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Case Report

End-to-end anastomosis of transected parotid duct in an emergency department: Clinical benefits from immediate repair and overview of treatment options

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ABSTRACT

Parotid duct injuries (PDIs) are not considered common complications of facial trauma. However, their associated morbidity may be increased by the formation of parotid sieloceles and fistulae. This article reports the case of a 31-year-old male patient who was presented to the emergency department of Evangelismos General Hospital of Athens, due to a sharp penetrating injury on left side of his face. Since transection of PD was clinically diagnosed, an end-to-end anastomosis was immediately carried out under local anesthesia. Within the early postoperative period, various angiocatheters of progressively increased diameters were used for stenting the repaired PD. After 10 months of follow-up, there were no clinical and ultrasonographic signs of sialocele or fistula formation. This case report aimed first to underscore the benefits of immediate surgical management in case of PDIs and second, to describe the postoperative management for maintenance of both PD patency and parotid gland function. PDIs in the context of emergency facial trauma are advisable to be timely recognized and treated immediately, by securing the saliva outflow to the oral cavity and maintaining a wide enough ductal lumen.

1. Introduction

Parotid duct injuries (PDIs) are not considered commonplace complications of facial trauma. Indeed, only 0.21% of 15,419 patients, who managed in trauma unit, experienced an injury to the parotid or PD [1]. Nevertheless, their reduced prevalence might be attributed to missed diagnosis at the time of hospital admission [2]. PDIs are predominantly reported in male gender, and can occur after penetrating (knife, bottle, or gunshot) and blunt trauma, PD cannulation for sialography, and surgical operations [3].

The aims of this article were first to underscore the beneficial outcomes of urgent/immediate surgical management in case of PDIs and second, to describe the postoperative management for maintenance of both PD patency and parotid gland function.

2. Case report

A 31-year-old patient was transferred to the ED of Evangelismos Hospital, due to a sharp penetrating injury on left side of his face after a knife assault (Fig. 1A), occurred 25 min before. The patient remained hemodynamically stable, without respiratory distress or alteration of mental status. Other injuries were not identified, except from a small superficial laceration on the nape of his neck. An emergency surgeon examined first the patient and applied local hemostasis with direct compression and ligation of small vessels. He remained in ED to undergo reconstruction of his trauma under local anesthesia, due to lack of availability of operating room for general anesthesia. The stab incision was deep and extended from the temporal region to near the oral commissure. Palsy of the left buccal branch of facial nerve was evident, but the patient was able to perform the rest facial movements. Transection of PD was clinically diagnosed after cannulation of its orifice with an intravenous catheter of 22 G of 33 mm in length. During the exploration of the wound, following to anatomic approximation of wound edges and parotid gland massage, the proximal segment of PD was recognized (Fig. 1B). The angiocatheter was inserted in both stumps of PD which were anatomically approximated by 4 nylon sutures (6-0 and 7-0) (Fig. 1C). The laceration was repaired with layered closure, a drainage tube was placed, and a compressive bandage was

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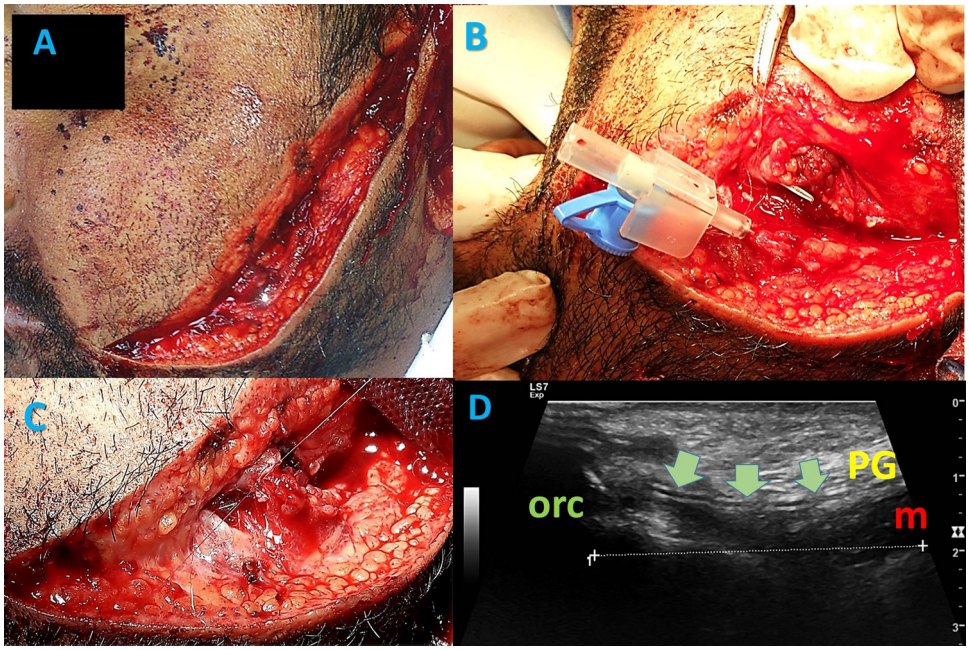

