Case Study

Management of the Mangled Face by a Forward Surgical Team

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Abstract

A mangled face is an uncommon injury that can occur in a combat zone as a result of blunt trauma, penetrating trauma or explosion injury. Despite the patient's dramatic disfigurement, attention needs to focus on the basic ABC's of initial trauma management. We present an injured Afghan civilian with a severe facial injury. Our approach to airway management, breathing evaluation and hemorrhage control are described. In addition we utilized two emergency hemorrhage control modalities that are usually associated with other areas of the body, a circumferential compression sling and a laparotomy sponge packing.

A 28 year old Afghan man presented to our FOB gate following a farm machinery accident where he sustained severe injuries to his face and right arm. Upon arrival to our trauma bay, he was noted to have multiple soft tissue and bone injuries to the eyes, midface, mandible and neck as well as a near amputation of the right forearm (Fig. 1).

Figure 1: *Mangled face secondary to farm machine accident.*

On initial exam the patient was awake and breathing spontaneously with good breath sounds. The patient had been brought to us propped up on blankets and a mattress, and we left him in that position. Bleeding was noted from his face, oropharynx and from a severe injury to his right forearm. BP 90/70, HR of 120, Temp of 98 and O_2 sat of 97%. A non-rebreather face mask was applied and a tourniquet was placed on the right upper arm. Two large bore IVs were placed and warm crystalloid infusions were initiated. The patient was then taken to the operating room for bleeding control and emergency airway management.

The patient was lightly sedated with titrated Versed, Ketamine, and Fentanyl to assure continuous spontaneous respirations. The operating surgeon utilized a headlight to improve visualization. There was an existing laceration to the skin overlying the trachea. One percent lidocaine with epinephrine was injected into the soft tissues overlying the trachea to improve patient cooperation. With attention to C-spine precautions, a single laparotomy sponge was used to apply circular compression around the head and mandible, drawing the mandible and facial structures together in a vertical sling fashion. This circular compression provided better control of bleeding and improved visualization of the neck (Fig. 2). A tracheotomy was

Figure 2: *Surgeon placing laparotomy sponge sling for circular compression.*

performed through the existing skin laceration at the level of the second tracheal cartilage and a 6F tracheostomy tube inserted and securely sutured into place. Once the airway was controlled, the patient was rolled for inspection of his back, with attention to C-spine precautions. The rectal exam was normal, the FAST exam was negative and a foley catheter inserted.

Examination of the patient's face and oropharynx demonstrated a comminuted mandibular fracture, a displaced alveolar fracture, multiple avulsed teeth, avulsed portion of the lower lip, a midface frac-

ture, multiple lacerations of the tongue, hard palate, soft palate, and multiple periorbital lacerations.

The oropharynx was packed with a laparotomy pad to control bleeding. The many facial lacerations and flaps were also sutured to provide hemorrhage control (Figure 3). The patient received 2 U of warmed PRBC's and 2 U FFP.

Figure 3: *Patient prepared for transport with face sutured and oropharynx packed for hemostasis. Tracheostomy tube is secured with 4 sutures.*

The patient underwent a right forearm amputation and was transferred to a role III facility approximately two hours postoperatively. At two months post injury, the patient has survived, has undergone reconstructive surgery and is being followed for wound care by the FST surgeons.

Discussion

The term "mangled" is generally refers to a severe injury and was first utilized in the surgical literature by Gregory in 1985 when he described the" mangled extremity syndrome".[1] Mangled, as applied to the face, has been used in popular civilian journalism to describe various facial injuries usually related to motor vehicle crashes or animal attacks.[2] The term "mangled face" has not been used in the scientific literature previously.

A basic tenet of trauma management is that the team should not be distracted by dramatic deforming injuries and should maintain their focus on the basic ABC's of trauma care. Our team followed the proper steps in the proper order and utilized standard emergency hemorrhage control and airway management techniques.

In emergency airway management, if the patient is able to maintain his own airway (i.e., has spontaneous respirations, adequate tidal volumes, maintain blood oxygen saturation, and can clear secretions), the healthcare team has time to prepare for an awake intubation. Ideally, allowing the patient to maintain spontaneous respirations until placement of the endotracheal or tracheostomy tube is preferred.[3] There are several medication options. Although not readily available in this case, Dexmetatomidine (Precedex) as an infusion is an excellent choice. It promotes spontaneous respirations and also contributes to pain control.[4] Precedex is available in theatre. Another option is to administer aliquots of opioids and sedative hypnotics. Fentanyl and Ketamine[5,6] in small amounts can be used in combination to control pain as well as promote respiratory drive.

Airway management and hemorrhage control were addressed simultaneously. The patient was found to have a laceration over the trachea, which we utilized for tracheostomy placement. We placed the tracheostomy in the most convenient and expedient location, which in this patient was not through the crico-thyroid membrane, but at the level of the 2nd tracheal ring. The use of a generous amount of local anesthesia in conjunction with light sedation resulted in complete cooperation of the patient during the tracheostomy procedure. Use of a headlight also expedited the procedure.

The use of a sling for hemorrhage control was first described by Cooper in1842 as a means of applying circular compression to pelvic fractures.[7] Since that time, a bed sheet or commercial pelvic sling have been utilized as an emergency management technique for reducing "open book" fractures and controlling hemorrhage.[8,9] We utilized a laparotomy sponge in the same fashion to compress the facial and mandibular fragments and improve hemostasis while we were performing the emergency tracheostomy. The sling also allowed for improved visualization of the neck.

The oropharynx was found to be severely injured, including the gingivae, tongue, hard palate, soft palate, and oral mucosa. Utilizing a tongue depressor, a laparotomy sponge was packed into the oropharynx in order to apply compression to the injured structures and control bleeding. Laparotomy sponge packing is most commonly associated with the abdomen, pelvis and thorax, but has also been described for use in controlling hemorrhage following trauma to the oropharynx.[10]

Attention to cervical spine precautions was maintained throughout since 1 to 4% of patient with facial injuries will also suffer a cervical spine injury.[11,12]

Summary

The mangled face is an uncommon injury in a combat zone but presents some unique challenges for the FST. Teamwork with simultaneous hemorrhage control and airway management is necessary. We utilized circumferential compression, packing of the oropharynx, and suturing of the multiple facial wounds to control hemorrhage. We utilized a headlight, light sedation and local anesthesia to gain access to the trachea through the 2nd tracheal ring. Attention to the cervical spine is necessary due to the risk of concomitant neck injury.

Figure 4: *Several months later as patient heals. Arrow points to a Orocutaneous fistula.*

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