



NOTE

Surgery

Surgical management of parotid salivary duct rupture secondary to non-iatrogenic trauma in a dog

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ABSTRACT. A 3-year-old French bulldog presented for evaluation of recurrent swelling and a fistula on the right cheek after a dog fight. A large volume of serous fluids was identified on the wound immediately after atropine drops. A diagnosis of parotid salivary duct rupture secondary to trauma was made. On surgical exploration, the thickened proximal segment of the severed duct was identified and circumferentially double ligated with 3–0 silk. No evidence of swelling and normal appearance of the parotid salivary gland were identified 4 months postoperative recheck. No further problems were noted 10 months postoperatively phone-call. To the author's knowledge, this is the first reported case of successful proximal parotid duct ligation of parotid salivary duct rupture secondary to non-iatrogenic trauma.

KEY WORDS: dog, parotid salivary duct rupture, proximal parotid duct ligation

Parotid salivary duct rupture is a rare disorder that can develop by sialolithiasis, neoplasia or physical trauma [7, 12]. Problems with the ducts of the parotid salivary gland can attribute to development of facial swelling with or without pain and can be diagnosed by history, physical examination, radiographs, ultrasonography, sialography or computed tomography [10, 13]. Treatments usually include medical therapy that can be considered for improvement of clinical signs and surgical therapy that can be required for fundamental solutions including sialolith removal, parotid duct repair, parotid duct ligation or parotidectomy [4, 7, 8, 12]. In animals, most of the reported cases associated with parotid salivary duct rupture are secondary to parotid duct sialolithiasis that is well documented finding [10, 12]. However, to the authors' knowledge, only one case report of parotid salivary duct rupture secondary to iatrogenic trauma has been reported in dogs, and there are few published data relative to parotid salivary duct rupture secondary to trauma [7]. The aim of this case report was to describe the clinical presentation, diagnosis, successful surgical correction using proximal parotid duct ligation and postoperative assessment in a dog with parotid salivary duct rupture secondary to non-iatrogenic trauma.

A 3-year-old, sexually intact female French bulldog, weighing 10.8 kg, presented for evaluation of recurrent swelling and a fistula on the lateral aspect of the right cheek. The owner described onset of swelling after a dog fight two months prior to presentation. The referring veterinarian prescribed corticosteroids and antibiotics, and the swelling was waxing and waning over the past two months. On initial presentation, a firm, non-painful swelling with serous fluid discharge from a fistula was recognized on the right side of the face just ventral to the zygomatic arch (Fig. 1A). Ventrodorsal skull radiographs, ultrasonography and computed tomography revealed no evidence of sialolith and normal appearance of the mandibular and parotid salivary glands. Wound closure following surgical debridement of a fistula was performed; however, there was evidence of recurrent swelling 2 days postoperatively. To stimulate salivary secretion, 1% atropine sulfate ophthalmic solution (Isopto-atropine; Alcon, Seoul, Korea) was dropped on the tongue, and a large volume of serous fluids took place from the wound immediately after atropine drops. A diagnosis of parotid salivary duct rupture secondary to physical trauma was made tentatively. Contrast medium (Omnipaque; GE Healthcare, Seoul, Korea) was injected into the parotid papilla for retrograde sialography. Poor filling of the duct was identified, and ductal obstruction was suspected in the severed end of the distal part of the duct by scar tissue (Fig. 1B).

With owner's consent, surgical exploration of the affected area was performed to determine parotid salivary duct rupture and repair it. The dog was premedicated for surgery with atropine sulfate (0.02 mg/kg, SC, Atropine sulfate inj; Je Il Pharmaceutical, Daegu, Korea) and dexamethasone (1 mg/kg, IV, Dexamethasone; Je Il Pharmaceutical) followed by anesthetic induction with

