

TRAUMATIC DISEASES OF PAROTID GLAND AND SEQUALAE. REVIEW OF LITERATURE AND CASE REPORTS.

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ABSTRACT

Parotid gland injuries are accompanied by a large number of sequelae. The aim of this paper is to highlight the importance of thorough management of these parotid gland injuries especially at initial presentation in order to minimize the complications that accompany these injuries. A review of the aetiology and management of the existing cases of parotid gland injuries obtained from published journals and internet search as well as a report of two cases managed in our centre is presented in this paper. A total of about 70 cases in the previous literatures were reviewed of which assault was responsible for almost 90% of the cases. Sialoceles and fistulae were the main sequelae of these injuries. More than half of the cases (54%) were managed by conservative methods. Surgical drainage was done in about 44% cases; where the Stenson's ducts were accessible, primary repair was done. Excision of the gland was done in very few cases. The two cases managed in our centre were due to assault from broken bottles and road traffic accident respectively and both were managed by conservative methods. The first patient was a case of sialocele following the injury, which resolved within 3 weeks after the cyst formation with reduction in food intake, aspirations and external surgical drainage; while the second patient was a case of persistent fistula which healed after about 5 weeks following the trauma. Follow-up of both patients for about 3 months revealed no further leakage or accumulation of saliva. Management of these injuries involves a thorough understanding of the structure and function of the parotid gland and closely related tissues.

Key Words: Parotid gland, trauma, complications

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INTRODUCTION

Parotid gland diseases of traumatic origin constitute about 2.5% of all parotid gland diseases¹. These diseases include cysts (retention cysts and sialoceles) and fistulae. Injuries to the face over the masseter muscle in the parotid gland region may damage the intralobular aspects of the parotid duct or the parenchyma of the gland itself, while injuries anterior to the masseter and directly on the upper fibres of the buccinator/ cheek muscle will result in damage to the extralobular (Stenson's) duct. Of the 70 cases reviewed in existing literatures there was either partial or complete transection/avulsion of the proximal, middle or distal part of the duct with or without injuries to the parenchyma. Injuries to the parenchyma will result in either oedema or hematoma of varying degree depending on the type and severity of the injury. These injuries were either blunt or penetrating injuries from road traffic accident, gun-shots, bomb blasts and assaults with different sharp objects e.g., knife, broken bottles, arrows, swords, e.t.c². Failure to properly manage these injuries may result in immediate or late complications and these include complete duct obstruction and glandular atrophy, partial duct obstruction and retention cysts, sialoceles, acute and chronic fistulas^{3,4}. Varying degrees of temporary or

permanent facial nerve paralysis which results in weakness of different portions of the face; in addition, fibrosis, unresolving swelling and cosmetic defects are some of the complications that can also occur following these injuries. Injury to the facial nerve may occur before the division of the main trunk of the nerve which usually divides into two branches in the gland while injuries to the masseter may affect one or few of the terminal or anastomotic branches. The temporal and marginal mandibular nerves have no anastomotic branches and the temporal branch has a very low regenerative potential, immediate repair of the facial nerve or these branches must be done in cases of complete nerve transection. Acute complications of these injuries include hypovolemic shock, due to complete or incomplete transection of the external carotid artery or the posterior facial vein and this may result in death of the patient if urgent rehydration/ transfusion is not done⁵⁻⁹.

Case Report 1

A 30-year-old male patient presented to our clinic with a two-week history of swelling following deep laceration to the parotid region of the face from assault with broken bottles. He was initially taken to a private hospital where the acute injury was managed with fluid replacement, suturing of the wound and drugs. On presentation the external wound had completely healed but there was localized swelling

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over the parotid area. The swelling was fluctuant, non-tender measured about 6cm in its widest diameter. Swelling was said to increase more during eating. The swelling was aspirated and about 30mls of blood-stained fluid was obtained. The orifice of the duct could not be located although the papilla around the suspected site was prominent. These made cannulation of the duct impossible. A diagnosis of sialoceles of the parotid gland with complete duct obstruction was entertained **fig. 1**. Ultrasonography revealed a thick-walled septated cystic mass which measured 41.3mm by 15.7mm, in the left parotid region. The scan also showed a gross alteration of the normal architecture of the parotid gland **fig. 2**. Contrast sialography could not be done because there was no contrast medium. Subsequent aspirations with 20millilitres (mls) hypodermic syringe were done on alternate days for 2weeks and 5mls of hot water was injected around the region in the penultimate session of the aspiration; this was to enhance sclerosis of the tissues. However results of the aspirations, hot water injection and pressure application with gauze and plaster were not satisfactory as swelling persisted, although, there was reduction in the amount of fluid aspirated at each visit, with some degree of fibrosis. However, external surgical drainage was then considered and done via a 0.5cm stab skin incision into the cyst and a non-perforated infusion given-set was cut and inserted as a drain, this was sutured to the skin with silk suture and left in-situ for 1 week. Patient was advised to avoid or minimize oral intake of foods. He complied and went on tablets (food supplements) which he was able to obtain from big supermarket stores although at high costs. There was remarkable improvement, with significant reduction in the drainage and salivary leakage, progressive healing with gradual extrusion of the drain. By one week and five days the swelling has resolved and the fistula had healed without any sign of leakage **fig 3**.

