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Surgical management of Stenson's duct injury by using double J stent urethral catheter

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ABSTRACT

BACKGROUND: Parotid duct or gland injury can be caused by assault with a knife, bottle, electrical-saw, road traffic accident, or rarely gunshot and fractures of the facial skeleton. The injury can be in the form of laceration, ductal exposure, total cutting, or crushing of the duct. These conditions are difficult to diagnose because of complex anatomy and variable forms of the injury. A successful management of parotid duct injuries depends on early diagnosis and appropriate intervention; improper surgery may lead to complications such as sialocele or salivary fistula

CASE REPORT: A 27-years-old man was presented to the maxillofacial unit, complaining of bleeding over the right side of his face after accidental exposure to a chain-saw three hours before admission. On examination, a 6 cm deep lacerated wound was found over the right buccal area, suspecting facial nerve-buccal branch and parotid duct injury. Under general anesthesia the parotid duct injury diagnosed, microsurgical anastomosis of the cut-ends of the parotid duct performed using the double J catheter. Sutures and JJ stent removed seven and twenty postoperative days respectively. After a proper supportive treatment a complete healing of the duct was obtained with normal amount of saliva.

CONCLUSIONS: Herein, we described an easy yet efficient technique in management of parotid duct injury using a JJ stent which is often used for urethra. We think that use of JJ stent is a valuable technique to be used in the diagnosis and surgical repair of the parotid duct during traumatic facial and/or parotid injuries.

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1. Background

In maxillofacial injuries deep penetrating wounds over the buccal area are common. In such situations many vital structures such as parotid duct, facial nerve branches and facial artery are vulnerable to injury [1]. Parotid duct injuries include ductal exposure, total cut, laceration and crush. If left untreated, these injuries may lead to complications including salivary fistula or pseudocyst (sialocele) formation [2]. Early diagnosis and proper management play crucial role in preventing such complications. Some of the surgical treatment modalities in practice are immediate duct repair, ligation of proximal cut end, fistulization of parotid duct, and primary anastomosis of the parotid duct which was first reported in

1896 by Nicoladoni [3,4]. In addition, several techniques to perform these processes have also been introduced. Use of milk, propofol, and methylene blue dye in diagnosis of parotid duct injury [5], and use of vein grafts, stiff iodine catgut, epidural catheter, horse hair suture, urethral catheter, fusiform bougie, vitallium wire, and silk worm gut as a indwelling stent inside the parotid duct before repairing are among the reported techniques [6,7,13]. This case report describes an easy yet efficient technique to diagnose and manage a parotid duct injury using a double J stent which is often used for urethra. The technique of JJ stent usage, its advantages, and limitations over other techniques proposed for the management of parotid duct injury is discussed.

2. Case presentation

A 27-years old man was presented to the maxillofacial unit of Sulaymaniyah emergency hospital, Iraq, with a chief complaint of bleeding over the right side of his face. The patient had accidental exposure to a chain saw resulted in a trauma three hours before

Abbreviations: JJ, double; J, stent.

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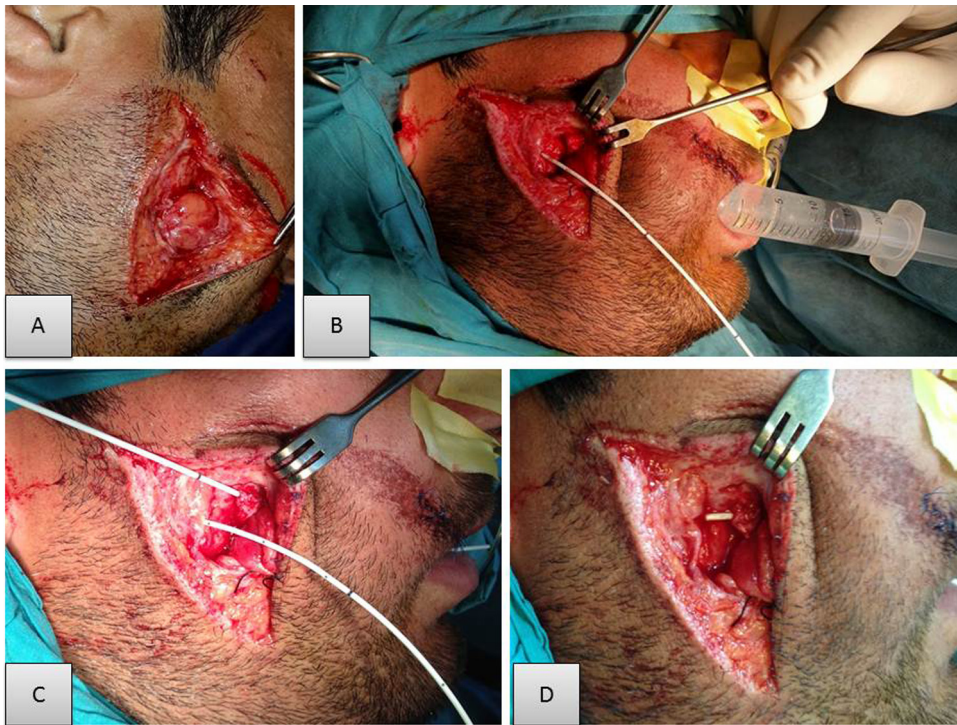


