

## Postoperative sialadenitis following retromastoid suboccipital craniectomy for posterior fossa tumor

SUBRATA KUMAR SINGHA and NILAY CHATTERJEE

Department of Anesthesia, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum-695011, India

### Abstract

During retromastoid and far-lateral posterior fossa surgical approaches the head may be positioned at the extreme limits of rotation and extension. In rare instances, patients may develop acute sialadenitis after surgery as a consequence of such positioning. In those patients, the neck/facial swelling is contralateral to the craniectomy site. The mechanism implicated in acute sialadenitis in the patient described in this report was because of obstruction to the salivary duct due to surgical positioning. The course of this complication is typically benign if it is identified early in the postoperative period.

**Key words** Acute sialadenitis · Skull base surgery · Position-related complications

### Introduction

During retromastoid and far-lateral posterior fossa surgical approaches the head may be positioned at the extreme limits of rotation and extension. In rare instances, such patients may develop sialadenitis that arises due to duct obstruction. The duct obstruction is thought to be a direct consequence of the positioning. The course of this condition is typically benign if it is identified early in the postoperative period and treatment is instituted soon. Alternative and rather safer positions may be implemented, such as a semisitting position that requires a lesser degree of head rotation and flexion and hence will cause a lesser degree of obstruction to the salivary duct and complications thereafter.

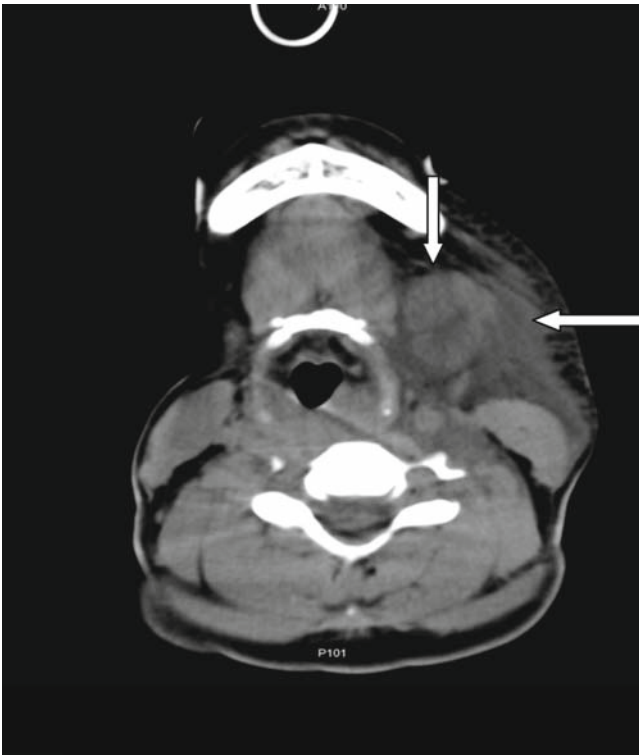
### Case report

A 23-year-old female patient (weight, 56 kg; height, 154 cm) presented with the complaint of headache in the occipital region that had been occurring for the previous 6 months, associated with vomiting and visual blurring. Clinical examinations of the central nervous system (CNS) and other body systems were normal, with no other comorbid condition. The patient had no abnormal findings with regard to salivary glands on the preoperative computed tomography (CT) scan. Magnetic resonance imaging showed a  $3.6 \times 3.8 \times 3.4$ -cm extra-axial lesion on the lateral aspect of the right cerebellar hemisphere that was diagnosed as a right cerebellar convexity meningioma.

A right retromastoid suboccipital craniectomy was planned. Anesthesia was induced with thiopentone, fentanyl with  $O_2$ , air, and sevoflurane. Muscle relaxation was achieved with pancuronium, and the patient was intubated uneventfully with a 7.5-mm internal diameter reinforced tube. Standard American Society of Anesthesiologists (ASA) monitoring was instituted. The patient was placed in the extreme left lateral position for facilitating the surgical approach, her sides were supported, and pressure points secured. The surgery proceeded uneventfully and all the hemodynamic parameters as well as the fluid input/output were maintained in the intraoperative period. At the end of the surgery, when the patient was found to be conscious and responding to commands, she was extubated in the operation theater. Neurological assessment was satisfactory. However, a swelling was noticed in the left submandibular region; it was approximately  $5 \text{ cm} \times 3 \text{ cm}$  in size, consistency was firm, and the margins were not well demarcated. The patient was shifted to the intensive care unit (ICU) and her vital signs were found to be within normal limits. An otolaryngology consultation was sought and a clinical diagnosis of acute sialadenitis was made, keeping in mind the differential



**Fig. 1.** Submandibular swelling on left side extending into the parotid region



**Fig. 2.** Computed tomography (CT) scan showing extensive swelling of the submandibular gland (vertical arrow) and associated swelling of the superficial lobe of the parotid gland (horizontal arrow)

diagnosis. After 2 h the submandibular swelling on the left side was found to have increased, and it extended to the left parotid region (Fig. 1). A CT scan was done and it revealed massive swelling of the left submandibular gland associated with swelling of the superficial lobe

of the left parotid gland (Fig. 2), and the glandular swellings were found to be displacing the larynx. At that time patient started complaining of mild respiratory distress, although peripheral oxygen saturation ( $Sp_{O_2}$ ) was 100% all along and vital signs were normal. The patient was electively intubated soon after showing features of mild respiratory distress, and in consideration of impending airway obstruction was put under mechanical ventilation. After the airway protection was instituted, our treatment protocol included copious hydration to facilitate salivary duct secretions and antibiotics directed at gram-positive pathogens. Steroid was not administered. As the swelling decreased incrementally over time, neither ductal dilatation nor sialolithotomy was required. The swelling was not appreciably reduced during the first 48–72 h; hence, tracheostomy was performed on the fourth postoperative day, and the patient was gradually weaned from the ventilator over the next 24 h, and was allowed to breathe through a T-piece. The glandular swelling had almost disappeared on the seventh postoperative day, without any residual complications. When the submandibular gland swelling clearly began to diminish, the pharyngeal soft tissues were evaluated before the patient could be decannulated, starting from the tenth day after the surgery. After decannulation of the tracheostomy tube, the patient did not require any further pulmonary care, and her pulmonary status had returned to baseline at discharge. The tracheostomy stoma was closed on the fourteenth postoperative day and the patient was discharged on the twentieth postoperative day.

