

Surgical management of Stenson’s duct injury using epidural catheter: A novel technique

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Abstract

Stenson’s duct of parotid gland is a major duct which drains saliva into the oral cavity. Deep penetrating wound in the form of cut or crush injury to the buccal area carries the risk of parotid duct injury. It is in the form of ductal exposure, laceration, total severing, or crushing of the duct. These conditions are difficult to diagnose because of complex anatomy and variable nature of injury. Successful management of parotid duct injury depends on early diagnosis and appropriate intervention, failing of which may lead to complications like sialocele or salivary fistula. Many techniques have been proposed for diagnosis and management of parotid duct injuries. This article presents an easy and novel technique to diagnose and manage the parotid duct injuries using an “epidural catheter” which is often used for inducing spinal anesthesia. The technique of epidural catheter usage, its advantages, and limitation over other techniques proposed for the management of parotid duct injury are discussed.

Key words: Epidural catheter, parotid duct, salivary fistula, sialocele

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Introduction

Deep penetrating wounds over the buccal area are common in maxillofacial injuries. Vital structures like parotid duct, facial nerve branches, and transverse facial artery are vulnerable to injury in such situations.^[1] Injuries to parotid duct include ductal exposure, laceration, total severance, and crushing. These injuries, if left untreated, lead to complications like pseudocyst (sialocele) or salivary fistula formation.^[2] Early diagnosis and proper management becomes crucial in preventing such complications. Immediate duct repair, ligation of proximal cut end, and fistulization of parotid duct are some of the surgical treatment modalities in practice.^[3,4] First primary anastomosis of the parotid duct was reported in 1896 by Nicoladoni.^[3,4] Since then, several techniques like use of milk, propofol, and mythylene blue dye^[5] for diagnosing the duct injury, and use of vein grafts, stiff iodine catgut, fusiform bougie, urethral catheter, vitallium wire, horse hair suture,

and silk worm gut as a indwelling stent inside the parotid duct before repairing have been reported.^[6] Only one study has reported the use of epidural catheter as an indwelling stent for the repair of parotid duct.^[7]

Case Report

A 42-year-old male patient presented to maxillofacial unit at Mansarovar Dental College, India, with a chief complaint of wound over the right side of his face. History of trauma from a road traffic accident 2 h before reporting was noted. Patient was conscious when he reported to the hospital. Clinical examination revealed around 15-cm-long, deep lacerated wound over the right buccal area, with an extension from lateral canthus of the right eye to the right corner of mouth and lower lip. Palsy of right buccal branch

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of facial nerve was observed and abraded wounds were seen over the right lower limb sheen area. Head injury, facial bone fractures, and orbital injury were ruled out by performing computer tomography (CT) scan, Paranasal Sinus and Orthopantomogram radiographs. With these clinical findings, a diagnosis of soft-tissue injury over right side of the face with facial nerve (buccal branch) palsy was made and an immediate soft-tissue repair was indicated. With the suspicion of injury to regional vital structures, the patient was taken for surgical reconstruction by locally anesthetizing the area with anesthetic agent lignocaine 2% with adrenalin 1:200,000, along the wound margins. Wound was properly debrided with normal saline and hydrogen peroxide, and oral rinse with chlorhexidine mouthwash was given. Wound was carefully explored to reveal the buccal branch of facial nerve without any break in continuity. Extensive nature of injury could not clearly identify other deeper structures. With a suspicion of parotid duct injury, right parotid duct orifice in the buccal mucosa was located near 2nd maxillary molar and the same was cannulated with 16G epidural catheter which was easily available in the operation theater [Figure 1]. Prior to cannulation, epidural catheter was slightly modified by cutting the closed distal tip end. Once the duct was cannulated, care was taken not to fully push the catheter in to the duct. Normal saline was slowly flushed through the catheter and the subsequent leak in the wound was carefully noted which confirmed the parotid duct injury. With proper hemostasis, all areas of the wound were checked and the exact site of saline leak (distal cut end of parotid duct) was located. Further advancement of the catheter was performed, which made it to exit in the wound from the distal cut end of the duct. Further, the wound was carefully explored to trace the proximal cut end of the parotid duct, and the same was cannulated with the catheter that had exited from the distal cut end [Figure 2]. At this point, we had a stent passing through both the cut ends of the duct. Microsurgical anastomosis of cut ends of the ducts was done with 6-0 Vicryl (polygalactin 910, Jhonson and Jhonson, New Jersey, USA) suture and further wound closure was done in layers [Figure 3]. The cannulated epidural catheter was left in the duct and excess length was cut 2-3 cm beyond the ductal orifice. It was fixed to the buccal mucosa by suturing. Epidural catheter was kept in this position for 3 weeks, which maintained the patency, flow, and prevented duct from getting compressed by postoperative edema. Postoperatively the patient was supported with intravenous antibiotics and analgesics. Oral hygiene maintenance was done with chlorhexidine mouthwash. Intravenous fluid maintenance was done and patient was advised to have a liquid diet. Postoperative follow-up revealed no signs of sialocele formation with a regular flow of saliva from the catheter and the patient was discharged on 5th postoperative day. Extra oral wound sutures were removed on 7th postoperative day with a wound dressing done once in-between on the 3rd postoperative day. Wound healed without complication and the catheter was

removed on 18th postoperative day. Flow of saliva through the duct orifice was noted immediately. Regular follow-up was done for 2 months at regular intervals.