Case Report 2

A 55-year old female patient was involved in a road traffic accident and brought to the casualty unit of the hospital, she presented with severe degloving injuries to the soft tissues on the lateral aspect of the middle and lower portion of the left side of the face. In addition, she also sustained fracture involving the body of the mandible on the left side. The soft tissue injuries over the parotid region were closed primarily by the casualty surgeons; after about 3 weeks, she was reviewed in our clinic, and on presentation, there was restriction of mouth opening (interincisal distance of 2.5cm) due to fibrosis; gross facial asymmetry of the face due to fullness and weakness of the soft tissues on the left side of the face and over the parotid region, there was

obliteration of the naso-labial fold, deviation of the lips and face to the unaffected side. The upper portion of the face supplied by the temporo-facial nerve was intact. Furthermore, there was persistence of clear-coloured salivary fluid via an opening in the healing wound. There was no cystic swelling in the subcutaneous region tissue over the masseter muscle and parotid gland. A diagnosis of left facial nerve palsy and salivary-cutaneous fistula was made; since the wound was already healing, it was not re-opened for exploration, the mandibular fracture was fixed with arch-bar ligation and intermaxillary fixation, while the fistula was managed by conservative means with reduction of oral food intake, fluids and watchful waiting, there was complete spontaneous healing of the fistula and cessation of salivary fluid leakage after 10 weeks following the injury. The arch bars were removed 7 weeks after placement, occlusion was acceptable, and the trismus was improved with jaw exercise using wooden spatulas. On further review, there was gradual but slow improvement of facial palsy.

Figures show pre-operative, ultrasound and post-operative photographs of the first case report. Swelling on the left side in figure:1, had resolved in figure:3.

Figure: 1



Figure: 2



Figure: 3



DISCUSSION

A total of about 70 cases in the previous literatures were reviewed of which assault was responsible for almost 90% of the cases. Sialoceles and fistulae were the main sequelae of these injuries. More than half of the cases (54%) were managed by conservative methods. Surgical drainage was done in about 44% cases; where the Stenson's ducts were accessible, primary repair was done. Excision of the gland was done in 2 cases. The 2 cases managed in our hospital were due to assault from broken bottle and road traffic accident respectively and both were managed by conservative methods. Direct injuries to the pre-auricular and parotid regions of the face commonly involve a penetrating injury that can lacerate any portion of the parotid duct or the parenchyma¹. Any penetrating injury to the cheek posterior to the anterior boarder of the masseter muscle should raise a suspicion of injury to the duct. If the duct cannot be easily identified on thorough exploration of the wound, then a probe should be passed into the duct via the intra-oral route and located in the wound. If the transection of the duct has occurred, an end to end

anastomoses over a polythene catheter should be done with fine sutures. The catheter may be sutured to the buccal mucosa and removed in two weeks. If the proximal end of the duct cannot be readily identified, the wound should be dabbed and the gland compressed to produce saliva from the cut ends to allow its identification. In situations where primary anastomoses are not feasible but the duct is long enough, i.e, (the transection is at the distal end close to the orifice) the duct can be sutured directly to the buccal mucosa, creating a new opening. If a large part of distal portion of the duct is avulsed the mucosa can be raised and the mucosa flap tubed and sutured end to end to the remaining part of the duct. It can be ligated and this will cause the gland to atrophy, although infection may result occasionally and manifest as swelling below a sutured wound; this can be managed with exploration, drainage, antibiotics and possible identification and repair of the duct^{2,3,4}. Laceration of the parenchyma in isolation can usually be managed by primary closure of the gland and the capsule with interrupted or continuous suturing technique. An acute/ chronic fistula or sialocele may develop but healing will occur either spontaneously with continuous leakage or aspiration and pressure dressing respectively. Resolution takes about 7-14days after which the traumatized intra-ductal system will re-open. The healing will be enhanced by reduction of oral intake of food and will be prolonged if the capsule is not properly repaired^{5,6,7}, this possibly explains the delay in healing in both cases presented, hence casualty surgeons must be thorough in their initial suturing of these wounds or better still, invite the Oral and Maxillofacial surgical team promptly. Persistent/chronic fistula may indicate an obstruction of the duct in addition to parenchyma injury, this is usually investigated with contrast sialography followed by a repair of the duct if possible. This may be a herculean task because of the expected fibrosis within and around the duct, making it difficult to locate and repair the duct^{8,9}. If the repair is not feasible and fistula persists after conservative approach, several workers have reported the use of drugs like percutaneous botulinum toxin type A or antisialogogues e.g. transdermal scopoloderm injected into the subcutaneous tissue around the gland; a major problem is the availability of these drugs^{10,11,12}. Parekh *et al.* reported an average healing period of 24 ± 4 days for patients who received nothing orally for only 5 days and 9.4 ± 0.9 days for patients that received nothing orally until healing of the injury. They concluded that response to conservative therapy depends on the severity of the injury based on sialography; minor intra-parotid ducts heal faster than major intraparotid ducts and partial transections also heal faster than complete transactions^{1,3}. The fistula can be diverted into the mouth via an internal

