goring injuries can be encountered in circumstances other than public performances. Although they are not so frequent in cities, these lesions are frequently observed in rural areas.[2,3] Very little data is available on the subject in our country. We decided to undertake this study with the following objectives: determine the frequency of goring injuries, list the circumstances of the occurrence of goring, describe the lesional aspects and evaluate the management of trauma by goring in hospitals in the departments of Borgou and Alibori in Benin.

## METHODS

The study took place in the departments of Borgou and Alibori in Benin, particularly in eight (08) referral hospitals, namely: Departmental university hospital

Borgou/Alibori (CHUD B/A), army training hospital of Parakou, Evangelical hospital of Bembéréké, Saint John of God hospital in Boko, Saint Martin de Papané hospital, Sounon Sero hospital in Nikki, Kandi Zone hospital, Malanville zone hospital.

The departments of Borgou and Alibori are located in the northeast of Benin. The population is predominantly rural. The economy is based on agriculture and livestock. This was a prospective and descriptive study of patients who suffered goring during the period from January 1, 2020 to June 30, 2021. The inclusion criteria were: being admitted for goring trauma in the one of the selected hospitals and have given his consent. Patients who died on admission were excluded. The variables studied were sociodemographic, clinical and therapeutic. The sampling was exhaustive, including all records of patients who met the inclusion criteria

The study was carried out in three phases: preparation phase characterized by the validation of the theme and the research protocol and the administrative procedures with the departmental health directorates of Borgou and Alibori, the authorities of the various hospitals in the study to obtain authorizations.

Data collection phase on the forms previously drawn up by the surgeons and doctors working in the emergency, operating theater and surgery units. Data were collected from medical records, hospitalization registers and operative reports. Data analysis phase using Epi Info version 7 software.

## RESULTS

### *Sociodemographic aspects*

During the period, 40 victims of goring were identified in six hospitals in the departments of Borgou and Alibori. The HIA of Parakou and the HSJ of Boko had not recorded any cases. High prevalence were found in the area hospitals of Malanville (22.50%), Bèmbèrèkè (20%) and at the CHUDB (20%).

The average age of the subjects reaches 20.12±14.37 years with extremes of 7 and 65 years. The age group between 10 and 15 years was the most represented (47.5%). The distribution of gored victims received in the reference hospitals of the departments of Borgou and Alibori according to age groups is depicted in (Table 1).

Male subjects were the most affected with a sex ratio of 39/1. The majority of victims were herdsmen (50%) followed by farmers (37.5%). The distribution of gored victims received in the reference hospitals of the departments of Borgou and Alibori according to their occupation (Table 2).

Among the victims, 33 (82.5%) were uneducated, six (15.0%) had primary education, while only one (2.5%) had secondary education. Goering occurred most often on pasture or in the field in 37.5% and 35% of cases respectively. The home and the street were concerned in 10% of cases each. Goering occurred most often during animal feeding (30%) or during field work (27.50%). Beef was the animal most involved in 36 (90%) of cases. The bull was involved in three (7.5%) cases and the elephant in one case (2.5%).

**Table 1: Distribution of victims of goring according to age groups.**

| Age groups (years) | N | % |
|---|---|---|
| **<10** | 3 | 7.5 |
| **10-15** | 19 | 47.5 |
| **15-20** | 5 | 12.5 |
| **20-25** | 3 | 7.5 |
| **25-30** | 1 | 2.5 |
| **≥30** | 9 | 22.5 |
| **Total** | 40 | 100 |

**Table 2: Distribution of victims of goring according to their occupation.**

| Occupation | N | % |
|---|---|---|
| **Herdsman** | 20 | 50.0 |
| **Farmer** | 15 | 37.5 |
| **Schoolboy** | 4 | 10.0 |
| **Civil servant** | 1 | 02.5 |
| **Total** | 40 | 100 |

### *Lesion assessment*

The blow was most often received in the abdomen. A total of 14 cases have been listed with the point of impact being the abdomen, the details of which appear in (Table 3).

### *Management*

All patients received medical treatment depending on the lesions. A laparotomy was necessary in 14 (35%) cases. The lesions and the surgical procedures performed are depicted in (Table 4). The average length of hospitalization of the subjects was 3.87±3.4 days with extremes of 1 and 16 days. Two (5%) patients died: one from anemia and the other from hypovolemic and septic shock.

**Table 3: Distribution of victims of goring according to the site of the impact.**

| Site of impact | N | % |
|---|---|---|
| **Abdomen** | 14 | 35.0 |
| **Head and neck** | 10 | 25.0 |
| **Chest** | 9 | 22.5 |
| **Perineum and buttock** | 6 | 15.0 |
| **Thoracic member** | 4 | 10.0 |
| **Pelvic member** | 2 | 05.0 |

**Table 4: Distribution of gored victims according to lesions and surgical procedures performed.**

| Locations | Lesions | Management |
|---|---|---|
| **Head and neck** | Scalp injury-4 | Suture |
| | Facial injury-3 | |
| | Cerebral contusion-2 | |
| | Ocular injury-1 | |
| **Chest** | Parietal injury 4 | Suture |
| | Hemothorax-1 | Pleural drainage |
| **Abdomen** | Abdominal blunt-2 | Suture |
| | Non-penetrating abdominal wound -2 | Suture |
| | Penetrating abdominal wound-10 | Laparotomy-10 |
| | Gastric perforation-2 | Gastric suture-2 |
| | Liver wound-1 | Packing-1 |
| | Ileal perforation-1 | Primary closure-1 |
| **Perineum** | Scrotal injury-3 | Suture |
| | Simple injury-2 | Suture |
| | Urethral rupture-1 | cystocatheter |
| **Members** | Simples injury -6 | Suture |
| | Tendon partial rupture-1 | Suture |
| | Acromio-clavicular disjunction-1 | Strapping |

