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Management of orofacial arrow injuries at Nigerian tertiary health care hospital: A report of 30 cases

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Abstract

Background: Arrow injuries are still common presentations at various medical facilities across the Northern region of Nigeria.
Objective: This study evaluated various degree of orofacial arrow injuries presented and managed at Federal Medical Centre, Nguru, North eastern Nigeria.
Methods: A retrospective analysis of thirty patients with orofacial arrow injuries who presented and were managed over a period of four years was carried out. The information collated included patients' personal profile, circumstances of injury, presentation, treatment and complications. The data analysis was done using IBM SPSS version 20.0.
Results: Thirty cases of orofacial arrow injuries in patients whose ages ranged from 10 to 70 years were evaluated and managed. The mean age of the patients was 50.70 years. All patients were males, mostly farmers and herders, and are rural dwellers. The arrows were shot following misunderstanding between these herders and farmers Among the age groups recorded, the highest frequency was found between the ages of 41-50 years. Out of the 30 patients, 8(26.67%) had arrow injuries outside the orofacial region. 23 patients had arrow in-situ on presentation and the others had a part of their arrows extracted mostly by themselves prior to presentation.
Conclusion: Orofacial arrow injuries has become a common finding at primary and secondary health care centers and hospitals in the North eastern region of Nigeria. In this study, we evaluated 30 cases with various degree of orofacial arrow injuries presented and managed at Federal Medical Centre, Nguru, North eastern Nigeria

Key word: Orofacial, Arrow injuries, Northern region, Nigeria.

Introduction

Arrow injuries are rare in advanced society and developed world,[1-5] but they have become a common presentation at various primary and secondary health centers especially in the Northern region of Nigeria. Bow and arrow are used during conflict between herders and farmers over grazing land, farm land dispute between farmers, armed banditry, cattle rustling, political violence and other forms of criminalities.[2-6] Bow and arrow are amongst the oldest weapons invented by man which are still being used till date in developing communities.[5] They are low velocity projectile weapon designed mainly for hunting and warfare during ancient civilization. Arrows when fired from a close

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proximity could cause penetrating trauma similar to a low powered handgun. Because bows and arrows can easily be fabricated locally, it has become a weapon of choice for the locals for warfare and for other criminal activities.[7-9] As a result, it has been estimated that injuries shots have killed more individuals than any other weapon in developing countries. Its basic form was not as deadly, but over time multiple additions to enhance its effectiveness were developed.[10-17] These variations make arrow injuries somewhat devastating and, in most cases, difficult to manage. Arrow injuries are a special type of penetrating injuries and its management requires a meticulous approach. Notwithstanding its relatively low velocity (compared to gunshots), the sharpness and propulsion force of the crossbow may be sufficient to enable penetration and significant tissue damage. The severity of arrow injury depends on various factors; such as distance of the assailants from the target, the force and trajectory of the arrow, as well as the physical characteristics of the arrow.[18-23] The wound often allows the outward flow of discharges due to its structure and high velocity. Arrows also remain in their target and, in such instances, serve as a tamponade to blood vessels and internal vital structures. If the arrow had completely pierced an individual, it would leave distinct entry and exit wounds. The entry wound resembles that of a bullet (a slit that is darkened, bruised, and depressed), and the exit wound looks like a simple slit. If only one of the wounds is found, it can be mistakenly assumed as a bullet or stab wound.[20-22] In addition, literature review revealed that an arrow can tangentially hit its target, resulting in a linear slit that resembles a laceration.[24-30] This study evaluated various degree of orofacial arrow injuries presented and managed at this centre.

Materials and methods

This was a retrospective analysis of patients who presented with arrow injuries and managed at the accident and emergency unit (A & E), and Oral and maxillofacial surgery clinic of Federal Medical Centre, Nguru, from January 2017 to December 2020. Federal medical centre, Nguru, Yobe State Nigeria serves as a reference hospital for neighboring villages and towns, as well as some parts of Niger republic and hence attends to large volume of patients. The information collated included patients' personal profile, circumstances of injury, presentation, type of imaging modality employed as well as treatments and complications. Other information collated included, the managing surgeon, the material with which the arrow was made and the medications that were administered.