Fig. 1. A. The facial wound. B. Identification of both stumps and insertion of intravenous catheters. C. Both stumps of PD were anatomically approximated by 4 nylon sutures. D. Ultrasonographic evaluation of catheter placement within PD; orc: oral cavity; PG: parotid gland; arrows: the catheter within the PD; m: masseter.

fixed over the parotid gland. The intraductal angiocatheter was fixed in place with 4-0 silk sutures, while the patient was admitted to the clinic of oral and maxillofacial surgery.

The 3rd postoperative day (pod) the catheter was accidentally removed and replaced by another one of 20 G (33 mm). At 5th pod there was removal of compressive bandage and drainage tube, but small amounts of saliva discharge were noticed from different sites of wound (preauricular area) after local pressure. Increased values of serum amylase (> 750 U/L) were measured too. Massage of preauricular area induced saliva exit from the intraparotid angiocatheter. At 6th pod, we decided to replace the intravenous catheter with a wider of 18 G (33 mm) for increase of intraoral saliva flow. The accuracy of its intraductal position was confirmed by ultrasonographic (u/s) evaluation (Fig. 1D). Indeed, serum amylase exhibited significant reduction (< 200 U/L) during the following 36 h and there was also cessation of saliva discharge from wound sites without signs of wound dehiscence.

The patient was released from hospital 9 days after his injury, without removing the catheter. On first follow-up visit (11th pod), mild facial swelling and the catheter was replaced by a longer one with the same diameter (18 G/45 mm), under u/s control. This catheter remained in place for a week and was taken out on 18th pod, without complications. Within 10 months of follow-up, the patient's parotid gland functioned normally without intraoral (Fig. 2A), extraoral (Fig. 2B), and u/s signs of sialocele or fistula formation. Spontaneous recovery of left buccal palsy was observed within 4 months after the traumatic event (Fig. 3), possibly because the neural injury was located anteriorly to the imaginary line connecting the unilateral lateral canthus with the mental foramen.

3. Discussion

Every deep facial laceration that transverses the imaginary horizontal zone between the tragus and upper lip carries risk for PD injury [4]. The type of injury is discriminated into ductal exposure, laceration, total severance, and crushing [5]. To facilitate diagnosis of a suspected PD injury in an open facial wound, retrograde irrigation through ductal orifice with various means such as milk, normal saline saline, propofol, fluorescein, and methylene blue dye has been proposed [4,6]; yet, methylene blue dye can stain the surgical field. Wu et al. [7] indicated a simplified method for identification of distal stump, once an inserted sialendoscope through the PD orifice produced a bright dot encircled by a flushing zone within the cutaneous wound.

Nicoladoni [3] carried out the first primary anastomosis of the PD in 1896, while Morestin [8], who treated large number of complex facial injuries in World War I, added significant knowledge on management of PDIs by performing ligation of the proximal portion of the duct. Before a few decades, some authors postulated that immediate surgical management of PD anastomosis may be not attempted in view of risk for facial nerve injury [1]. However, such an approach is nowadays not generally recommended, because either undiagnosed or undertreated injuries of PD invariably provoke complications such as formation of sialocele, salivary fistula, and/or salivary duct cyst; all of them may be additionally aggravated by sialadenitis [4,9,10]. If the surgical management of PDIs is either neglected or postponed, the extravasated saliva may result in fibrosis of the surrounding tissues [11]. A procedure of delayed PD reconstruction and repair of parotid gland function not only is challenging, but also may be proved unsuccessful due to the chronic inflammation and scar tissue formation. Any attempt of delayed surgical exploration increases the risk of facial nerve injury too, and poses difficulties in identification and cannulation of both PD stumps [11]. It should be mentioned that if an unrepaired or undiagnosed PD injury exists, the formation of a sialocele is typically anticipated between 8–14 days post-traumatically, whereas a cutaneous fistula usually occurs within the first week [12].

