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Arrow-Chest Injuries in North Central Nigeria: Case Series

Arrow-poitrine blessures dans le Centre-Nord Nigéria: Série de cas

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ABSTRACT

BACKGROUND: **Metal arrows are still used in communal conflicts on the Jos Plateau in the north central region of Nigeria, even at the turn of the 21st Century with yet undetermined pattern and outcome.**

OBJECTIVE: **To determine the pattern of the injuries and the factors that influence the outcome of this uncommon condition.**

METHODS: **A prospective study of nine patients managed over a 6-year period. Information obtained on each patient included sex, age, site of and event leading to the injury, treatment offered and its outcome. The data were analyzed using Microsoft® Excel Software.**

RESULTS: **Nine cases of metal tipped arrow chest injuries are reported. They were all males. Six (67%) cases arrived at the Accident & Emergency Department alive with the arrows partly or completely in the chest. Three cases died in the field of combat giving a mortality rate of 33 The other six (66.6%) were received alive. All the six (67%) had emergency thoracotomy and all of them survived with two (22%) morbidities. In five (56%) cases, including the three dead cases, the arrows were partly inside the chest and partly protruding outside while in four (44%) cases the metal arrows were completely inside the chest. The left hemithorax was more commonly involved with 6 (67%) cases, 2 (22%) on the right and the manubrium sterni in one (11%) case. The associated injuries were arrow injury of the thigh in one (11%) patient and Colles fracture in two (22%) patients. Hospitalization period ranged between 10 to 18 day while mortality was 33% and morbidity was 22% as a result of wound infection.**

CONCLUSION: **Arrow chest injuries on the Jos Plateau result from communal conflicts among young male adults. Emergency thoracotomy resuscitation produce good outcome in majority of the patients. Bow, arrows and crossbows should be banned as weapons, and instruments for hunting and sports. WAJM 2008; 27(3): 160–163.**

Key words: **Chest injuries, Arrow, Nigeria, Outcome.**

RÉSUMÉ

CONTEXTE: *Metal flèches sont encore utilisés dans les conflits sur le plateau de Jos, dans le nord région centrale du Nigéria, même au tournant du 21e siècle avec encore indéterminée modèle et les résultats.*

OBJECTIF: *Pour déterminer la configuration des blessures et les facteurs qui influent sur les résultats de cette condition rare.*

MÉTHODES: *Une étude prospective de neuf patients géré plus de 6 ans. Les informations obtenues sur chaque patient ont compris le sexe, l'âge, du site et des événements conduisant à la blessure, le traitement offert et de ses résultats. Les données ont été analysées en utilisant Microsoft Excel® Software.*

RÉSULTATS: *Neuf cas de métal avec embout flèche poitrine blessures sont signalés. Ils étaient tous de sexe masculin. Six (67%) cas sont arrivés sur les accidents et les services des urgences en vie avec les flèches en partie ou complètement dans la poitrine. Trois cas sont morts dans le domaine de la lutte contre donnant un taux de mortalité de 33 Les six autres (66,6%) ont été reçus en vie. Tous les six (67%) avaient thoracotomie d'urgence et chacun d'entre eux a survécu à deux (22%) de morbidité. Dans cinq (56%), notamment en cas de mort trois cas, les flèches étaient en partie l'intérieur de la poitrine et en partie en saillie à l'extérieur pendant que quatre (44%) cas, les flèches de métal sont complètement l'intérieur de la poitrine. Le hemithorax gauche est plus communément ayant contribué à 6 (67%) des cas, 2 (22%) sur le droit et le manubrium sterni dans un (11%) cas. Les blessures ont été associés flèche de la blessure à une cuisse (11%) des patients et de fracture de Colles en deux (22%) patients. Hospitalisation période varie entre 10 à 18 jour, alors que la mortalité était de 33% et la morbidité était de 22% à la suite de l'infection des plaies.*

CONCLUSION: *Arrow poitrine blessures sur le plateau de Jos résultat de conflits chez les jeunes hommes adultes. Thoracotomie réanimation d'urgence de bons résultats dans la majorité des patients. Arc, les flèches et les arbalètes devraient être interdits comme des armes, et des instruments pour la chasse et le sport.* ***WAJM 2008; 27(3): 160–163.***

Mots-clés: *Chest blessures, Arrow, Nigéria, final.*

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Abbreviations: POP, plaster of Paris