The extracted data were analyzed using statistical package for social sciences (SPSS) version 15.0 (SPSS Inc, Chicago, IL). Absolute numbers and simple percentages were used to describe categorical variables. Quantitative variables were described using mean (with standard deviation), median and range as appropriate.

Results

This study involved retrospective evaluation of 30 cases of orofacial arrow injuries. All patients were males, mostly farmers and herders, and are rural dwellers. Patient ages ranged from 10 years to 70 years. The mean age for the patients was 50.7 years. Among the age groups recorded, the highest frequency was noted between the ages of 41-50 years. Out of the 30 patients, 8 patients (26.67%) had arrow injuries outside the orofacial region, excluding the arrow injuries they had on the orofacial region. Twenty-three (23) patients had arrow in-situ on presentation and the others had their arrow extracted mostly by themselves prior to presentation (Tables 1-3). About 12 patients had superficial facial laceration without deep penetration. Such group of patients had wound debridement with normal saline in addition to surgical apposition of their wounds. For intact arrows with deep penetration (figure 1-3), imaging modality (X-ray) was used to carefully guide surgical extraction of the arrows. All the patients were noted to have received tetanus toxoid immunization as well as adequate doses of intra and post-operative antibiotics in accordance with hospital policies.

Three patients that presented late following failed attempt to extract the arrows at home developed various severities of wound infection. These ones had a longer hospital stay and a longer course of antibiotic administration.

Table 1: Age distribution of patients with orofacial arrow injuries

Age range	Frequency	Mean frequency	Percentage
<20	3	20	10%
21-30	3	35.75	10%
31-40	8	50.75	23.3%3
41-50	9	65.75	26.67%
>51	7	51	30%
	30	50.7	100%

Table 2: occupational distribution of patients with orofacial arrow injuries

S/N	Age	Occupation	Purpose of assaults	Sites of injuries	
				Orofacial	Other parts
1	25	Trader	Political violence	+	-
2	41	Herder	Farmers / Herdsmen clash	+	-
3	43	Farmer	Land dispute	+	-
4	70	Farmer	Farmers / Herdsmen clash	+	*
5	37	Trader	Trade dispute	+	*
6	15	Herder	Farmers / Herdsmen clash	+	-
7	35	Herder	Rubbery (cattle rustling)	+	-
8	31	Trailer Driver	Rubbery (cattle rustling	+	-
9	54	Farmer	Farmers / Herdsmen clash	+	*
10	32	Farmer	Political violence	+	-
11	31	Trader	Fight over women	+	-
12	40	Hunter	Friendly fire	+	-
13	56	Herder	Land dispute	+	-
14	52	Farmer	farmland dispute	+	*
15	26	Taxi Driver	Rubbery	+	-
16	38	Teacher	Political violence	+	-
17	45	Herder	Farmers / Herdsmen clash	+	-
18	58	Teacher	Farmland dispute	+	*
19	17	Unemployed	Political violence	+	-
20	33	Farmer	Fight over woman	+	-
21	21	Farmer	Farmers / Herdsmen clash	+	*
22	43	Farmer	Rubbery	+	-
23	47	Farmer	Political violence	+	-
24	63	Trader	Rubbery	+	*
25	42	Herder	Rubbery (cattle rustling)	+	-
26	51	Herder	Farmers / Herdsmen clash	+	-
27	47	Farmer	Farm land dispute	+	*
28	37	Farmer	Farm land dispute	+	-
29	62	Herder	Rubbery (cattle rustling)	+	-
30	38	Farmer	Farmland dispute	+	-

Key: +: Patient with orofacial arrow injury*: Patient with orofacial and extra facial arrows injuries.

Table 3: Age distribution and types of orofacial arrow injuries, treatment done and complications

