Trauma Evaluation of the Parotid Duct in an Austere Military Environment

MAJ Kyle N. Remick, MC USA; MAJ Todd S. Jackson, NC USA

ABSTRACT Evaluation of the parotid duct from trauma in an austere military environment can be challenging. Appropriate radiologic evaluation of a potential isolated parotid duct injury in this environment has not been reported. The use of a plain X-ray sialogram at the forward surgical team is demonstrated and may be beneficial in this setting.

INTRODUCTION

A 45-year-old Afghan male was injured by fragments from a mortar. He arrived for evaluation at the 772nd Forward Surgical Team (FST) in Jalalabad, Afghanistan. His only complaint was pain from penetrating fragment injuries on the right side of his face and on his right upper back. On physical examination, he was noted to have a 2-mm penetrating fragment wound over his maxilla and a 2-mm penetrating fragment wound 2 cm anterior to his tragus (Fig. 1). Except for several small penetrating fragment wounds on his right upper back, the remainder of his physical examination and a chest X-ray were unremarkable.

The location of the penetrating facial wounds was concerning for injury to the parotid duct. Surgical exploration of the face was not indicated due to the small size of the wounds and lack of hemorrhage. Given the austere environment and the low probability of this patient returning for follow-up, a plain X-ray sialogram was performed to evaluate the integrity of the parotid duct.

The patient was asked to suck on a lemon hard candy. Afterward, oral examination successfully identified the opening of the parotid, or Stensen's duct, adjacent to the 2nd molar. A 50:50 mixture of Visiopaque (Iodixanol 270 mgI/mL) saline solution was prepared. Using a 24-gauge intravenous catheter, the oral opening of the parotid duct was cannulated. When the military field-portable X-ray apparatus was oriented for a lateral plain film X-ray, 1 cc of the contrast solution was injected, and the X-ray was taken. An intact parotid duct was confirmed radiologically (Fig. 2). The patient was discharged from the FST.

The parotid duct is at risk from penetrating injuries occurring along a line drawn from the tragus to the middle upper lip. Many times this injury does not occur in isolation as it did in this case study. Injury to the duct is often overlooked or delayed in multisystem trauma patients, but evaluation should be planned when the patient is stable.[1]

Acute evaluation of the parotid duct may be accomplished by first applying pressure over the parotid gland and examining the duct opening intraorally for salivary drainage.[1] If this is unsuccessful, cannulation of the oral opening followed by injection of saline or methylene blue is attempted and drainage into the wound cavity from injured ends of the duct is noted.[1,2] Demian and Curtis describe a novel technique to cannulate the intraoral parotid duct. Using the 0.025-inch spring-wire guide from a standard arterial line kit, the duct is cannulated. Then an 18- or 20-gauge angiocatheter is passed over the wire and the wire is removed.[3]

Injuries to the duct may occur within the parotid gland, in its course superficial to the masseter muscle, or in the portion between the muscle and its opening in the oral cavity. Injuries within the parotid gland are treated by closure of the parotid capsule. Injuries over the masseter muscle are treated with direct duct repair. Injuries that are distal and anterior to the masseter muscle are treated with either direct duct repair or creation of a new intraoral duct opening using the damaged end of the duct.[1] A duct repair is performed with 8-0 or 9-0 nylon sutures over a stent. The stent should remain in place for 10–14 days to prevent stricture of the duct at the repair. Formation of an intraoral fistula is accomplished using an 8-0 nylon suture to approximate duct epithelium to oral mucosa. A stent is not necessary in this case.[2]

Complications include sialocele and salivary fistula. These may occur early or late but occur more commonly after late repair.[4] A sialocele will cause a facial swelling in the area of

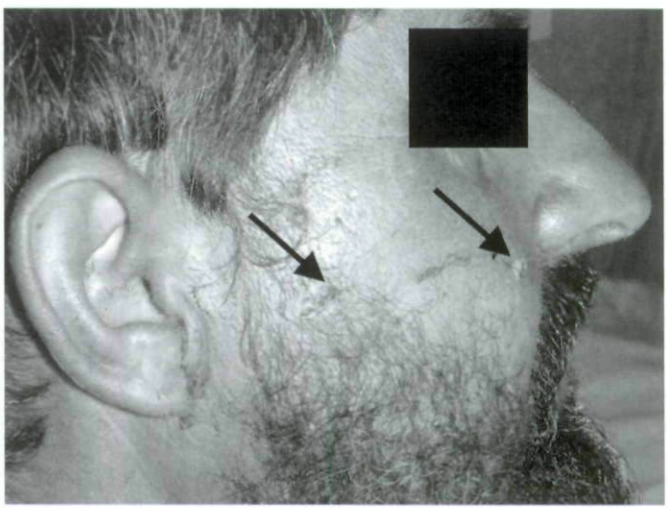

FIGURE 1. 2mm penetrating fragment wounds to right side of face (arrows).