INTRODUCTION

The Jos Plateau is located more than 4000 feet above sea level in the north central region of Nigeria with a near-temperate climate with fertile soil rich in industrial ores. The mining activities and trade attracted migration of other ethnic groups to Plateau State at the turn of last century who settled in ethnic/religious clusters in this region while maintaining their ethno-social affiliations with their ancestral homeland elsewhere in Northern Nigeria. Land ownership, political or other social disagreements can erupt at the slightest provocation leading to intense violence with the use of both sophisticated and primordial weapons such as bow and arrow with severe mortality and morbidity.[1,3,4] The arrows were sometimes soaked in herbs with potent curariform effects.[1] The issue of bow and arrow as weapons in communal conflict have been reported in 1981 by a worker in the Enga Province of Papua New Guinea.[2] Shortly thereafter, in 1987 Fingleton reported his experience with arrow wounds to the chest and bush thoracotomy in Mt. Hagen in Papua New Guinea.[3,4] Even at the turn of the new millennium, arrow injuries continued to be reported from various developing countries.[5,6] Though rare, arrow chest injuries have recently been reported from the industrialized countries as well.[7,8] We wanted to know if arrow chest injuries continued to exist on the Jos Plateau and the pattern of the injuries and the factors that influenced outcome. In order to address this issue, we prospectively studied all the arrow chest injuries seen at the Jos University Teaching Hospital, Jos, Nigeria over a six-year period.

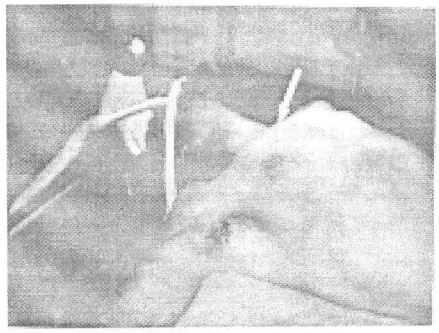
Case reports:

Case 1

A 28-year-old farmer presented to the Accident & Emergency Department two hours after he sustained an arrow injury to the left side of his back as he retreated during combat over a farmland (Figure 1). He was armed with a bow and arrow and a cudgel. His relatives promptly removed him from the scene of conflict to Jos Univesity Teaching Hospital where he was promptly resuscitated and a metal arrow painted white was

Figure 1: **Arrow chest impalement in a combatant.**

(A)



(B)

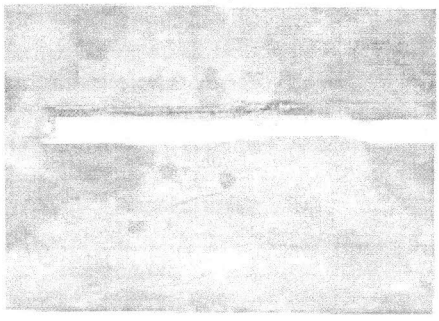


Figure 2: **(A) Upper panel of the Arrow chest injury through the sternum following robbery attack.**
(B) Lower panel of the arrow removed from the patient.

Figure 3: **Chest x-ray of patient showing the arrow completely embedded in the chest.**

removed via a posterolateral thoracotomy after full exposure. The tip of the arrow was embedded in the substance of the left lung. He was discharged on the eleventh post-operative day.

Case 2

A 35-year-old Fulani herdsman was brought into the Accident & Emergency Department of our hospital six hours after he was attacked by armed robbers. He sustained arrow injury in the upper chest after being shot with arrow while lying supine as shown in Figure 2. The robbers left with some of his cattle. He was discovered by his kinsmen later but was unable to move all four limbs despite being fully awake. After resuscitation, the arrow was removed via bilateral antero-lateral thoracotomy. The metal arrow was 18 cm long, covered with crusts of herbs (Figure 2); it was obliquely embedded in the upper lobe of left lung. He was discharged on the 21st post-operative day after his superficial wound infection had been managed.

The seven other cases are as shown in Table 1.

DISCUSSION

The main finding of this study was that arrow chest injuries still occur in the north central Nigeria, even at the turn of the millennium. In this study, nine cases of arrow chest injuries were managed within the six year period and all the injuries were sustained as a result of civil strife. Arrow chest injuries sustained as a result of civil conflicts were reported within the same period of study in developing countries.[5,6] These injuries were also noted during same period in industrialized countries.[7,8] Whereas arrow chest injuries were sustained accidentally during hunting and sports in the industrialized nations,[7,8] they were commonly sustained in combats during communal conflicts[1,2,3,5] and uncommonly as a result of accidents in developing countries.[6]

The injuries involved only young men; the back and the left side were more commonly affected. Young male combatants were mostly affected in the reports of workers in Papua New Guinea and India.[2-5] That would lead to a drain in the economy of these countries as

young male adults contributed immensely to the economy as farm hands and the labour force in rural communities. Only in one case was a woman with arrow chest injury reported in the series by Fingleton in Papua New Guinea.[4] It is instructive that all the patients were in Social Class V – the unskilled manual workers and the unemployed – the available and willing hands. Provision of employment for this group would reduce the available force for combat.