Fig. 1. A; six centimeter long, deep lacerated wound at the right buccal cheek. B; the buccal mucosa near the second maxillary molar was cannulated with 22G (blue color) cannula. The cannula was slightly modified by cutting the closed distal tip end of the needle. C; the proximal cut-end of the parotid duct was also cannulated and joined to the JJ stent that had extended from the distal cut-end. D; stent passing through both cut ends of the parotid duct.



Fig. 2. A; Microsurgical anastomosis of the cut-ends of the parotid duct was performed with 6-0 Vicryl suture. B; and further wound closure was performed in layers. C; The JJ stent catheter was left in the duct and the excess length was cut (5 cm beyond the ductal orifice outside the oral cavity) and fixed by suturing to the buccal mucosa.

his arrival to the hospital. On examination he was conscious, with six centimeter long, deep lacerated wound at the right buccal cheek [Fig. 1A] with soft tissue bleeding. Although the plane X-ray showed no fracture, 2-buccal branches were suspected to be injured. To confirm this, we asked the patient to puff up his cheeks and tried to

tap over the right cheek with finger to detect possible air expulsion on the affected side. Unfortunately, the high level of pain did not allow us to perform this examination properly.

Based on our clinical investigations and inspections, we diagnosed the case as a soft-tissue injury over the right side of the face

with facial nerve (buccal branch) injury and indicated the case for an immediate soft-tissue repair. Meanwhile, because of the suspicion of injury to the regional vital structures, the patient underwent a general anesthesia, proper wound debridement, and irrigation with normal saline and iodine. Later the wound was explored carefully to reveal the buccal branch of the facial nerve without causing any break in continuity.

For the deeper structures, we could not clearly identify the severity of the wound. However, we were still suspecting a parotid duct injury. To explore this possibility, the right parotid duct orifice which is located in the buccal mucosa near the second maxillary molar was cannulated with 22G (blue color) cannula. The cannula was slightly modified by cutting the closed distal tip end of the needle. Normal saline was slowly flushed through the cannula and a clear leak in the wound was observed confirming the parotid duct injury [Fig. 1B].

After obtaining proper hemostasis, the wound area was carefully checked and the exact site of the saline leak was located to the distal cut end of the parotid duct. We put double J stent (JJ) in the distal cut-end of the parotid duct inside the wound and performed further advancement of the catheter inside the oral cavity. Then the blue cannula was removed from the Stenson's duct orifice intra orally which made the JJ stent to exit in Stenson's duct orifice. Furthermore, the proximal cut-end of the parotid duct was also detected by visual examination. This duct was cannulated and joined to the JJ stent that had extended from the distal cut-end [Fig. 1C]. At this point, we had a stent passing through both cut ends of the parotid duct [Fig. 1D].

Finally, microsurgical anastomosis of the cut-ends of the parotid duct was performed with 6-0 Vicryl suture [Fig. 2A] and further wound closure was performed in layers. We also put corrugated drain to prevent hematoma and saliva accumulation (edema) which may cause pressure and affect duct healing [Fig. 2B]. The JJ stent catheter was left in the duct and the excess length was cut (5 cm beyond the ductal orifice outside the oral cavity) and fixed by suturing to the buccal mucosa [Fig. 2C]. The patency and flow (preventing the duct from getting compressed by postoperative edema) of the JJ stent catheter was maintained in this position for 20 days.

Postoperatively, intravenous antibiotics and analgesics with chlorhexidine mouthwash was given to the patient to maintain the oral hygiene. Moreover, the patient was advised to have a liquid diet in addition to intravenous fluid maintenance. Regular postoperative follow-up revealed a normal flow of saliva from the catheter with no complication (signs of sialocele formation). The patient was discharged on the fourth postoperative check day. Sutures of extra oral wound were removed on the eighth postoperative day with a daily wound dressing for ten days. Eventually the wound healed without complication and the stent was removed after 20 days of the operation. A regular follow-up was performed for three months at regular intervals and a normal flow of saliva through the duct orifice was noted.

