

## Clinical Note

### Postoperative acute sialadenitis following posterior fossa surgery

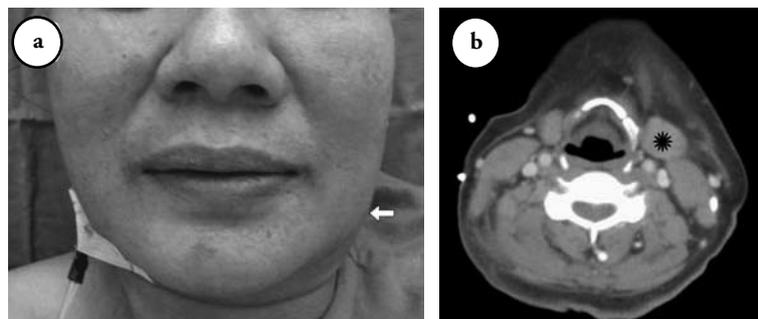
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Postoperative acute sialadenitis, known as an inflammation of a salivary gland, is a well-known entity primarily affecting patients who undergo abdominal surgery.<sup>1</sup> The incidence of postoperative acute sialadenitis subsequent to major abdominal surgery has been estimated at approximately 0.1%.<sup>2</sup> However, postoperative acute sialadenitis following posterior fossa surgery has been rarely reported in the literature.<sup>2-4</sup> Here, we present 2 patients that developed postoperative acute sialadenitis following posterior fossa surgery, and review the relevant literature.

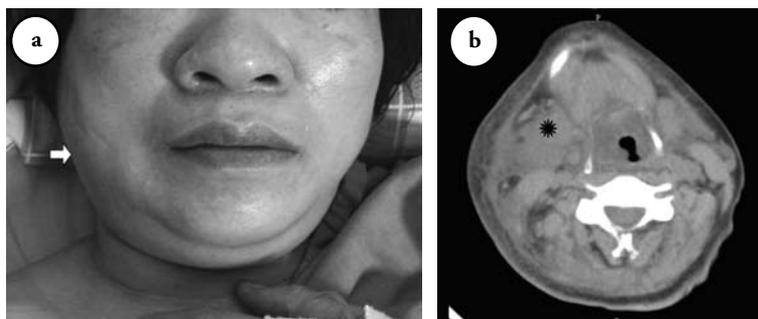
The first patient is a 49-year-old female referred to our department with a 2-year history of unsteady gait and impairment of memory. Physical examination revealed no contribution. Neurological examination revealed a positive cerebellar sign. An MRI of the brain showed a contrast enhancing mass occupying the right cerebello-pontine angle, originating from the right tentorial membrane. After induction of anesthesia and intubation, she was placed in a lateral decubitus position. After a 3-pin head holder was applied, the head was

placed in hyperflexion with a rotation of 45 degrees away from the tumor site. A right retromastoidal craniectomy was performed, and the tumor was uneventfully subtotally removed. Mannitol was prescribed to decrease intracranial pressure, perioperatively. The surgery lasted 5 hours. The overall fluid input/output was balanced. The pathological examination confirmed a diagnosis of meningioma. A swelling and mild tenderness in the left submandibular region was noticed the next day after her transfer to the neurosurgical intensive care unit (Figure 1a). The consistency was soft, and the margin was not well demarcated. A CT scan of the neck revealed swelling of the left submandibular gland (Figure 1b) and the absence of a calculus. Postoperative acute sialadenitis was diagnosed. After hydration and antibiotics were administered, the swelling completely disappeared on post-operative day 8. Neither ductal dilation nor sialolithotomy was required. She was discharged without any additional deficit.

The second patient is a 54-year-old female who presented with the complaint of painful sensation over the posterior-orbital and posterior-auricular region 6 months before admission. As treatment with carbamazepine had failed, she was referred to our department for microvascular decompression. At admission, neurological examinations revealed the tenderness along the distribution of first branch of the



**Figure 1** - Post-operative complication in the first patient showing a) Photograph of swelling in the left submandibular region (arrow). b) Axial neck CT showing swelling of the left submandibular gland (asterisk).



**Figure 2** - Post-operative complication in the second patient showing a) Photograph of swelling in the right submandibular region (arrow). b) Axial neck CT showing swelling and enlargement of the right submandibular gland (asterisk).

fifth cranial nerve. A CT scan of the head revealed no obvious pathological lesion. After induction of anesthesia and intubation, she was placed in a lateral decubitus position. After a 3-pin head holder was applied, the head was placed in hyperflexion with rotation 50 degrees away from the lesion site. A left retromastoid craniectomy was administered, and Teflon was placed between the entry zone of the trigeminal nerve and the affecting vessels. Mannitol and hyperventilation were prescribed to decrease the intracranial pressure. The surgery lasted 3 hours. A mildly tender swelling was noticed in the right submandibular region the day after surgery (Figure 2a), and acute sialadenitis was diagnosed after CT scan of the neck (Figure 2b). The symptoms completely improved on post-operative day 10 with conservative treatment.