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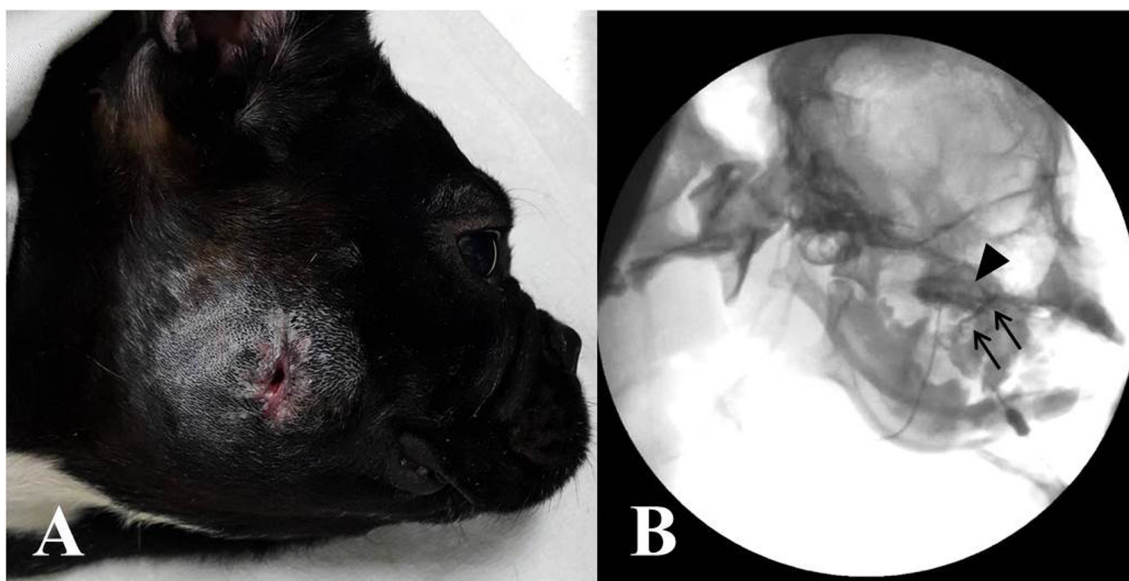


Fig. 1. Preoperative photograph (A) and parotid sialogram (B) of a dog with recurrent swelling and a fistula on the right cheek after a dog fight. (A) A swelling with a fistula is recognized on the right side of the face just ventral to the zygomatic arch. (B) Note that the parotid duct (arrows) is discontinued (arrow head) close to the opening of oral cavity. The extravasation of the contrast is unclear which is assumed because of two months duration of chronic inflammation. The ductal rupture with obstruction is suspected in the severed end of the distal part of the duct by scar tissue.