772nd Forward Surgical Team, Bldg. 6942, 42nd Street, Fort Campbell, KY 42223.

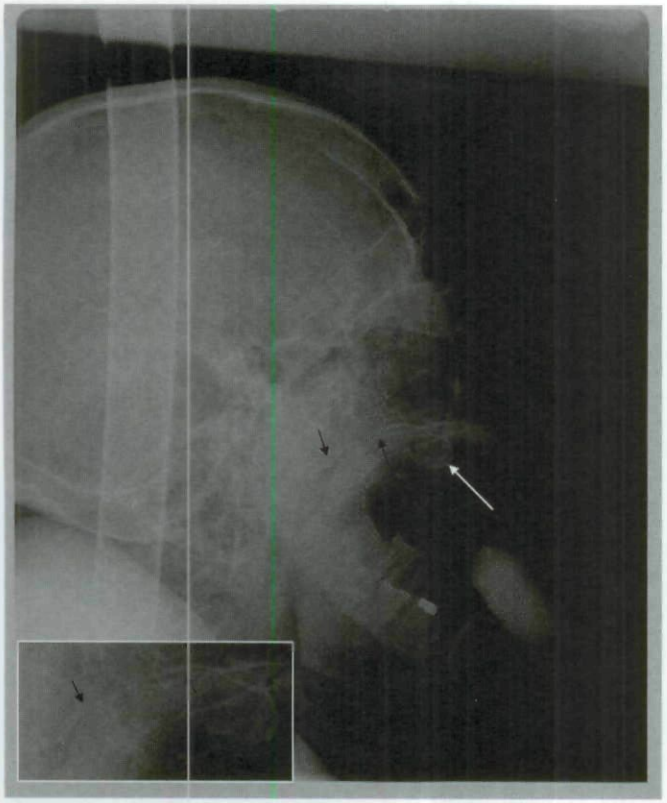

FIGURE 2. Sialogram with oral opening (white arrow) and path of duct (black arrows); inset with magnified course of parotid duct (black arrows).

the parotid and is diagnosed by aspiration of fluid and examination for a high amylase level (>10,000 units/liter). If found early after repair, treatment is re-exploration and repair. If it is discovered late, options include repeated aspiration, external compression, antisialogogue therapy, and, as a last resort, parotidectomy.[1]

A salivary fistula is external drainage of saliva from the area of injury. If this occurs early after injury, exploration and direct repair of the duct are indicated. If it is delayed or persistent, options include reattempted direct repair, external pressure/fasting/antisialogogue therapy, saphenous vein grafting, intraoral drainage, and parotidectomy.[1]

An algorithm for the evaluation and treatment of complex maxillofacial injuries produced by the Global War on Terrorism has been proposed and implemented by military medical centers.[5] As noted above, early detection of duct injury is best accomplished using injection techniques to detect duct leakage in the wound. Sialograms are usually reserved for evaluation of a duct repair or late evaluation for duct injury. Modern techniques for imaging of the parotid gland and duct include computed tomography, magnetic resonance imaging,[6] and even sialendoscopy.[7] Appropriate radiologic evaluation of a potential isolated parotid duct injury in an austere military environment has not been reported. The use of a plain X-ray sialogram may be beneficial in this setting.

REFERENCES

1. Lewkowicz AA, Hasson O, Nahlieli O: Traumatic injuries to the parotid gland and duct. J Oral Maxillofac Surg 2002; 60: 676–80.
2. Steinberg MJ, Herrera AF: Management of parotid duct injuries. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2005; 99: 136–41.
3. Demian N, Curtis W: A simple technique for cannulation of the parotid duct. J Oral Maxillofac Surg 2008; 66: 1532–3.
4. Van Sickels JE: Management of parotid gland and duct injuries. Oral Maxillofac Surg Clin North Am 2009; 21: 243–6.
5. Powers DB, Will MJ, Bourgeois SL, Hatt HD: Maxillofacial trauma treatment protocol. Oral Maxillofac Surg Clin North Am 2005; 17: 341–55.
6. Shah GV: MR Imaging of Salivary Glands. Neuroimaging Clin N Am 2004; 14: 777–808.
7. Marchal F, Dulguerov P, Becker M, Barki G, Disant F, Lehmann W: Specificity of parotid sialendoscopy. Laryngoscope 2001; 111: 264–71.