Discussion

Deep penetrating and crushed wounds over buccal area are common in maxillofacial injuries. Injury to vital structures

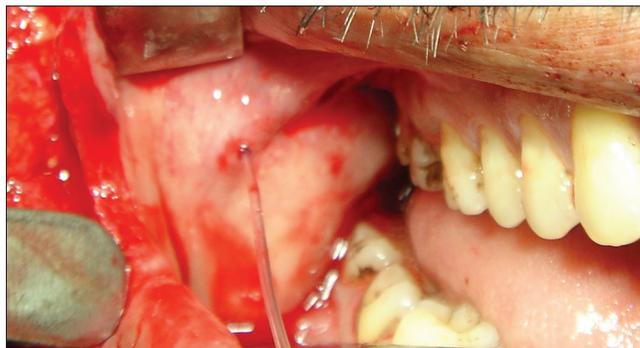


Figure 1: Parotid duct cannulated with epidural catheter

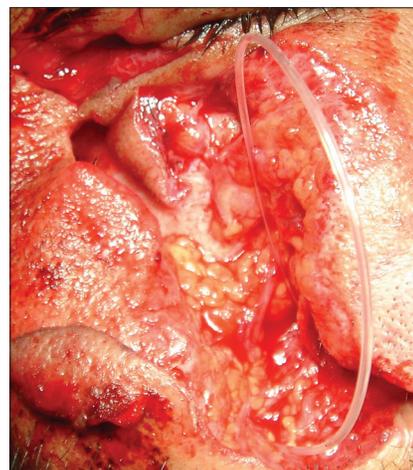


Figure 2: Epidural catheter cannulating the proximal cut end of duct

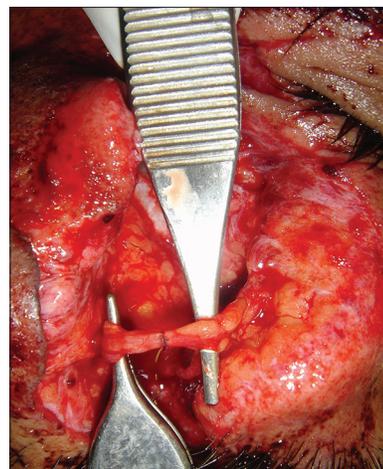


Figure 3: Anastomosis of duct

like parotid duct, facial nerve, and transverse facial artery are part of these. Management of parotid duct injury is unique, as any extravasation of saliva in the wound will lead to complications like pseudocapsule (sialocele) or salivary fistula formation. Conservative management of parotid duct injuries is one amongst the various treatment modalities proposed. This believes in treating the complications like sialocele or salivary fistula with no indication of immediate parotid duct repair.^[2] Studies have reported that correction of these complications may require surgical or medical treatments like use of anti-sialogogues, radiation therapy, parasympathetic denervation (tympanic denervation), cauterization of the fistulous tract, reconstruction of the duct, superficial or total parotidectomy.^[3,8] A significant delay in the healing of complications was noted when there was total transection of duct.^[9] Immediate microsurgical anastomosis of the parotid duct injury is one such modality of treatment, which will possibly prevent such complications.^[1] Use of methylene blue dye for retrograde filling of the duct from orifice and its subsequent leak from the injured duct in the wound is a well-documented technique for diagnosing ductal injuries as it maintains the contrast with tissues.^[2] However, it is difficult to identify and repair the duct as all the structures are deeply stained blue and may affect the glandular tissue as well.^[10] Hence, use of methylene blue can only be a diagnostic procedure for duct injuries. In our technique, normal saline was flushed slowly after cannulating the duct with epidural catheter. Its subsequent leak in the wound was diagnostic of duct injury. This proved advantageous over methylene blue as it did not stain the tissues and had no effect over glandular tissue. Moreover, epidural catheter acted as an indwelling stent inside the site of duct injury, which was helpful for anastomosis. Literature report reveals use of milk and propofol for the diagnosis of parotid duct injuries by the same technique.^[5] But their limited studies put them into a remote practice. Use of sialography for diagnosing parotid duct injuries has been documented with the use of contrast media.^[9,11] Need for extra time, special equipment like X-ray unit, radiation exposure of the patient, and radioopaque dye are the factors to be considered for this technique. Effect of contrast media on glandular tissue and its reactivity cannot be neglected as well. Water-soluble contrast media have a definite advantage over lipid-soluble contrast media in clearing from the site after usage.^[3] The present technique did not use any such material which could alter the parenchyma of gland or cause allergy.

Flexibility and soft consistency of the duct make it difficult to handle during anastomosis. The concept of placing an indwelling stent in the duct at cut or lacerated site is reported to have good stability during repair.^[12] Vitallium wire, urinary catheter, catgut suture, and pediatric intravascular cannula are some of the materials used for cannulating the duct for its repair, which have been reported in the previous studies.^[5,10,11] The indwelling stent in the duct demands properties like softness, flexibility, stiffness, small diameter, and adequate

length. Epidural catheter with a diameter of 0.034 inch (US Patent)^[13] in accordance with ductal orifice suits ideal for this situation as it is stiff, yet flexible, and has enough length. It is easily available in the operation theater as well. All these properties prove epidural catheter as an ideal material for cannulating the duct. With this technique, the patency and immediate flow of saliva from the duct is well maintained, and hence its compression is prevented from postoperative edema. However, this needs a good patient compliance as well. As a normal physiology, the sialochemistry changes as the saliva passes through the duct.^[14,15] Re-absorption of sodium and water with secretion of potassium is documented.

Conclusion

The influence of catheter on sialochemistry, sialometry, and retrograde infection during the treatment needs to be evaluated in future studies. In all, use of epidural catheter for immediate diagnosing and repair of parotid duct injury can be considered a novel technique.

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