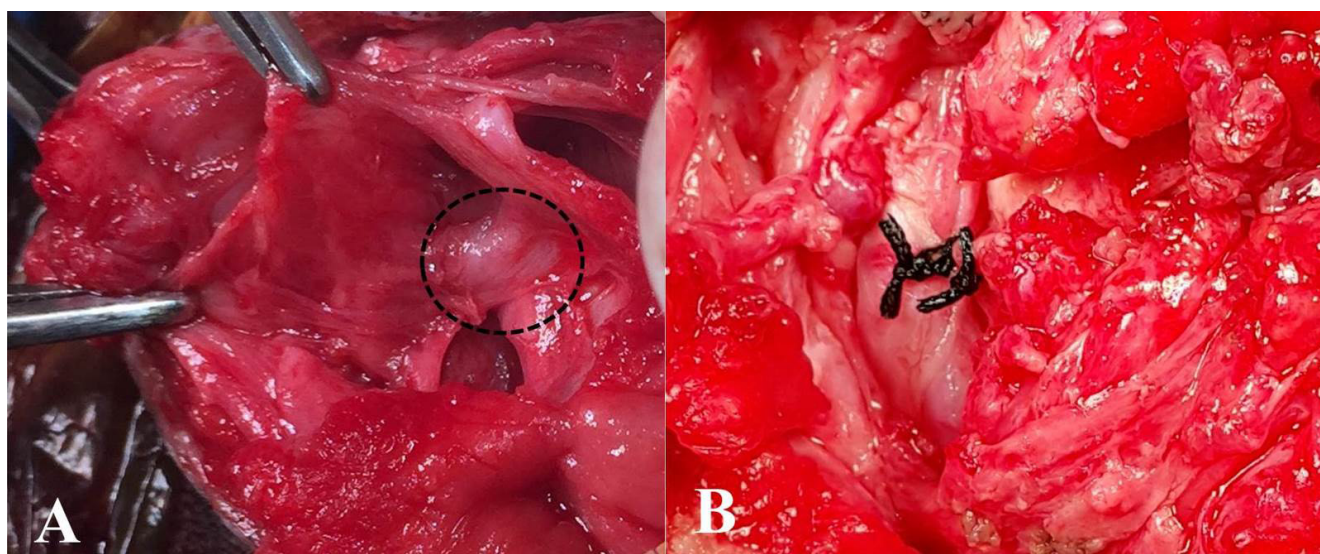


Fig. 2. Intraoperative photographs illustrating proximal parotid duct ligation. The patient's cranial part is on the right of all images. (A) The thickened proximal segment (dotted circle) of the severed duct is identified approximately 2 cm cranial to the parotid salivary gland. (B) The proximal segment of severed duct is isolated and circumferentially double ligated with 3-0 silk.

propofol (6 mg/kg, IV, Provive 1%; Myungmoon Pharm. Co., Ltd., Seoul, Korea). The dog was intubated, and anesthesia was maintained with isoflurane (Isoflurane; Choongwae Pharmaceutical, Seoul, Korea) and oxygen. Lactated Ringer's solution was administered intravenously at a rate of 5 ml/kg/hr until completion of the surgical procedure. A skin incision, parallel to the parotid salivary duct, was made on the affected area. The thickened proximal segment of the severed duct was identified approximately 2 cm cranial to the parotid salivary gland (Fig. 2A). The proximal segment of severed duct was then isolated for ligation. The distal segment of the severed duct was not identified, because it was shortened after complete severance. The proximal parotid duct was circumferentially double ligated with 3-0 silk (Black silk; Ailee. Co., Ltd., Seoul, Korea) (Fig. 2B). Closure was composed of routine replacement of subcutaneous and skin sutures.

Recovery from anesthesia was uneventful, and postoperative analgesia (0.1 mg/kg butorphanol intravenously, Butophan Inj; Myungmoon Pharm, Seoul, Korea) was administered q 8 hr for 24 hr. Because pain was not detected any more, the analgesic

was stopped on day 1 postoperatively. In postoperative assessment of facial nerve function, no evidence of facial nerve damage was identified. Postoperative medications included prednisolone (0.5 mg/kg, PO, bid, Solondo; Yuhanmedica, Seoul, Korea) and cephalexin (30 mg/kg, PO, bid, Cefacin; Hankook Korus Pharm, Seoul, Korea) for 2 weeks. Mild swelling on the parotid gland region was observed, and ultrasonography revealed that the parotid salivary gland appeared homogeneous with increased echogenicity 2 weeks postoperatively. Swelling was reduced, and on ultrasonography, the decrease in echogenicity was identified 3 weeks postoperatively. No evidence of swelling on the lateral aspect of the right cheek and normal appearance of the parotid salivary gland were identified 4 months postoperative physical examination and ultrasonography, respectively. No further problems were noted 10 months postoperatively on the basis of telephone interview with owner.

Parotid salivary duct rupture secondary to physical trauma is an uncommon problem [7]. In 1977, the only case report, including two cases, of parotid salivary duct rupture secondary to physical trauma was reported, even though the duct rupture iatrogenically resulted from previous surgery [7]. Nevertheless, there may be a large number of cases that would be misdiagnosed as dog bite wounds or dog fight wounds, especially with history of a dog fight on initial presentation. The parotid salivary duct leaves the parotid salivary gland and is closely united to the lateral surface of the masseter muscle by superficial fascia as it runs straight forward to the cheek [2]. The masseter muscle projects somewhat laterally and is covered with the platysma, a thin and wide sheet of muscle; therefore, there is a higher chance of duct rupture in cases with full thickness skin defect caused by a dog fight [3]. Parotid salivary duct rupture, although a seemingly rare case of duct disorders, should be considered in the differential diagnosis for onset of facial swelling after a dog fight.