S/N	Age	Soft tissue laceration without penetration	Deep penetration without arrow in-situ	Deep penetration with arrow in-situ	Treatment	Complications
1	25	+			Debridement & suturing	None
2	41		++		Debridement & suturing	None
3	43			+++	Surgery/arrow extraction	Wound infection
4	70			+++	Debridement & suturing	Wound infection
5	37	+			Debridement & suturing	None
6	15		++		Debridement & suturing	None
7	35			+++	Surgery/arrow extraction	None
8	31			+++	Surgery/arrow extraction	None
9	54	+			Debridement & suturing	None
10	32	+			Debridement & suturing	None
11	31			+++	Surgery/arrow extraction	None
12	40		++		Debridement & suturing	Wound infection
13	56	+			Debridement & suturing	None
14	52			+++	Surgery/arrow extraction	None
15	26			+++	Surgery/arrow extraction	None
16	38			+++	Surgery/arrow extraction	Wound infection
17	45			+++	Surgery/arrow extraction	None
18	58			+++	Surgery/arrow extraction	None
19	17		++		Debridement & suturing	Wound infection
20	33			+++	Surgery/arrow extraction	None
21	21			+++	Debridement & suturing	None
22	43	+			Debridement & suturing	None
23	47		++		Debridement & suturing	None
24	63			+++	Surgery/arrow extraction	None
25	42			+++	Surgery/arrow extraction	None
26	51		++		Debridement & suturing	None
27	47			+++	Surgery/arrow extraction	None
28	37			+++	Surgery/arrow extraction	None
29	62	+			Debridement & suturing	None
30	38			+++	Surgery/arrow extraction	None

Key; +: Soft tissue laceration without arrow penetration. ++: Deep penetration without arrow in-situ.
+++: Deep penetration with arrow in-situ.

Figure 1: A 25-year-old patient with penetrating arrow through his cheek, his PA radiograph and extracted arrow.

Figure 2: A 32-year-old patient with penetrating arrow through lateral aspect of his nose (left), his PA and true lateral radiographs

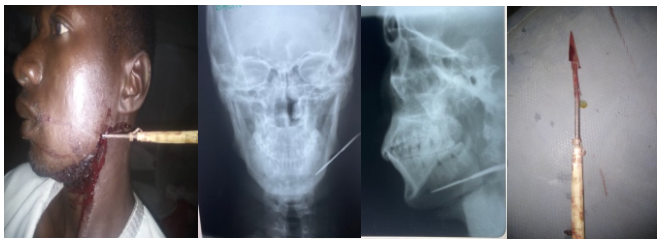

Figure 3: Clinical photograph showing orofacial arrow injurie in a 37-year-old patient, his PA and true lateral radiographic views as well as an extracted arrow at presentations.

Key: PA: Posterior-Anterior

Discussion

Arrow injuries frequently present and are managed at Federal Medical Centre, Nguru. This study assessed the management of 30 patients with orofacial arrow injuries within a four-year period (January 2017 to December 2020). The patients' ages ranged from 10 years to 70 years. The mean age for the patients was 50.7 years. Among the age groups recorded, the highest frequency was noted between the ages of 41-50 years. The age groups observed in the present study were consistent with the most active age group in traditional African community. The ages of patients seen in the present study is slightly different from the findings of Amole et.al[4] who recorded a mean age of 33.97 years. The slight difference in age from the present study may be related to the reason for the assault. While the present study was mostly from farmers/herders' dispute. The former was mostly due to armed robbery attacks. Out of the 30 patients, 8 (26.67%) had arrow injuries outside the orofacial region. In our study, majority of the injuries occurred as a result of farmland dispute between farmers and cattle herdsmen over right to grazing land, as well as between farmers over ownership of portions of land. Others cases presented were as a result of cattle rustling, political violence, fight over woman and other criminalities. Again, this was quite deferent from other studies where arrow injuries were as a result of war between ethnic groups or when bow and arrow were previously, the only weapon of warfare.[7,24-25]

Injuries caused by arrows are usually less destructive than those caused by bullets because of lesser velocity and energy,[31-33] but in our study, some arrow injuries we evaluated and managed were quite extensive and destructive because of the crude nature of the arrows used. Usually, arrows cause a wound that is both punctured and incised.[31] Most arrow wounds allow extraction of the arrow by pulling it back along the path of its insertion. However, barbed arrows (figure 1, 3) are an exception because of the risk of extensive damage to major structures when retrieved.[5,6] The morphology of the wound track depends essentially on the arrowhead shape. A broad head causes star-like and sometimes gaping wounds.[3,31] The field tip (Fig 1) causes incision-like wounds which are sharply cut with no significant bruising or tearing of tissue. Mobile structures and vessels in the trajectory of the injury seem not to be pushed aside but incised. Because of their unique method of penetration and relative complexity for removal, the removal of an arrow from the individual it pierces has given rise to multiple tools and techniques that certain aspects of modern management of arrow injuries can be attributed to.[7,14-25,34-35]

