

# Arrow Shot Injuries: Experience in a Referral Centre in North Eastern Nigeria

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**Abstract:** *Background:* Arrows are one of the most common weapons in sub-Saharan Africa readily deployed in conflicts. Injuries from arrow shots are underreported though conflicts are being seen increasingly. *Aim:* To review the incidence and propose guiding principles for arrow retrieval procedures. *Patients and Methods:* The study is a prospective review of all patients with arrow shot injuries managed at the General SaniAbacha Specialist Hospital Damaturu, Yobe State, north eastern Nigeria between January 2012 and December 2013. *Result:* Thirty-three patients comprising 31 males and 2 females were studied. The male to female ratio was 15:1 and the mean age was 27.3 ±SD 14.8 (range 3-60 years). The peak age of incidence was 10-19 (27.3%). Twenty-seven (81.8%) patients were aged less than 40 years. The main reasons for attacks were conflicts between farmers and herdsmen 17 (51.5%) and cattle rustling 7 (21.2%). A total of 59 arrows were extracted of which 17 were multiple with a maximum of 4 arrows in one patient. The trunk 33(55.9%), limbs 17 (28.8%) and head and neck 9 (15.3%) were the main sites affected. Arrow extraction and wound debridement, extraction with thoracostomy tube drainage and laparotomy with visceral repair were the main operative procedures performed. There was no mortality and the mean hospital stay was 13 days. *Conclusion:* Arrow shot injuries still exist in developing societies and pose considerable challenges in their management; however with adequate resuscitation and adherence to the proposed principles for extraction the outcome is good.

**Keywords:** Arrow Shots, Injuries, Extraction.

## 1. Introduction

Arrow injuries are generally rare globally but there are reports of such injuries in the highlands of Papua New Guinea, South Africa and India<sup>1-3</sup>. Arrows are low velocity projectiles and from a close proximity can cause penetrating trauma similar to a low powered handgun<sup>4</sup>. The arrow is made up of a metallic tip which is edged and barbed, mounted on a wooden shaft to be propelled from a bow when fired. Poisons are usually applied to the metallic portion in the hunting arrows, and the barbs keep them in the tissue after penetration. Injuries may range from non fatal soft tissue, to life threatening when vital organs are involved. This study reviewed arrow shot injuries in a referral centre and proposes principles for the extraction of arrows.

## 2. Patients and Methods

The study was a prospective review of all patients with arrow shot injuries managed at the General SaniAbacha Specialist Hospital Damaturu, Yobe State, north eastern Nigeria between January 2012 and December 2013. Data were extracted from clinical notes and analysed using SPSS version 16. Informed consents were obtained from the patients and permission for the study was granted by the Hospital management. The initial management involved resuscitation with intravenous fluids, antibiotics (ceftriaxone and metronidazole), tetanus toxoid, blood transfusion where indicated, and analgesics. Investigations done included packed cell volume, urinalysis, blood chemistry, x-ray and ultrasound scan where applicable. Prophylactic antibiotics (ceftriaxone and metronidazole) were given at induction of anaesthesia and anaesthetic techniques were local, regional, or general as the case may be. The operative techniques were guided by the following principles: **A.** Never pull out arrows. **B.** Adopt ante grade or retrograde approach in arrow retrieval (ante grade means arrow barbs

first, while retrograde means arrow tip first). **C.** Good illumination under vision.

Never pull out arrows because it may cause more tissue damage especially vascular with torrential bleeding. In perforation injuries we advocated tip first approach because the barbs have traversed through, while in superficial tissue injuries we advocate barbs first after meticulous dissection under vision.

## 3. Results

A total of 37 patients were found, 4 excluded for incomplete data, 33 were studied, comprising of 31 males and 2 females, giving a male to female ratio of 15: 1. Age ranged from 3 to 60 years, with a mean of 27.33 years and SD 14.78. The 10-19 year age group accounted for most of the patients (N=9; (27.27%), while 27 (81.81%) were under 40 years. (Table 1). The main reasons for attack were conflicts, between farmers and herdsmen 17 (51.51%), cattle rustling 7 (21.21 %) (Table 2). A total of 59 arrows were removed all of which were non-poisonous. Seventeen patients had multiple arrow shots with 4 arrow shots as the maximum in a patient. The sites injured were trunk 33(55.93 %), limbs 17 (28.81 %), and head and neck 9(15.25%). There were multiple organ injuries (Figures 1-4), soft tissues 31 sites, bowel and mesentery 17, lungs and pleura 7, bladder, liver, and spleen 5 each, while kidneys and vascular injuries in 4 and 3 patients respectively (Table 3). The procedures done were arrow extraction and debridement for soft tissue injuries in 31 sites, extraction with thoracostomy tube drainage in 9 patients, laparotomy and visceral repair in 13 patients (Table 4). There was no mortality; the mean hospital stay was 13 days with the range of 1 – 29 days. Three patients stayed more than 3 weeks because of associated co-morbidities, 1 being diabetic, and 2 hypertensive.