A sialocele commonly results from parotid salivary duct rupture secondary to sialolithiasis or blunt trauma, although injury of a parotid salivary duct does not necessarily cause a sialocele [13]. Therefore, swelling on the lateral aspect of the cheek is an important clinical symptom to diagnose parotid salivary duct rupture. In the case reported here, as well as swelling on the lateral aspect of the cheek, an ipsilateral fistula was identified. Swelling and a fistula were only reported in cases that underwent surgical treatment of an abscess, with iatrogenic parotid duct rupture and fistula resulting [7]. In the case reported here, open wound occurred from a dog fight and both swelling, and a fistula was identified on initial presentation. A fistula should be considered as an important clinical symptom of parotid salivary duct rupture as well as swelling.

A saliva stimulation test using atropine sulfate ophthalmic solution can be performed to diagnose parotid salivary duct rupture in cases where penetrating trauma was described and both swelling and a fistula were identified on initial presentation. This test is performed by placing one or two drops of ophthalmic atropine solution which has a bitter taste that cause abundant salivation [7]. Parotid sialography has been previously described and also confirms the diagnosis [6]. In this case, the confirmation of the diagnosis was made by unique history, saliva stimulation test using atropine sulfate ophthalmic solution and parotid sialography.

Choosing an appropriate technique to treat dogs and cats with parotid salivary duct rupture can be difficult. Presently available options include a total parotidectomy, end-to-end anastomosis over a stent, parotid duct transposition and proximal parotid duct ligation [4, 7, 9, 12]. A total parotidectomy has been described for the management of dogs with parotid duct sialolithiasis [12]. In this technique, repair of the duct was not performed, because of ductal fibrosis [12]. However, the parotid salivary gland might not be good candidates for surgical excision, since the parotid glandular tissue is intimately attached to the surrounding musculature and the gland neighbors to several important neurovascular structures including the superficial temporal artery, internal maxillary vein, rostral auricular artery and vein, buccal nerves, and facial nerve and its branches [2, 4]. End-to-end anastomosis has been described for the treatment of dogs with iatrogenic parotid duct rupture [7]. In this technique, end-to-end anastomosis was performed using small diameter polyethylene tubing, inserting through the parotid duct opening into the proximal segment of the severed duct, and fine gauge suture materials [7]. However, end-to-end anastomosis would not be appropriate, if there is evidence of duct obstruction caused by scar tissue or duct remnants are not sufficient to allow anastomosis. Parotid duct transposition is also not possible in cases with short proximal duct. Proximal parotid duct ligation has been described for the management of a dog and a cat with duct rupture and creation of salivary mucoceles in normal dogs [1, 7]. In this technique, back pressure resulted in atrophy of the secretory cells without adverse effects including mucoceles [1, 5]. Sacrifice of one parotid salivary gland is not clinically significant.

Proximal parotid duct ligation can be primarily considered in cases with parotid salivary duct rupture. In the case reported here, the severed duct was ligated using silk suture, because of some handling advantages; however, silk is not primarily recommended, because this kind of non-absorbable multi-filament suture can cause postoperative infection and absorbable monofilament suture should be used [11].

Postoperative assessment includes facial nerve function using palpebral reflex and fluid production from a surgical site [4, 9]. Perioperative complication of facial nerve deficits can occur during the dissection of the parotid salivary duct; therefore, care should be taken to avoid injury to the facial nerve [4]. Successful parotid duct ligation has been assessed on the basis of no fluid production and no evidence of swelling [7, 9]. In the case reported here, no signs of facial nerve damage and no fluid production from a surgical site were identified; however, mild swelling on the parotid gland region was observed, and ultrasonography revealed increased echogenicity of the parotid salivary gland 2 weeks postoperatively. The swelling lasted for 2 weeks and was reduced 3 weeks postoperatively without further medical management. No evidence of swelling on the parotid gland region has been described after parotid duct ligation in previous reports [7, 9]. Complete ligation of the parotid duct has been described, leading to atrophy of the glandular tissues [1, 5]. Swelling secondary to saliva retention in the parotid salivary gland could be possible until the gland starts to be atrophied and cease production of saliva. Postoperative swelling on the parotid gland region without fluid production from a surgical site can be considered as the normal treatment process in postoperative assessment.

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