

## **Retrograde Exploratory Laryngography in the Management of Head and Neck Trauma**

**Imogu AO and Mbanaso OO\***

*Department of Otorhinolaryngology, Head and Neck Surgery, National Hospital Abuja, Nigeria*

**\*Corresponding Author:** Omezikam Mbanaso, Resident in Otorhinolaryngology, Head and Neck Surgery, National Hospital, Abuja, Nigeria.

**Received:** June 06, 2017; **Published:** June 29, 2017

### **Abstract**

Penetrating neck injury still remains a cause of severe morbidity and mortality in head and neck trauma. Injury may be perpetuated with conventional weapons and occasionally with unusual weapons such as the stem spiked arrow common among the indigenous people of Northern Nigeria. The type of assault weapon has a role in determining the surgical approach for the effective management of the patient. Conventional weapons such as pellets, conventional arrows and their likes may be approached by direct exploration. Unusual weapons such the stem spiked arrow require a more innovative approach.

We report two unusual cases of penetrating neck injury with stem spiked arrows which were impaled at presentation and their successful removal via a retrograde laryngography approach.

The technique is discussed and its applicability in similar types of injury is recommended.

**Keywords:** *Laryngography; Head and Neck Trauma*

### **Introduction**

Penetrating neck injury (PNI) has been a significant cause of injury and death for centuries [1]. It commonly occurs following missile injury, road traffic accidents, armed robbery, military assault as well as communal clashes [2]. Various objects may be used to perpetuate such injury ranging from bullets, knives, cutlasses, machetes, broken glass, etc [2-5]. Majority of injuries occur in the zone II region of the neck with the trachea (69%), esophagus (38%) and larynx (31%) most commonly injured structures [6].

In some parts of the world, penetrating neck injury from weapons such as bow and arrows are scarcely encountered [7]. However, in some areas in Africa, including Northern Nigeria, such injuries still occur due to the use of such weapons during inter communal feuds or low scale terrorist activities [8]. The arrow may penetrate and exit the neck from the opposite side or may remain impaled in the neck close to critical structures. The type of assault weapon has a role in determining the surgical approach for the effective management of the patient. Conventional weapons such as pellets, conventional arrows and their likes may be approached by direct exploration. Unusual weapons such the stem spiked arrow require a more innovative approach. During surgery, attempts to retrieve a stem spiked arrow by direct entry point approach may result in further damage to critical neck structures.

In this paper, we report two unusual cases of penetrating neck injury with stem spiked arrows which were impaled at presentation and their successful removal via a retrograde laryngography approach.

## Case Report

### Case 1

A 29-year-old male who presented with an arrow lodged in his neck of 6 hours duration. He was involved in a terrorist attack in his community. There was no history of respiratory distress, stridor or voice change. There was no associated hemoptysis, no neck expansion, no weakness of upper limbs or other associated injuries. On examination, he was conscious and calm, in no obvious distress. Vital signs were stable and within normal limits. Neck examination revealed an arrow embedded from the left side of neck. No findings suggestive of involvement of the major vessels of the head and neck. X-ray soft tissue of the neck revealed a stem spiked arrow in the neck extending into the larynx. The cervical vertebrae were spared. Full blood count, electrolytes, urea and creatinine as well as a chest X-ray was normal.

A diagnosis of a penetrating neck injury with impalement of a stem spiked arrow in the larynx was made.

He was wheeled into the emergency theatre where he was administered with general anaesthesia via endotracheal tube using a small sized tube to navigate into the trachea in supine position. He had a neck exploration which involved approaching the arrow from the right counter point via a transverse incision. A fine dissection was carried out to the point of the arrow. The tip was identified and dissected free. It was then protected by grasping it with an appropriate forceps and gently extricated via the right surgical wound. The arrow entry point was copiously irrigated with normal saline and managed by open dressing. The right surgical wound was closed in layers with interrupted sutures. Post operatively patient was placed on antibiotics, analgesics and tetanus prophylaxis. He made an uneventful recovery and was discharged a few days later. He was however, lost to follow up.