**Table 1:** Age distribution

Age(yrs)	No	(%)
< 10	2	6.06
10 – 19	9	27.27
20 – 29	8	24.24
30 – 39	8	24.24
40 - 49	2	6.06
50 - 59	3	9.09
60 +	1	3.03
Total	33	100

**Table 2:** Reasons for the attack

Reason	No	(%)
Farmers / Herdsmen clash	17	51.51
Cattle Rustling ( theft )	7	21.21
Communal crises	5	15.15
Accidental	2	6.06
Fight over women	2	6.06
Total	33	100

**Table 3:** Site injured

Site injured	No
Soft tissues	31
Viscera:	
a. Mesentery	7
b. Large bowel	5
c. Small bowel	3
d. Stomach	2
e. Lungs and pleura	7
f. Spleen	5
g. Liver	5
h. Bladder	5
i. Kidneys	4
Vascular:	
a. Popliteal vein	1
b. Axillary vein	1
c. Femoral vein tributary	1

**Table 4:** Operative procedures performed

Procedure	No
Arrow extraction and wound debridement.	31 sites
Arrow extraction and thoracostomy tube drainage.	9 patients
Laparotomy, arrow extraction and visceral repair.	13 patients
Vascular repair. (Popliteal and axillary veins).	2 patients

#### 4. Discussion

Arrow shot injuries are uncommon in the developed countries<sup>5</sup>, however in the developing countries they are relatively common as found in this study where 37 cases were treated in 2 years, an average of 1 monthly. Previous studies found the injuries to be exclusively affecting males<sup>6-7</sup> however, in this study female were affected with male to female ratio of 15: 1 probably because they were actively involved in previously male dominated socioeconomic activities. The peak age group affected was 10 – 19 years accounting for 9 cases (27.27%) as opposed to a similar

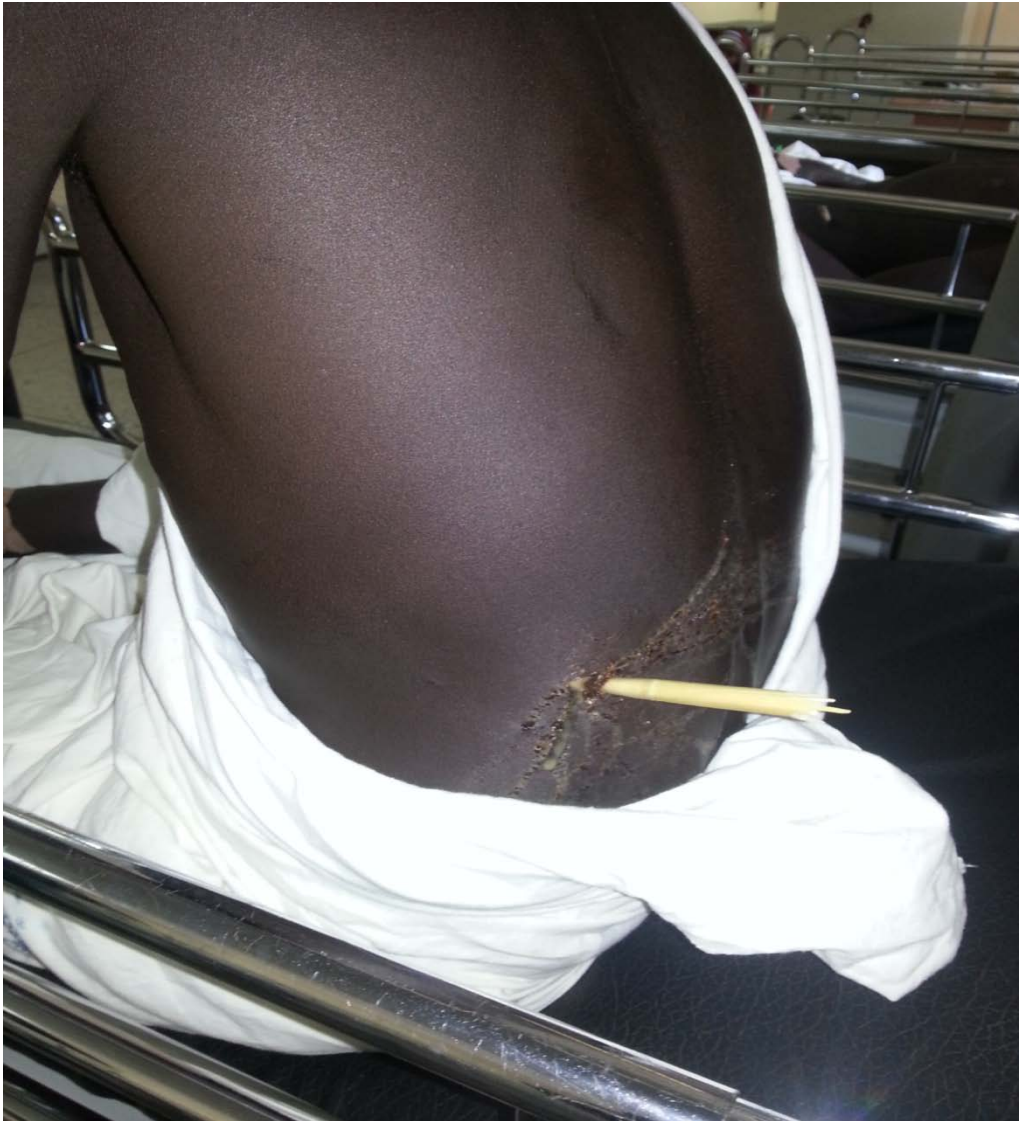
study by Na'ayaet *al*<sup>7</sup> who found the 21 – 30 year age group accounting for most (36.8%) of the cases. This study revealed 27(81.81%) of the patients were under the age of 40 years buttressing the fact that this age group are the most mobile and economically active.