Either medical (conservative) or postoperative management secondary to parotid trauma may comprise restriction of all oral intake, administration of antisialogogues, placement of compressive dressings, and patient's maintenance on intravenous fluids for 5 days [9,13]. Antisialogogues drugs, such as atropine, glycopyrrolate, propantheline and scopolamine, induce anticholinergic effects due to competitive blockage of acetylcholine at muscarinic receptor sites. Their commonly reported side effects involve tachycardia, xerostomia, blurred vision, urinary retention, and constipation [11]. Atropine and scopolamine, both categorized as tertiary amines, may produce CNS effects since they can infiltrate the blood brain barrier [11]. For treatment of sialoceles, aspirations and subcutaneous injections in preauricular area of botulinum toxin, either type A or B, may offer satisfactory outcomes without impairing facial nerve or masseter function [2]. An overview of

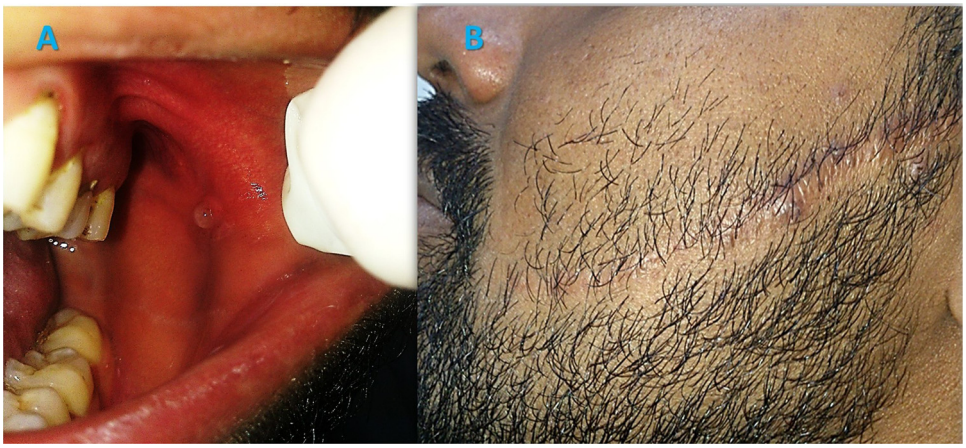

Fig. 2. Ten-month follow-up. A. Saliva exits from the ductal orifice. B. Dermal scar.

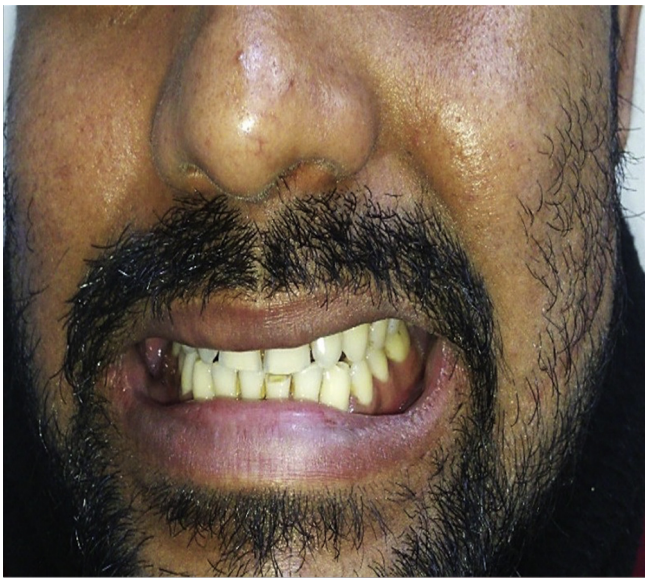

Fig. 3. Recovery of the left upper lip function.

treatment options found in current literature is contained in Chart 1 [1–5,9–12,14–18].