## Discussion

Considering the extreme rotation and flexion imparted during the retrosigmoid procedures in the present patient, the mechanism of the development of the swelling was likely manifold. Apparently, compression of the tongue from an endotracheal tube and extreme head positioning during rotation and flexion can occlude Wharton's duct [1]. Moreover, the mechanisms primarily implicated are surrounding soft-tissue compression of the gland, which can contribute to duct obstruction and pressure ischemia. Once the duct is mechanically obstructed, the situation is functionally identical to that of sialolithiasis [2,3], which leads to salivary stasis and secondary bacterial infection. Therefore, once a patient attains the neutral supine position after the conclusion of surgery, copious hydration helps to facilitate the salivary secretions and relieve the stasis. The cause of infection is the lack of salivary secretions, which permits retrograde bacterial overgrowth from oral flora, the commonest pathogens being gram-positive bacteria, e.g., *Streptococcus* or *Haemophilus* [2]. Although our

patient did not develop overt clinical signs of salivary gland infection, acute sialadenitis occurred contralateral to the Cerebello-Pontine angle lesion, which was the side most affected by the extreme positioning. In this patient the onset of inflammation was dramatic. Louis J Kim et al. [4] have reported that the incidence of sialadenitis following far-lateral and retrosigmoid procedures is about 0.84%. Numerous medical conditions [2] are associated with a predisposition to salivary stasis and hence an increased risk of sialadenitis: diabetes mellitus, hepatic failure, renal failure, hypothyroidism, Sjögren's syndrome, depression, and malnutrition. The perioperative use of medications with anticholinergic effects can also predispose patients to salivary stasis. Either by diuresis or an anticholinergic process, antihistamines, phenothiazines,  $\beta$ -blockers, barbiturates, and diuretics all contribute to systemic dehydration, which increases the risk of salivary stasis [2]. Anesthesia and surgery are known risk factors for salivary stasis and acute bacterial infection of the salivary gland [2]. In our patient, the surgery lasted for 5 h, which is well within the average duration of skull-base surgical procedures at our institution. Although an older age is associated with decreased salivary gland secretion and a predisposition to salivary stasis [5], our patient was young, at 23 years, and not obese (obesity could be a suspected risk factor given the mass effect because of the surrounding soft tissue). However, the association of skull-base approaches with acute sialadenitis has rarely been reported, particularly in the anesthesia literature, and our patient did not have any comorbid conditions that could have predisposed toward salivary stasis. Last but not least, other possible diagnoses such as angioneurotic edema (possibly due to drug allergy) and internal jugular vein thrombosis were ruled out by the appropriate laboratory tests and the clinical presentation of the patient.

In our institute, retrosigmoid craniotomies are routinely performed with patients in the lateral position, and far-lateral craniotomies are performed with patients in the park-bench position. A retrosigmoid craniotomy performed with the patient in the semisitting position

requires a lesser degree of head rotation and flexion and this position is a useful alternative that may reduce the risk of salivary duct obstruction during surgery. Other positions such as semisitting, supine with a shoulder roll, and prone, all have inherent advantages and disadvantages. However, given that the entity of acute sialadenitis is rare and that its course is relatively benign when recognized early, lateral positioning is still commonly used, with an ipsilateral shoulder roll.

## Conclusion

Careful attention to preoperative hydration and the avoidance of excessive head and neck positioning may help prevent salivary duct obstruction in patients having skull-base surgery. For optimal and safe postoperative management, the signs of acute sialadenitis should be recognized early after skull-base surgery and treatment instituted quickly for a better patient outcome. Fortunately, with early recognition and treatment, the course of this entity is typically benign. Adequate precaution has to be taken if any predisposing factors are found to be present in patients undergoing skull-base surgery in the extreme lateral position. A safer alternative position such as semisitting may be advocated for patients undergoing retrosigmoid surgeries, as this position involves a lesser degree of head rotation and flexion.

## References

1. Finck M, Cheng EY. Acute pseudo tongue enlargement after general anesthesia. *Anesth Analg*. 1998;87:1443–5.
2. Raad II, Sabbagh MF, Caranasos GJ. Acute bacterial sialadenitis: a study of 29 cases and review. *Rev Infect Dis*. 1990;12:591–601.
3. McQuone SJ. Acute viral and bacterial infections of the salivary glands. *Otolaryngol Clin North Am*. 1999;32:793–811.
4. Louis J. Kim, Jeffery D. Klopfenstein, Iman Feiz-Erfan, Geoffery P. Zubay, Robert F. Spetzler. Postoperative acute sialadenitis after skull base surgery. *Skull Base*. 2008;18:129–34.
5. Lundgren A, Kylen P, Odkvist LM. Nosocomial parotitis. *Acta Otolaryngol*. 1976;82:275–8.