Various reasons were attributed for arrows shot attacks in different societies ranging from inter-tribal wars, socio-political and economic conflicts<sup>1-3</sup>. Madzigaet *al*<sup>6</sup> found armed banditry, communal clashes, and herdsmen/ farmer clashes over grazing land as the predominant causes accounting for 41.0, 20.5, and 17.8 % respectively. Na'ayaet *al*<sup>7</sup> found herdsmen / farmers clash, armed banditry, and fighting over women accounting for 43.9, 29.8, and 17.5% respectively as the main causes. In this study the main causes for arrow shot injuries were herdsmen/farmers clash, cattle rustling (theft), and communal clash accounting for 51.51, 21.21, and 15.15% respectively. This signifies the persistent of conflicts between herdsmen and farmers over grazing land as a main source of arrow shot injuries.

Arrow shots are low velocity missiles. Therefore they mostly cause superficial soft tissue injuries. The commonest sites affected in this study were in keeping with previous studies with the trunk, limbs, and head and neck bearing the brunt in that order<sup>6,7</sup>. Though most of these injuries are superficial, they may occasionally be fatal with major vessels or vital organs involvement especially when shots are multiple and/or at close range<sup>8</sup>. This study did not find brain, heart, nor major vessels of the head and neck injured. There was one arrow that traversed the soft tissue of the supraciliary ridge of the left orbit and another through the lower retrobulbar space without visual loss, as opposed to a similar case reported by Lawanet *al*<sup>9</sup> that resulted in loss of vision. We found multiple visceral injuries in keeping with findings in similar studies by Madzigaet *al*<sup>6</sup>. All the visceral injuries were repaired primarily, including colonic injuries without diverting colostomy because there was minimal peritoneal soilage, as the arrows were in-situ reducing visceral leak. The primary repair without colostomy was in keeping with the principles of primary colonic repair without colostomy when there is minimal peritoneal soilage<sup>10-11</sup>. Renal and bladder injuries were repaired, living perinephric drains, and continuous bladder drainage respectively. There was no mortality and morbidities were limited to surgical site infections which resolved with wound dressing. The study had better outcome compared to findings by Mnguniet *al*<sup>12</sup> in penetrating abdominal trauma. The overall hospital stay was short though longer than laparoscopic procedures for penetrating thoracoabdominal injuries<sup>13</sup>.

#### 5. Conclusion

Arrow shot injuries still exist in developing societies and pose considerable challenges in their management, however with adequate resuscitation and adherence to the proposed principles for extraction the outcome is good.



**Figure 1:** Arrow in the left lumbar region



**Figure 2:** Arrow in the right hypochondrium.





**Figure 3:** Arrow in the right lung



**Figure 4:** Arrow extraction ante grade approach

#### Legends of Tables and Figures

Table 1: Age distribution

Table 2: Reasons for the Attack.

Table 3: Sites Injured.

Table 4: Operative procedures performed.

Figure 1: Arrow in the left lumbar region.

Figure 2: Arrow in the right hypochondrium.

Figure 3: Arrow in the right lung.

Figure 4: Arrow extraction, Ante grade approach.

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