### Case 2

A 47-year-old male who presented with history of an arrow embedded into the front of the neck of one day duration. He was said to be a victim of an assault. There was associated difficulty breathing as well as hoarseness. No other significant injuries were sustained. On examination, he was conscious but agitated, in obvious respiratory distress. Neck examination showed an arrow with a central entry point in the anterior neck in the zone II region just below the thyroid cartilage. The arrow was pointing towards the left side of the neck. X-ray soft tissue neck showed an arrow traversing the larynx and embedded in the soft tissue on the left side. The cervical vertebrae were spared. A diagnosis of penetrating neck injury with laryngeal trauma (grade 2) was made. He had an emergency tracheostomy performed under local anaesthesia. General anaesthesia was administered via the tracheostomy tube. He subsequently underwent a neck exploration which was approached from a left transverse incision. Dissection was carried out until the tip of the arrow was identified and protected by grasping with appropriate forceps then extracted via the left surgical wound. The entry point was irrigated with a copious amount of normal saline and managed as an open wound. Left surgical wound was closed in layers with interrupted sutures. Patient was placed on analgesics, antibiotics and tetanus prophylaxis. Patient was decannulated eight days post operation. He made a satisfactory recovery and was discharged 10 days post op. He was also lost to follow up.



A stem spiked arrow

*Figure: A stem spiked arrow.*

### Discussion

The stem spiked arrow is common among indigenous groups in Northern Nigeria. They are locally fabricated by black smiths. They have two to four pairs of special spikes on the arrow stem close to the tip. This design makes the arrow more likely to cause further tissue damage if an attempt is made to remove it via the entry wound. They fall under the category of a low velocity missile with an average velocity of 60 – 90 m/s when fired from a compound bow [9].

Impalement injuries present an uncommon and complex surgical problem and their removal requires careful pre-operative planning [10]. Furthermore, it needs to be tailored to each specific case and may involve a variety of standard or unconventional incisions and approaches to permit extraction of impaled object [10]. In our cases, we employed a retrograde exploratory laryngography technique to successfully remove the stem spiked arrows from the larynx.

A summary of the technique is as follows: the preoperative planning which entails identification of the entry point. The characteristics and location of the object is determined radiologically. A counter point is selected for the surgical approach bearing in mind the avoidance of critical structures in the incision and dissection path. Intraoperative, the counterpoint incision is made followed by sharp and blunt dissection with adequate exposure until the object is identified. The tip of the arrow is protected by appropriate forceps and it is then extracted via the surgical wound. The surgical wound is closed primarily while the entry wound is thoroughly irrigated and managed by open dressing. Postoperatively, analgesics, antibiotics and anti-tetanus prophylaxis is given. Standard care and suture removal protocols are followed. Follow up involves assessment of voice and breathing. In our cases, long term follow up was not possible because both patients were lost to follow up.

### Conclusion

We have presented two rare cases of stem spiked arrows penetrating the larynx from different angles and their successful removal via a retrograde laryngography approach.

Penetrating neck injury may occasionally present in an unusual manner. The surgeon needs to approach each case based on its peculiarities and develop ingenious ways of tackling the problem.

We recommend this approach for the removal of weapons with similar characteristics embedded in the neck which may cause further injury if approached from the entry point.

### Bibliography

1. Panwar A. "Penetrating Injuries of the Neck: History of the Procedure, Problem". *Epidemiology Emedicine.medscape.com*. (2016).
2. Burgess C., *et al.* "An evidence based review of the assessment and management of penetrating neck trauma". *Clinical Otolaryngology* 37.1 (2012): 44-52.
3. Ozturk K., *et al.* "Penetrating zone II neck injury by broken windshield". *International Wound Journal* 3.1 (2006): 63-66.
4. Sari M., *et al.* "Atypical penetrating laryngeal trauma: a bullet in the larynx". *European Journal of Emergency Medicine* 14.4 (2007): 230-232.
5. Ordog GJ. "Penetrating neck trauma". *Journal of Trauma and Acute Care Surgery* 27.5 (1987): 543-554.
6. Bumpous JM., *et al.* "Penetrating injuries of the visceral compartment of the neck". *American Journal of Otolaryngology* 21.3 (2000): 190-194.

7. Nepal A., *et al.* "Penetrating neck injury by an arrow: A paradigm of age old assault". *Nepal Medical College Journal* 12.1 (2010): 58-60.
8. Imogu A., *et al.* "Effective Management of Casualties in National Disaster: 44 Nigerian Army Reference Hospital Kaduna Experience". Proceedings of 43<sup>rd</sup> Annual General Meeting and Scientific Conference, West African College of Surgeons (2003): 5-6.
9. Ogunleye A., *et al.* "Arrow injury to the skull base". *West African Journal of Medicine* 23.1 (2004): 94-96.
10. Horowitz MD., *et al.* "Impalement injuries". *Journal of Trauma and Acute Care Surgery* 25.9 (1985): 914-916.

**Volume 12 Issue 1 June 2017**

**© All rights reserved by Imogu AO and Mbanaso OO.**