surgical drainage, the tract dissected out and turned into the oral cavity through the cheek and sutured to the mucosa. Sialoceles/ extravasation cysts may develop instead of a fistula especially when there is complete healing of the cutaneous tissues based on the fact that the skin heals faster than the gland and duct. The conservative and surgical methods of treatment of fistulae are also applicable in the management of these sialoceles^{6,12}. External surgical drainage was used for our first patient with satisfactory result. If internal or external drainage fails, excision of the gland or irradiation to destroy the gland may be done. Surgery will include both excision of the cyst and the gland. However, there are reported cases of persistent sialoceles after superficial parotidectomy. These may resolve within a short time with conservative therapy⁶. In addition, other surgical treatment that can be done include tympanic neurectomy of the post-ganglionic fibres that pass through the auriculo-temporal nerve from the otic ganglion to the parotid gland⁹. Retention cysts result from partial obstruction of the ducts and this may resolve by making an incision into the duct and suturing the duct mucosa to the buccal mucosa, thereby creating a new opening. Passage of food debris and infection may occur but this may resolve with time due to subsequent collapse². Blunt trauma can cause swelling with oedema or hematoma of the gland, this may resolve with the application of cold packs, although temporary obstruction may occur. However, significant hematoma should be drained before it organizes and results in scarring and fibrosis which can lead to permanent duct obstruction and aesthetic deformity⁵.

In conclusion, management of these injuries involve a thorough understanding of the structure and function of the parotid gland and closely related tissues as well as patiently applying all possible conservative methods following primary repair of the traumatized gland/capsule, duct, neurovascular and cutaneous tissues. Superficial or total removal of the gland will rarely be needed in majority of these injuries.

REFERENCES

1. **Parekh D, Glezerson G, Stewart M, Esver J, Lawson HH.** Post-traumatic parotid fistulae and sialoceles. A prospective study of conservative management 51 cases. *Ann Surg.* 1989 Jan; 209(1): 105-111.
2. **Sela J, Ulmansky M.** Mucous retention cyst of salivary glands. *J Oral Surg.* 1969 Aug; 27(8): 619-623.
3. **Hemenway WG, Bergstrom L.** Parotid duct fistula: a review. *South Med J.* 1971 Aug; 64(8): 912-918.
4. **Morel AS, Firestain A.** Repair of Traumatic fistulas of the parotid duct. *Archsurg.* 1963 Oct; 8(7): 623-626.
5. **Solomon AR, Mcclatchey KD, Batsakis JG.** Serous extravasation granuloma. A parotid mass. *Arch Otolaryngol.* 1981 May; 107(5): 294-296.
6. **Cant PJ, Campbell JA.** Management of traumatic parotid sialoceles and fistulae: a prospective study. *Aust NZJ Surg.* 1991 Oct; 61(10): 742-743.
7. **Bialek EJ, Jakubowski W, Zajkowski P, Szopinski K, Osmolski A.** Ultrasound of the major salivary glands: Anatomy and spatial relationships, pathologic conditions and pitfalls. *RadioGraphics* 2006; 26:745-763.
8. **Stewart C, Cohen-Kerem R, Ngan B, Forte V.** Post-traumatic facial artery aneurysm in a child. *International Journal of Pediatric Otorhinolaryngology*, 68(12): 1539-1543.
9. **Rushton VE, Pemberton MN.** Salivary Otorrhoea: A case report and a review of the literature. *Dentomaxillofacial Radiology* 2005; 34:376-379.
10. **Lapid O, Kreiger Y, Sagi A.** Use of transdermal scopolamine, Scopoderm TTS. *Aesthetic Plastic Surgery*, 2004.
11. **Chow TL, Kwok SP.** Use of botulinum toxin type A in a case of parotid sialoceles. *Hong kong Med J*, 2003.
12. **Blotta P, Pastore A, Tugnoli V, Galatis LT, Parnes SM.** Management of parotid sialoceles with botulinum toxin, laryngoscope 1999; 109: 1344-1346.