Although, our institution presently does not have specialized armamentarium for arrow removal, however, all cases were thoroughly and

meticulously evaluated and managed. For arrows that passed completely through, an assessment of the injured part was done for any loss of function or damage. If no such trauma was observed, the wound required minimal intervention and wound healed via primary intention after few days. For intact arrows that were lodged, the most important thing to determine was if the arrow had impacted bone, imaging modalities, such as X-ray and computed tomographic (CT) scans, were used to determine if the arrow had impacted bone. But in our study, only X-rays were used in the course of management as computed tomographic (CT) was not available. Patients that required CT scans were referred to centers where it is available for further evaluation and management. Once the exact location of the arrowhead was determined, the next step in management was to decide whether the arrow should be pulled out or pushed through. This was dependent on the depth of the arrow, presence or absence of barbs as well as the tissues it was encountered. When it was decided that the arrow could successfully be removed by emergence, the shaft was to be lubricated and firmly pushed through at its base. As the tip of the arrowhead became visible underneath the skin, a scalpel was used to release the arrow from the underneath skin, ensuring no part breaks and that no part of the arrow was left behind. This was usually confirmed, if in doubt, through post-operative X -rays. Once it was confirmed that the entire arrowhead had been removed, the rest of the arrow could be pushed through. If any portion of the arrow was suspected to remain in the wound, a drainage tube would be used to prevent suppuration. For arrows that were more superficial, an incision was made to allow a probe to visualize or feel for the arrowhead and eventually dressing forceps used to retrieve it.

Some arrowhead and shaft were removed at the same time, by grasping each together, so as not let the arrowhead break from the shaft. Patients with penetrating arrow injuries are usually haemodynamically stable unless the arrow has involved some major vessels.

Conclusion

Orofacial arrow injuries have become a common finding at primary and secondary health care centers and hospitals in this region. In this study, we evaluated 30 cases with various degree of orofacial arrow injuries presented and managed at Federal Medical Centre, Nguru, North eastern Nigeria.

References

1. Arrow head wounds: major stimulus in the history of surgery. Karger B, Sudhues H, Brinkmann B. World J Surg. 2001;25:1550–1555.
2. Bill JH. International Encyclopedia of Surgery: A Systematic Treatise on the Theory and Practice of Surgery by Authors of Various Nations. Vol. 2. New York: William Wood & Co; 1882. Sabre and bayonet wounds; arrow wounds; 101–117.
3. Successful removal of an impacted metallic arrowhead penetrating up to the brainstem. Paramhans D, Shukla S, Batra A, Mathur R. J Emerg Trauma Shock. 2010; 3:303.
4. Amole IO, Akhiwu BI, Osunde OD, Omeje KU, Efunkoya AA et al. Penetrating Craniomaxillofacial arrow injuries: A 14-year review of epidemiology, clinical presentation and management at a Northern Nigera tertiary facility. Nigerian J Oral Max Fac Surg.2017; 3: 20-27.
5. Sung L, Kesha K, Hudson J. Morphology of modern arrowhead tips on human skin analog. J Forensic Sci. 2018;63:140–150.
6. Lawan A, Danjuma SA. Arrow injuries to the eye. Ann Afr Med 2012; 11:116-8
7. Mohanty SK, Behera BK, Behera SS. Arrow Injuries In Eastern Odisha; A Series of 13 Cases. Ann. Int. Med. Den. Res. 2017; 3(5):SG10-SG12.
7. Thylefors B. Epidemiological pattern of ocular trauma. Aust N Z J Ophthalmol 1992; 20:95-8.
8. Abdu L. Prevalence and cause of blindness and low vision in Dambatta local government area, Kano state, Nigeria. Niger J Med 2002; 11:108-12.
9. Adeoye AO. Eye injuries caused by locally manufactured Dane guns. Niger J Ophthalmol 1996; 4:27-30.
10. Lasisi OA, Malomo AO, Adeleye AO, Sogebi OA, Shokunbi MT. An unusual faciocerebellar arrow injury: Successful surgical removal in a peasant Nigerian: A case report. Niger Postgrad