3. Discussion

Injuries to vital structures such as facial nerve, parotid duct and transverse facial artery are very common in sharp, deep penetrating, and crushed wounds over buccal area in maxillofacial injuries. In management of parotid duct injury, any extravasation of saliva in the wound will lead to serious complications such as pseudocapsule (sialocele) or salivary fistula formation. Conservative management is one of the non-operative methods among various treatment modalities used for parotid duct injuries. As mentioned there is no indication of immediate parotid duct repair in treating the complications like sialocele or salivary fistula [2]. If happened, correction of these complications may require surgical or medical treatments

such as use of anti-sialogogues, parasympathetic denervation (tympanic denervation), radiation therapy, cauterization of the fistulous tract, reconstruction of the duct, and total or superficial parotidectomy [3,8]. A delay in the healing of complications was noted when there was total duct transection [9]. Immediate microsurgical anastomosis of the parotid duct injury is [Fig. 2] one of the modalities of treatment which possibly prevents such complications [1,14,15]. Staining with methylene blue dye is a well-documented technique for diagnosing ductal injuries for retrograde filling of the duct from orifice and its subsequent leak from the injured duct in the wound as it maintains the contrast with tissues [2,14]. However, in this method, all the structures are deeply stained with blue color and the stain may affect the glandular tissue as well and which makes it difficult to identify and repair the duct [10].

In our technique, the normal saline was slowly flushed through the cannulated parotid duct leading to diagnosis of the duct injury via subsequent leakage of the saline in the wound. This method had a great advantage over the use of methylene blue as it did not stain the surrounding tissues and had no effect over the glandular tissues. Moreover, JJ stent catheter acted as an indwelling stent inside the lumen of the duct injury, which was helpful for anastomosis. Some studies reported use of milk and propofol for the diagnosis of parotid duct injuries by the same technique [5], but limited studies put them into a remote practice.

Use of contrast media (sialography) for diagnosis of parotid duct injuries has been well documented [9,11]. However, this procedure is time consuming and it needs special equipment such as X-ray unit, radiation exposure of the patient, and radiopaque dye. Moreover, the adverse effect of contrast media on the glandular tissues and its reactivity cannot be neglected. In contrast, using water-soluble contrast media have a definite advantage over lipid-soluble contrast media in term of clearing from the site after usage [3].

Soft consistency and flexibility of body ducts make it difficult to handle during anastomosis. Placing an indwelling stent in injured ducts at cut or lacerated site is reported to have good stability during repair [12]. Catgut suture, vitallium wire, urinary catheter, and pediatric intravascular cannula are some of the tools/materials used for cannulating an injured duct for its repair [5,10,11]. However, duct demands properties, such as softness, stiffness, flexibility, small diameter, small porosity in the head for easily accumulation of saliva, and adequate length in accordance with ductal orifice suits, are among the factors that limit the usage of these tools. We believe that the indwelling JJ stent used in the management of this case is an excellent choice for this situation as it is stiff, yet flexible, has enough length, and easily available in all operation theaters. Moreover, with this technique the immediate flow and the patency of saliva through the duct can be easily and efficiently maintained. All these properties make the JJ stent catheter to be considered as an ideal tool for cannulating the injured ducts.

4. Conclusions

In this case report, we described a successful use of an easy yet efficient technique to diagnose and manage a parotid duct injury using JJ stent which is often used for urethra. We conclude, from our work, that use of JJ stent in the diagnosis and repair of the parotid duct during traumatic facial and/or parotid injuries is a valuable technique to be used in the surgical practice.

Conflict of interests

All authors of this manuscript declare that they have no conflicts of interest with any person or organization.

Sources of funding

This work is performed solely by the authors of this manuscript. Nobody else participated in preparation or financial aid of this work. The operation is performed in a public hospital which is open to everybody. We just spent extra time to collect the data and put it together in the form of case report.

Ethical approval

Here in Iraq, we do not have committees or organizations for ethical approval. Taking informed consent is the only standard ethical process within hospital permission rules because all hospitals in Iraq are teaching governmental hospitals therefore informed consent is taken before doing any procedure or publishing the information of any patient.

Consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Authors' contributions

SNA performed the surgery; NK designed and wrote the manuscript, SMA received, prepared the patient for and shared the operation. BAM assisted in drafting and editing the manuscript and reviewed the article. All authors read and approved the final manuscript.

Guarantor

Not applicable.

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