Acute sialadenitis, known as inflammatory swelling of the salivary gland, is a well-documented entity occasionally observed after general anesthesia.<sup>5</sup> Most often it involves the parotid gland subsequent to abdominal or orthopedic surgery.<sup>4</sup> Acute submandibular swelling following neurosurgical procedures is rarely reported in the literature. The incidence of acute sialadenitis subsequent to posterior fossa surgery including far-lateral and retromastoid procedures is approximately 0.16-0.84%.<sup>2,3</sup> Although the etiology of postoperative acute sialadenitis remains unclear, numerous causes such as medical conditions, infection, mechanical trauma, hypersensitivity reaction, perioperative medications, anesthesia, or surgical positioning may contribute to salivary stasis and acute bacterial infection of the salivary gland.<sup>5</sup> Numerous medical diseases including sialolithiasis, diabetes mellitus, hepatic failure, renal failure, hypothyroidism, Sjögren's syndrome, depression, and malnutrition have been described to increase the risk of sialadenitis.<sup>2</sup> The commonly prescribed medications including antihypertensives, anticholinergics, antidepressants, diuretics, antihistamines, phenothiazines, beta-blockers, barbiturates, glycerol or mannitol, have been associated with acute sialadenitis and may contribute to systemic dehydration, increasing the risk of salivary stasis.<sup>1,2</sup>

The anatomic factors may play an important role in the predilection of infection of the submandibular gland. The Wharton's duct rests on the floor of the mouth near the tongue. The mobility of the tongue prevents salivary stasis, reducing the rate of infections involving the submandibular glands. Surgical positioning and anesthesia has been thought to contribute to occlusion of the Wharton's duct. The lack of salivary secretions permits retrograde bacterial overgrowth from oral flora. The infection mostly results from the gram-positive bacteria, such as *Streptococcus* or *Haemophilus*.<sup>3</sup> However, the more mucinous saliva

of the submandibular glands is thought to confer more bacteriostatic properties than the serous saliva produced by the parotid gland. Postoperative acute sialadenitis rarely affects the submandibular gland.<sup>4</sup> In a report of one patient developing acute right submandibular swelling following surgery for bilateral optic nerve meningioma, dehydration was thought to contribute to this complication.<sup>1,4</sup>

In posterior fossa surgery, rotation, and flexion of the head is common in the neurosurgical approach because of the best surgical field and the facilitation of microscopic techniques. Cerebrospinal fluid leaks, meningitis, wound infection, and cranial nerve palsies are the most common complications of posterior fossa surgery. However, acute postoperative sialadenitis following posterior fossa surgery is rarely described. The tongue may be compressed from an endotracheal tube, oral airway, and the extreme head positioning, leading to occlusion of the Wharton's duct.<sup>4</sup> In this instance, such patients may develop sialadenitis due to duct obstruction. In the reported cases, acute sialadenitis all occurred contralateral to the surgical lesion, which was the side most affected by the extreme positioning.<sup>2</sup>

Depending on the involving salivary gland, patients harboring postoperative acute sialadenitis present a sudden onset of a firm, erythematous swelling around the auricular area or the angle of the mandible during surgery or, most often a few hours later.<sup>2</sup> Although the course of postoperative acute sialadenitis is benign, airway protection should be considered early. Hydration helps to facilitate the salivary secretions and relieve the stasis.<sup>4</sup> Antibiotics directed at the gram-positive pathogens should be prescribed. However, steroids are not administered. Generally, the swelling of the salivary gland decreases incrementally over time after these treatments. No ductal dilatation or sialolithotomy is required. In our 2 cases, extreme head positioning and dehydration from Mannitol were encountered during surgery. The postoperative acute sialadenitis developed in the contralateral lesion site the next day after surgery. As discussed above, the occlusion of the Wharton's duct and the decrease of salivary secretion resulting in salivary stasis contributed to the postoperative acute sialadenitis. After copious hydration and suitable antibiotic treatment, the submandibular gland swelling decreased incrementally. Neither patient received ductal dilatation or sialolithotomy. No additional neurological deficits were observed.

In conclusion, the retromastoid approach is commonly performed in patients with posterior fossa lesions. During the head positioning, the avoidance of the extreme degree of head rotation and flexion and compression of the tongue from an endotracheal tube or oral airway may be helpful to reduce the risk of salivary

gland obstruction. Hydration may facilitate the salivary secretions and reduce the salivary stasis. Although posterior acute sialadenitis following posterior fossa surgery is a rare complication, awareness of this clinical entity is important for all neurosurgeons who must access the skull base using head rotation and flexion as its course is benign when recognized and treated early.

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