Diagnosis and management of common maxillofacial injuries in the emergency department. Part 1: advanced trauma life support

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MAXILLOFACIAL INJURY

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Maxillofacial injuries are often seen in the emergency department. Fractures of the facial skeleton are commonly seen after assault, road traffic accidents, falls, and sporting injuries in a ratio mandibular:zygoma:maxillary of 6:2:1.[1] Clinicians must be familiar with their management so that appropriate treatment may be used.

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This series of articles addresses the important aspects of maxillofacial trauma and its management. Soft tissue trauma is not discussed. The aim of these articles is to outline the fundamental principles, the relevant surgical anatomy, and to advise on the possible pitfalls in the management of maxillofacial trauma in the emergency setting. It does not attempt to be a definitive text on maxillofacial trauma.

ADVANCED TRAUMA LIFE SUPPORT

As with all traumas, basic advanced trauma life support principles should be applied to the initial assessment of the casualty. This must include a primary and secondary survey.

It is only after the secondary survey that definitive care begins.

Fifty per cent of maxillofacial injuries are secondary to assault and fifty per cent of those will have raised alcohol levels. However, it is important to remember that confusion may be secondary to head injury and/or hypoxia so do not assume the patient is drowsy because of alcohol. There is a 10–15% chance of cervical spine injury in an unconscious patient with severe maxillofacial trauma.

Airway breathing and ventilation

The main cause of death in severe facial injury is airway obstruction. This may be because of the tongue falling back and obstructing the hypopharynx in an unconscious patient or may be secondary to uncontrolled haemorrhage drowning the airway.

Assess the patient for airway obstruction

Agitation suggests hypoxia, obtundation suggests hypercarbia, and cyanosis suggests hypoxemia secondary to inadequate oxygenation.

Look for evidence of injury to the larynx and trachea, including crepitus of the soft tissues. Clinically the patient may have noisy breathing, snoring, gurgling, or croaking. Hoarseness, subcutaneous emphysema, and a palpable fracture are suggestive laryngeal fracture. Check that the trachea is central.

Establish and maintenance of the airway

Good suction is essential.

Remove the debris (broken teeth, dentures) from the mouth with a finger sweep, yankauer suction. A magill's forceps may also be used for larger objects.

The chin should be pulled forward either through chin lift or jaw thrust procedures.

The jaw thrust and chin lift relieves soft tissue obstruction by pulling the tongue, anterior neck tissues, and epiglottis forward. The jaw thrust has the advantage that it can be performed by one clinician who can simultaneously stabilise the cervical spine.

In a bilateral fractured mandible, the central portion of the mandible and attached tongue may fall backwards obstructing the airway. Pulling the anterior part of the mandible forward may clear the airway

In severe midface fractures the maxilla may be pushed backwards towards the spine causing an airway obstruction. To relieve this, the maxilla must be pulled forward to disimpact the fracture.

In the unconscious patient a towel clip is useful to pull the tongue forward.

If the airway still cannot be established by these methods use a laryngoscope to check that there is no foreign body, such as denture impacted in the vocal cords, which can be removed with a magill's forceps. If the foreign body cannot be removed quickly it should be left and a surgical airway performed. If no foreign body is visible an endotracheal tube should be inserted. Endotracheal intubation with a cuffed tube will secure the airway.

If the vocal cords can not be adequately visualised or endotracheal intubation is not possible then a surgical airway should be performed.

A cricothyroidotomy is the preferred way to establish a surgical airway in the emergency setting. A 5 or 6 mm tube cuffed tracheostomy tube should be inserted through the cricothyroidotomy incision.

A needle cricothyroidotomy is advised in children less than 12 years of age as there is a high risk of damaging the cricoid cartilage. In a child the cricoid cartilage is the only circumferential supporting structure that maintains patency of the upper trachea.

Figure 1 Epistal™ tube.

Figure 2 Inflated epistat™ tube.

Circulation with haemorrhage control

If there is no evidence of damage to the major vessels of the neck or middle third of facial fractures blood loss is usually insufficient to cause hypovolaemic shock problems, but may cause problems with establishing and maintaining an airway.

Bleeding from the soft tissues of the head and neck may be controlled with direct pressure on the bleeding site.

Once the bleeding has ceased the wound should not be probed. Scalp lacerations may bleed profusely but are unlikely to cause hypovolaemic shock with a reduction in blood pressure in an adult. However, large scalp lacerations may be life threatening in children. Any arterial source of bleeding in the scalp can be safely clipped off and further haemostasis may be achieved by approximating scalp tissues with large sutures.

Intra oral bleeding may be controlled by getting the patient to bite on a swab.

A conscious patient with maxillofacial injuries is usually more comfortable sitting upright as this allows blood and secretions to drain out of the mouth.

Bleeding from a tongue laceration can be torrential and direct pressure may not be enough to control the bleeding; in such cases deep sutures across the laceration are advised to achieve haemostasis.

Bleeding from fractured mandible ends may be arrested by manually reducing the fracture, although a bridle wire is usually required to maintain this reduction.

Suggested further reading

Greaves I, Porter K, Ryan J. Trauma care manual. Oxford: Oxford University Press, 2001.
Gwinnutt C, Driscoll P. Trauma resuscitation - the team approach. 2nd edition. Oxford: BIOS Scientific Publishers, 2003.
Ward Booth P, Eppley B, Schmelzeisen R. Maxillofacial trauma and esthetic facial reconstruction. London: Churchill Livingstone, 2003:31–61.

Torrential bleeding from the region of the nasopharynx following trauma to the middle third of the facial skeleton can be difficult to control

An epistat tube with anterior and posterior balloons that can be inflated to tamponade any bleeding can be very useful in these situations (figs 1 and 2).

Using an epistat

Insert an epistat fully into each nostril and then inflate the posterior cuff with 10 mls of saline (10 mls written on pig tail). Withdraw the epistat until resistance is felt. Inflate the anterior cuff (30 mls written on pig tail) with up to 30 mls of saline. This causes the bleeding to tamponade.

Suction catheters can be inserted through the central portion of the epistat to clear the nasopharynx.

In a patient with a mobile maxilla, epistat tube inflation may press the posterior maxilla apart preventing haemostasis. In these cases with a mobile maxilla the use of rubber mouth gags is advisable. The mouth gags, which act as a splint compressing the maxilla between the skull base and the mandible, are placed between upper and lower posterior teeth bilaterally. The epistat tubes are then inserted and inflated as previously described.

In cases where there is also a mobile mandible fracture a cervical collar may be used as a temporary form of mandibular splint.

Care must be exercised when placing epistat tubes as the cribiform plate may be fractured and the tube may end up intercranially. The epistat must always be placed in a horizontal direction never cranially.

Foley catheters may also be used. The authors recommend that all units have epistat tubes available and that all clinicians are familiar with their use.

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