The essence of having unique color of arrows in the quiver of a combatant was in order to identify the combatant who got the successful shot as shown in Figure 1. In this study, one patient sustained arrow chest injury as a victim of armed robbery as shown in Figure 2. The choice of arrow in the attack was to avoid calling the attention of other people to the robbery.

All the arrows used in this study – both shaft and tip – were made of solid metal. The arrow removed from the patient (Figure 2) was 18 cm long with barbs to stabilize it in flight. In two of the patients, the arrows had crusts of herbs which had curariform effects on the patients as they were found conscious but unable to move their limbs. That had implications for the anesthetics used during surgery in order not to overdose the patients with muscle relaxants. Though the patients recovered full muscle power after a few days, there was still the need to characterize the principal active components of the poison in the arrows in order to determine appropriate antidotes. In contrast, the arrows used in reports from Papua New Guinea were all fashioned from bamboo except for one case in which the arrow was fashioned from a human forearm bone.[3,4] In 33% of cases in this study, the arrows were embedded completely in the chest. The impact of arrow missile in the chest was better dissipated by the fibrous tissue in the lungs than the blood vessels and the heart. The fibrous tissue of the lung produced a tamponade effect on the arrow track and so prevented possible fatal haemorrhage.[7,8]

The relatives of the three dead victims of arrow chest injuries did not consent to postmortem, chest x-ray or their photographs taken because of cultural/religious reasons. The refusal to consent to postmortem in North central Nigeria had been reported by Mandong and co-workers.[9] All the three mortalities died during attempts at manual extraction of the chest impalement. The implication of this is that attempts should not be made to pull out the impaling missile; such missiles should be stabilized during transportation to hospital and only removed at surgery when the whole impaling object must have been fully exposed. The complications were superficial wound infection in two patients. All the six patients who arrived alive at the Accident & Emergency Department had thoracotomy and removal of the projectile after adequate resuscitation and all of them survived. The majority of the patients were operated within 24 hours of injury and that positively impacted on the outcome of surgery even as 67% of the patients were admitted with ASA grades of III and IV.

In all cases the tip of the arrow and the barbs were hooked to the fibrous tissues of the lung including the patient in Fig. 2 whose arrow was shot at close range with enough kinetic energy to pierce through the manubrium sterni. The hospitalization period ranged between10 and 18 days. The main limitation of this

Table 1: Summary Data of Nine Patients with Arrow Chest Injuries

Case no.	Age (yrs)	Occupation	Event	Site of Injury	Other injuries	Treatment	Complications	Outcome
1.	28	Farmer	Dispute over farmland	Posterior, Left side.	None	Surgey/ Removal	None	Alive
2.	35	Nomad Robbery	Armed Midline	Sternal, Removal	None Infection	Surgery/	Wound	Alive
3.	18	Student	Political Violence	Posterior, Left side	Arrow wound right thigh	Dead at Combat	–	Dead
4.	22	Farmer	Ethnic/religious dispute	Anterior, Left side	Colles fracture rightwrist	Surgery/ Removal & Colles POP	None	Alive
5.	31	Unemployed dispute	Ethnic/religious	Right side	None	Dead at combat	–	Dead
6.	25	Farmer	Ethnic/religious dispute	Posterior, Left side	Colles fracture leftwrist	Surgery/ Removal & Colles POP	Wound infection	Alive
7.	24	Trader dispute	Ethnic/religious	Posterior, Left side	None	Dead at combat	–	Dead
8.	30	Trader	Ethnic/religious dispute	Posterior, Right side	None	Surgery/ Removal	None	Alive
9.	26	Taxi driver	Ethnic/religious dispute	Posterior, Left side	None	Surgery/ removal	None	Alive

study was the small sample size due to this uncommon condition.

Our future study would aim to determine if the lung puncture sustained by patients with arrow chest injuries led to permanent pulmonary insufficiency.

In conclusion, arrow chest injuries still occur on the Jos Plateau as a result of communal conflicts and involve young male adults. Despite the severity of the injuries, emergency thoracotomy with complete exposure and removal of the arrow after adequate resuscitation produced good outcome in majority of the patients. Bow, arrows and crossbows should be banned as weapons, in hunting and sports.

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