Parotid trauma may involve stretching and compression of PD on its curvature around the masseter plus laceration on the parotid gland capsule. Indeed, the study of Nahlieli et al. [19] evaluated patients who underwent such specific types of PDIs secondary to facial rejuvenation surgeries. The authors highlighted the application of dilation (by endoscopic means using hydrostatic pressure) as an effective treatment for postoperative sialoceles and/or prolonged swelling that occurred as complications of the aforementioned PDIs. Moreover, Su et al. [20] evaluated the use of salivary duct stents with outer diameters (OD) of 1.7 and 2.0 mm, when they were placed for prevention of re-stenosis after sialendoscopy procedures. Although the mean time of stent placement lasted 8.1 days, the study concluded that 2 weeks may be considered as an adequate period of ductal stenting [20]. After the end-to-end reconstruction of PD, many authors preferred to maintain ductal stent for at least 10–14 days to avoid postoperative stricture at the site of anastomosis [3–5].

Based on the aforementioned findings, during the early posttraumatic period, we selected to apply ductal stenting with progressive and controlled increase in OD of the used catheters in order to facilitate improved rate of saliva flow to the oral cavity and resolution of local edema. By this manner, we also aimed to prevent compression of PD from local edema and the accumulations of extravasated saliva. Taking into account that the mean maximum internal caliber of PD is 0.6 ± 0.2 mm [21], its lumen intentionally remained moderately dilated for avoidance of a potential anastomotic stenosis. To alleviate any risk of anastomosis rupture, controlled dilation was gradually achieved with adequate time intervals between stent replacements. It should be noted that this approach eliminated the need for extended

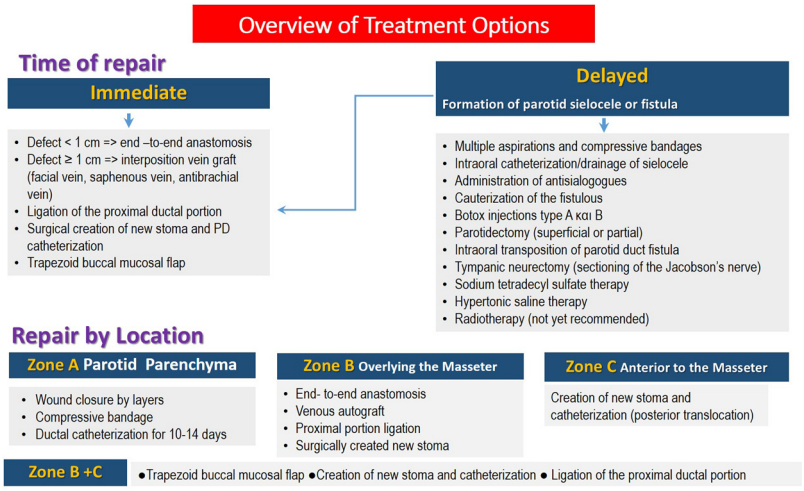

Chart 1. Overview of treatment options.

administration of antisialogogues, multiple patient visits, or long-lasting use of inconvenient compressive dressings that restrict mouth opening.

For both the reconstruction of PD integrity and prevention of postoperative anastomotic stenosis, various types of ductal stenting/catheterization can be utilized. Components of readily available medical equipment such as intravenous silicone catheters, Crawford stent, epidural catheter, infant feeding tube, Albertini drain, 0.025-inch wire (arterial line kit), lacrimal probe, embolectomy catheter, cuff cannula of intubation tube, and double-*J* ureteral catheter have been successfully used for the above purposes [5,22–29]. Moreover, an inserted semiflexible sialendoscope of 1.1 mm diameter was found useful for evaluation of the anastomotic outcome both intra-and post-operatively [30,31].

In conclusion, this case indicates that PDIs in the context of emergency facial trauma are advisable to be timely recognized and treated immediately, by securing the saliva outflow to the oral cavity and maintaining a wide enough ductal lumen.

Ethical approval

Not required.

Conflict of interest

None declared.

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