CASE REPORT

Unexpected rare complication of the facial paralysis in a patient with an antrochoanal polyp following canine fossa puncture

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SUMMARY

Canine fossa puncture (CFP) combined with endoscopic sinus surgery is a simple and effective method for treating antrochoanal polyps, particularly those that originate in the anterior, inferior or medial aspect of the antrum. Several complications can occur following CFP, including facial paraesthesia and dental numbness. However, facial palsy is extremely rare after CFP. We postulated that a possible mechanism of facial palsy is pressure injury to the soft tissues adjacent to the puncture site, which can damage the buccal branch of the facial nerve during CFP.

BACKGROUND

Antrochoanal polyps are benign lesions that arise from the maxillary sinus. The recurrence rate of such polyps is known to be high if removal of the origin of the polyp in the antrum is inadequate.¹ However, if the origin site of the polyp is in the anterior, inferior or medial portion, it is difficult to access via a middle meatal antrostomy. In such cases, the Caldwell-Luc approach or endoscopic sinus surgery (ESS) combined with canine fossa puncture (CFP) can be used. CFP is a simple and effective method but can cause several complications, such as facial paraesthesia and dental numbness.² However, facial palsy is extremely rare. We experienced a case of facial palsy following CFP treatment for a recurring antrochoanal polyp. We report this case and provide a literature review.

CASE PRESENTATION

A 74-year-old woman presented with a nasal obstruction on the right side. She had undergone ESS for an antrochoanal polyp at another hospital 2 years prior. Endoscopic nasal examination revealed a single large polyp extending to the choana via the previous middle meatal antrostomy site. We considered postoperative recurrence and planned ESS combined with CFP. Part of the polyp in the nasal cavity was removed via the endonasal approach, but a portion located in the inferomedial aspect of the antrum was not reachable via the antrostomy site despite attempts made with various angled-power instruments. After infiltration of the mucosa of the canine fossa with 1% lidocaine and 1:100 000 diluted epinephrine solution, the intersection point at which the vertical mid-pupillary line and the horizontal nasal floor meet was punctured with a 4 mm diameter trocar under direct vision.³ At this time, an incision was not made, and

a mallet was used to tap the trocar gently. Through the puncture site, straight and variable-angle microdebrider blades (0°, 45°, 60°) were inserted, and the remaining polyp in the antrum was removed with these tools under view with a 70° endoscope placed in the antrostomy site ([figure 1](#)). After the operation, the puncture site of the mucosa was not sutured, and compression dressing was not performed. On postoperative day 1, the patient reported that her upper lip looked crooked.

INVESTIGATIONS

The Cupid's bow of her upper lip moved to the left (non-operative) side during rest. While pursing her lips, weakness of the right upper lip was prominent ([figure 2A](#)), but during phonation (E), weakness was not prominently visible ([figure 2B](#)).

OUTCOME AND FOLLOW-UP

The patient was discharged after the removal of the packing and was followed for 3 months. At 3 months, the patient's facial paralysis had recovered completely.

DISCUSSION

CFP can access the maxillary sinus similarly to the Caldwell-Luc operation but requires less time and is easier. However, one study reported that CFP

Figure 1 A 70° endoscopic view of the removal of the remaining polyp in the maxillary sinus with a microdebrider through the canine fossa puncture. The white arrow indicates a remnant antrochoanal polyp that originated from the inferomedial area of antrum and the black arrow indicates a straight microdebrider blade.

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Figure 2 (A) Photograph of the patient after canine fossa puncture. The Cupid's bow of her upper lip was displaced to the non-operative (left) side when she pursed her lips due to right side palsy of the buccal branch of the facial nerve. (B) Paralysis of right upper lip was not prominent during (E) phonation. A slight asymmetry of upper lip was visible.

has a complication rate that is as high as 75%.² Most of the complications mentioned were transient and included effects such as facial swelling, facial pain, facial numbness or tingling sensations and dental numbness.² These complications are caused by injuries to the anterior superior alveolar nerve (ASAN) and the middle superior alveolar nerve (MSAN) during the blind puncture after palpation of the canine fossa. Sathananthar *et al*³ recommended a safe entry point for CFP that is located where a vertical line drawn through the mid-pupillary line meets a horizontal line drawn through the floor of the pyriform aperture, which enables the avoidance of the main branches of the ASAN, MSAN and infraorbital nerve.⁴