Med J 2006; 13:370-2.
11. Lascaratos J, Lascaratos G, Kalantzis G. The ophthalmic wound of Philip II of Marcedonia (360-336 BCE). Surv Ophthalmol 2004; 49:256-61.
12. Ogunleye AO, Adeleye AO, Ayodele KJ, Usman MO, Shokunbi MT. Arrow injury to skull base. West Afr J Med 2004; 23:94-6.
13. Madziga AG. Arrow injuries in North East Nigeria. West Afr J Med 2003; 22:106-9.
14. O'Neill OR, Gilliland G, Delashaw JB, Purtzer TJ. Transorbital penetrating head injury with hunting arrow: Case report. Surg Neurol 1994; 42:494-7.
15. Mono J, Hollenberg RD, Harvey JT. Occult transorbital intracranial penetrating injuries. Ann Emerg Med 1986; 15:589-91.
16. Jacob OJ. Penetrating thoracoabdominal injuries with arrows: experience with 63 patients. AustNZJ Surg 1995; 65:394–7.
17. Karger B, Sudhues H, Kneubuehl BP, Brinkmann B. Experimental arrow wounds: ballistics and traumatology. J Trauma 1998; 45:495–501.
18. Fingleton LJ. Arrow wounds to the heart and mediastinum. Br J Surg 1987; 74:126–8.
19. Mullan FJ, O'Kane HO, Dasmahapatra HK, Fisher RB, Gibbons JR. Mediastinal transfixion with a crossbow bolt. Br J Surg 1991; 78:972–3.
20. Fradet G, Nelems B, Muller NL. Penetrating injury of the torso with impalement of the thoracic aorta: preoperative value of the computed tomographic scan. Ann Thorac Surg 1988; 45:680–1.
21. Lang-Lazdunski L, Mouroux J, Pons F, et al. Role of videothoracoscopy in chest trauma. Ann Thorac Surg 1997; 63:327–33.
22. Fingleton U. Arrow wounds to heart and mediastinum. Br J Surg 1987;74 (2):126-8.
24. Singh RJ, singh NK. Arrow injury. J Indian Med Assoc.1985;83(2):65-2.
25. VanGurp G, Hutcinson TJ, Alto WA. Arrow wound management in Papua New Guinea. J Trauma.1990;30(2):183-2.
26. Jacob OJ. Penetrating Thoraco abdominal injuries with arrows: Aus NZ J Surg 1995; 65:394-7.
27. Green BF, Kraft SP, Carter KD, et al. Intraorbital wood detection by magnetic resonance imaging. Ophthalmology. 1990; 97: 608-611.
28. Specht CS. Orbitocranial wooden foreign body diagnosed by magnetic resonance imaging. Dry wood can be isodense, with air and orbital fat, by computed tomography. Surv. Ophthalmol. 1992; 36: 341-344 7. O'Neill OR, Gilliland G, Delashaw JB, Purtzer TJ. Transorbital penetrating head injury with a hunting arrow: case report. Surg. Neurol 1994; 42: 494-497.
29. Nicolas Peloponissos et al. Penetrating thoracic trauma in arrow injuries. Ann Thoracic Surg.71:1019-102
30. Fingleton LJ. Arrow wound to the heart and mediastinum. Br.J. of Surg. 1987; 74: 126-8.
31. Singh RJ, Singh NK. Arrow injury. J. Indian Med. Assoc (India) 1985; 83: 65-6.
32. Van Gurp G, Hutchison TJ, Alto W. Arrow wound management in Papua New Guinea. J Trauma 1990; 30: 183-8.
33. Nepal A, Joshi RR, Bhandary S, Mathur NN, Roka YB, Yadav R. Penetrating neck injury by an arrow: A paradigm of age-old assault. Nepal Med Coll J. 2010; 12: 58-60
34. Malachovsky I, Straka L, Novomesky F, Statelova D, Janickova M, Stilla J, Urvanova E. Atypical maxillofacial shot wound. SoudLek. 2011; 56: 2-4.
35. Madziga AG. Arrow injuries in North Eastern Nigeria. WAJM, 2003; 22:106-9.
36. Na'aya HU, Eni UE, Madziga AG, Kwari YD. Arrow injuries in North Eastern Nigeria. Port Harcourt Medical Journal. 2010; 6: 350-7.