## DISCUSSION

During the present study we identified 40 patients. Tamou et al and Gajbhiye et al in retrospective studies found respectively 84 and 67 victims of goring.[4,5] Goring trauma is rare in the world because it is only observed in a few agricultural countries, particularly in black Africa as is the case in Madagascar and India, which still use oxen in the agriculture and livestock sector. In northern Benin, two factors predispose to goring: breeding and the use of oxen for animal traction.

### *Sociodemographic aspects*

The average age of the subjects was 20.12±14.37 years with extremes of 7 and 65 years. The age group 10-15 was the most represented (47.50%) which is consistent with the study by Tamou et al and that of Biréga et al who found a mean age of the subjects of 11.69±4.5 years and 18.4±16.1 years respectively.[4,1] However, the present population was younger than that of Randrianambinina et al who found a median age of 38 years.[5,6]

The low rate of schooling of children and their initiation to breeding could explain this predominance among young people. We noted a male predominance with a sex ratio of 39. This male predominance is noted by several authors Gajbhiye et al in India, Ugboko et al in Nigeria and Tamou et al in Benin found sex ratios of 4 respectively; 3, 8 and 6.4-7 This is because livestock husbandry and agriculture are mostly done by men in our environment. The majority of victims were herdsmen (50%) followed by farmers (37.5%). Biréga et al and Dogan et al showed that the majority of victims of goring were either the owners of the oxen or workers responsible for supervising them.[1,8] The trauma most often occurred on pasture (45%) or during field work (35%). Tamou et al had noted that the trauma had occurred most often during the feeding of beef and especially during transhumance.[1] Rani et al report that in India, bulls roam the city, blocking traffic, defecating on the roads and, above all, attacking people with impunity.[9] Sabo et al. in Nigeria showed that the majority of goring occurs following the provocation of the animal during grazing (59%).[10]

### *Lesion assessment*

Traumatic injuries by goring can be located in any part of the body. However, the lesion topography is variable depending on the circumstances of the trauma, the size of the animal and the victim. Works reporting traumatic lesions by goring of oxen in circumstances of accidental aggression report the frequency of abdomino-perineal and external genitalia injuries.[11,13] In our series, the goring having been accidental, the abdominal lesions were the most frequent, as in the literature (Table 5).

### *Treatment*

Goring wounds have characteristics that make them different from civilian wounds. The contaminated character of the wounds by goring justifies the meticulous trimming, the use of antibiotics and antitetanus seroanatoxinotherapy.

**Table 5: Topographic distribution of injuries according to studies.**

| Study country | Most common lesions (%) | Other lesions (%) |
|---|---|---|
| **Northern-Bénin[4]** | Abdomen (52.4) | Perineum (15.5), Head and neck (9.5), members (7.1) |
| **India[5]** | Abdomen (53.7) | Périnée (11 .9), back and pelvic members (11.9 each one), head and neck, chest and thoracic members (4.5 each one) |
| **Turkey[8]** | Abdomen (60.9) | Chest (39.1) |
| **Latin countries[14,15]** | Pelvic members (>50) | Perineum (7-10.5) |
| **Togo[1]** | Abdomen (91.1) | Perineum (8.9) |
| **Our study** | Abdomen (35.0) | Head and neck (25.0), chest (22.5), perineum (15.0), thoracic members (10.0), pelvic members (5.0) |

The specific treatment depends on the lesions. In the series, systematic laparotomy was the rule in the case of a penetrating wound in the abdomen, as some authors.[16,17] The white laparotomy rate was 60%. This rate is higher than that of Ankur et al and Gajbhiye et al who found 10% and 52% respectively.[5,18]

However, this attitude is currently debated because it causes a high number of white laparotomy.[19-21] In our reference hospitals, the attitude remains systematic intervention in the face of penetrating abdominal wounds, because the staff is insufficient and the means limited. The average hospital stay was 3.87±3 days with extremes of 1 to 16 days, which is consistent with the study by Biréga et al which finds 4.4±2.1 days (extremes: 1 day and 12 days).[1] The overall mortality rate in our series is 5%, close to that of Nagarajan (4.76%) but higher than that of Randrianambinina et al which was 3.84%.[6,22] On the other hand, Biréga et al had not reported any deaths.[1]

### *Limitations*

About the study setting: our study only focused on patients admitted to reference hospitals in the departments of Borgou and Alibori. Then, patients cared for in peripheral health centers were not taken into account. The existence of several data collection teams which could cause bias in the reliability of the data. However, these biases are negligible because the collection team was medical (surgeons, general practitioners).

## CONCLUSION

Goring injuries in the departments of Borgou and Alibori are frequent (40 cases in 18 months) and constitute a major health problem. Firstly by the high number of children affected (47.5%) which testifies to a real problem of children dropping out of school, then by the diversity of the lesions encountered. The schooling of children and the education of the population would reduce the incidence of these injuries.

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