However, there have been extremely rare reports of facial nerve palsy after CFP. Byun *et al*⁵ first reported weakness of the buccal branch of the facial nerve after CFP that was similar to our case. These authors postulated that the cause of this palsy was a laterally placed puncture point. The cheek muscles distributed around the puncture site are the levator labii superioris (superior), the zygomaticus and the levator angular oris (lateral), and the orbicularis oris (inferior). Therefore, injury to the cheek muscles during CFP can damage the terminal buccal branches in those muscles. The functions of the buccal branch of the facial nerve include smiling, aiding chewing via holding the cheeks flat, elevating the upper lip, pursing the lips and flaring the nostrils.⁶ In our case, the weakness was more prominent when resting or pursing and not when the patient showed her teeth (figure 2A and B), which indicates that the paralysis did not extend to the entire buccal branch of the facial nerve; rather, the paralysis partially affected the terminal branches of this nerve. We postulate that muscle paralyses that contributed to the deficits in the pursing of the lips and pulling of the upper lip outwardly involved the levator angular oris, the zygomaticus minor, or the orbicularis oris. Notably, these muscles topographically surround the puncture site.

The mechanisms that we believe to be responsible for the injuries to the terminal buccal branches of the facial nerve are detailed as follows. In our case, an incision on the gingivobuccal sulcus and a flap elevation was not performed before introduction of the trocar. After puncture, the microdebrider blade insertions were manipulated at various angles to remove the remaining polyp in the antrum. At this time, the insertion of the microdebrider blades might have produced pressure on the surrounding soft tissues. Such direct pressure to the cheek muscles might have damaged the terminal branches of the facial nerves. The puncture site created in the soft tissue is not the same plane with the bony puncture site if the upper lip is not pulled up. In such situations, the insertion of the microdebrider blades between the soft tissue and maxillary bone could cause continuous tension on the surrounding soft tissue. Furthermore, by prolonged use of a microdebrider blade at an acute angle to the

anterior wall of the maxilla (acute angles can produce much more tension around the soft tissues than is produced by right angles), injury to the surrounding soft tissue can occur. Byun's report did not mention whether incision and flap elevation were performed during CFP.⁵ Singhal *et al*⁷ reported that they were able to reduce the complication rate significantly using an endoscope sheath elevator and by making a vertical incision during CFP compared with the use of blind CFP.

Physicians must perform neurological studies when encountering facial weakness or paralysis after surgery. Electroneurography can objectively quantify the degree of neuronal damage within 2 weeks after surgery, and electromyography can do so beyond 2 weeks after surgery. With the results of these studies, physicians can explain the prognosis to the patient. Furthermore, the results of these studies can help direct the management plan during the follow-up period. For Byun's report, a waiting strategy without further treatment was adopted because the electroneurography results indicated incomplete paralysis, and spontaneous complete recovery of the patient's facial weakness occurred.⁵ However, if the results of neurological studies show complete paralysis, high-dose steroid therapy (1 mg/kg prednisolone) can be administered soon after surgery to help reduce the oedema of injured nerves.

We recommend the following to avoid injury to the buccal branch of the facial nerve during CFP: (1) create a vertical incision in the gingivobuccal area; (2) elevate the soft tissue to the anterior face of the maxilla and puncture away from the nerves running to the face of the maxilla under direct vision; (3) manipulate the microdebrider blade in such a manner as to not produce tension on the surrounding soft tissues and avoid prolonged use of the blade and (4) inform the patient of the small possibility of facial palsy prior to any surgery that requires CFP.

We have reported a rare complication of facial palsy following CFP. Operators should be aware of this rare but possible complication of CFP and how to avoid it.

Learning points

- ▶ Several complications can occur following canine fossa puncture (CFP), including facial paraesthesia and dental numbness.
- ▶ A buccal branch of facial paralysis after CFP can occur and operators should be aware of this rare but possible complication.
- ▶ To avoid injury to the buccal branch of the facial nerve, create a vertical incision before CFP and manipulate the microdebrider blades in such a manner as to not produce tension on the surrounding soft tissues and avoid prolonged use of the blade.

Competing interests None.

Patient consent Obtained.

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