

## Acute Upper Airway Obstruction Secondary to Gunshot Injury Splitting Cervical Vertebra

### Dear Editor,

The management of penetrating neck wound remains controversial. The complicated anatomy of the neck has always made this management challenging. Airway, spinal cord and great vessels are the most important structures to be concerned with. In the presence of cervical spine fracture, airway must be handled with greater care and neck manipulation should be minimised so as to avoid further damage to the injured structures.

### Case Report

A 30-year-old male presented to emergency department with inability to move all his limbs after sustaining a gunshot injury on his left shoulder region. All the vital signs were normal and there was no shortness of breath or any chest pain. There was minimal bleeding from the oral cavity.

Neurological examination revealed loss of tone, power and reflexes of both sides in both upper and lower limbs. Hyperesthesia was noted at the level of C5 and above distribution but absent at the lower levels. Plain lateral neck radiograph located the bullet at the submandibular

area. A collection of air was seen in the prevertebral soft tissue (Fig. 1).

Computed tomography (CT) of the neck showed comminuted fracture of C5 vertebral body on the left foramen transversarium. Bony and metallic fragments were seen in the spinal canal. Bony fragments were also found in the swollen prevertebral soft tissue region. Subcutaneous emphysema was present at retropharyngeal space from the level of palate superiorly to the level of T1 vertebra inferiorly (Fig. 2).

After the CT procedure, the patient developed shortness of breath. Endotracheal intubation attempted by both emergency physician and anaesthetist failed. Urgent referral was made to the Otorhinolaryngology (ORL) team. Emergency tracheostomy was performed at the bedside and mechanical ventilation commenced.

The patient was nursed in the ward while waiting for the spinal shock to recover. Correction of fractures and neck exploration for removal of the air-gun pellet were planned. However, the patient succumbed to death after 3 days. The cause of death was neurological shock.



Fig. 1. Air-gun pellet in the submandibular area, comminuted fracture of vertebral body with air in the prevertebral space.



Fig. 2. Axial cut CT scan demonstrated narrowing of the airway with neck emphysema.

## Discussion

Severe trauma to the airway or to surrounding structures can complicate the resuscitative management and definitive intubation of the penetrating neck trauma patients.<sup>1</sup> Besides direct injury, edema or swelling of the adjacent structures due to emphysema or haematoma collection can further narrow the remaining airway.

Patients who sustained neck trauma may require intubation and mechanical ventilation for several reasons. Upper airway obstruction secondary to severe facial or laryngeal trauma, airway access in patients with cervical spine injury, management of retained airway secretions, maintenance of patent airway and airway access for prolonged mechanical ventilation are among the common indications.<sup>2</sup> However, the optimal approach to airway management for penetrating neck injuries remains a controversial topic.<sup>1</sup>

The development of upper airway obstruction in this case was attributed by the expansion of the width of prevertebral space. It was clear from the plain lateral radiograph of the neck that injury to the cervical spine had caused bony fragments to be dispersed in the space and created more injury and edema. The presence of subcutaneous emphysema had further narrowed the airway.

A lateral radiograph of the neck was the single most valuable investigation in the evaluation of the retropharyngeal space.<sup>3</sup> As demonstrated in this case, plain lateral neck radiograph was performed at initial part of the presentation. It was significantly shown that there was increase in prevertebral soft tissue thickening which should have triggered alarm that the airway compromise was pending. Furthermore, there was loss of cervical lordosis compounded by comminuted fractures, which necessitated tracheostomy in view of difficult airway if intubation was attempted.

In this case, endotracheal intubation should not be considered a choice because of several factors. The patient had cervical spine injury and manipulation of the neck would further damage the structures. Clinical examination also revealed findings of spinal cord injury at C5 level. Sims and Berger<sup>4</sup> in 2002 recommended that early tracheostomy should be considered in patients with cervical spine injury requiring halo fixation, especially if they had a high injury severity score, had cardiac disease, are older than 60 years, or have a past history of difficult intubation, and were anticipated to require an artificial airway for more than 1 week.

If translaryngeal intubation was performed, it would have ended up with prolonged translaryngeal intubation to accommodate mechanical ventilation. Later on, the patient would still need a tracheostomy.

In 1990, Rodriguez et al<sup>5</sup> studied 106 mechanically

ventilated trauma patients in a prospective randomised controlled study. Fifty-one randomised patients underwent early tracheostomy (within 7 days of intubation) and 55 patients late tracheostomy (>7 days). They were able to demonstrate a significant decrease in the duration of mechanical ventilation, and intensive care unit (ICU) and hospital length of stay in patients who underwent early tracheostomy.

In addition, a comminuted fracture of cervical vertebra with foreign bodies embedded within prevertebral soft tissue might necessitate surgical procedures later on and surgical field would be compromised if the endotracheal tube was in situ. This is an additional indication why early tracheostomy is recommended as the preferred method of securing airway in this case. In such cases, manipulation of the neck should be avoided and usually the endotracheal intubation has failed.

## Conclusion

In conclusion, upper airway obstruction should be expected in every case of penetrating neck trauma. At the initial presentation, a plain lateral neck radiograph is the best tool to evaluate the patency of upper airway. Techniques of airway resuscitation may vary from one patient to another, depending on the extent of trauma. When a spinal cord injury is suspected, early tracheostomy is recommended as the best option of airway management.

## REFERENCES

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