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A case of severe postoperative airway edema induced by hyperflexion of the neck

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To the editor: We encountered a patient in whom severe airway edema occurred after a relatively short duration of general anesthesia, with post-surgical mechanical ventilation being necessary. Reduction of local venous circulation in the surgical position (hyperflexion of the neck) may have been the main cause of the edema.

The patient was an 83-year-old woman (150 cm; 62 kg; body mass index [BMI], 27.6) scheduled to undergo excision of a right parotid tumor. The patient had a previous medical history of hypertension, treated with a calcium channel blocker (nifedipine). She was also being treated with nitroglycerin for negative T wave on ECG, but she had no subjective symptoms, such as chest pain, nor were there any symptoms of heart failure or a cold, such as pharyngeal pain or cough.

No anesthetic premedication was administered. Anesthesia was induced with 100 mg propofol, 100 μg fentanyl, and 6 mg vecuronium, and maintained with oxygen, nitrous oxide, and sevoflurane (0.5%–2%). After oropharyngeal intubation with a tracheal tube (6.5 mm in diameter), 6 ml of air was infused into the cuff until air leakage from the tube disappeared. No abnormalities, such as flare or swelling, were noted with laryngoscopy. The tracheal tube was easily inserted.

After a central venous catheter was inserted into the femoral vein, nitroglycerin was continuously administered at 0.5 $\mu g \cdot kg^{-1} \cdot min^{-1}$, and central venous pressure was measured.

The operator placed the patient's neck in a left flexion position to turn the affected side upward; the left side of the operation table was inclined to about 10°; and surgery was initiated.

Surgery was performed without any problem. The tumor was localized in the parotid gland, without tracheal invasion. The operation time was 157 min, the duration of anesthesia was 200 min, the infused volume of Ringer's acetate solution was 1100 ml, the blood loss was 50 ml, urinary volume was 400 ml, and intraoperative central venous pressure was 3–5 mmHg. When the patient's head was returned to the median position after the completion of surgery, edema was noted in the eyelid and conjunctiva on the unaffected side. No edema was noted macroscopically in the neck. No leakage was confirmed when the air was released from the cuff of the tracheal tube. Severe edema was noted in the nasal and oral cavities, and therefore the airway and laryngeal region were observed using a bronchofiberscope. Edema was present in the entire circumference of the trachea, and the membranous region bulged homogeneously (Fig. 1). Severe edema and flare were also noted in the larynx.

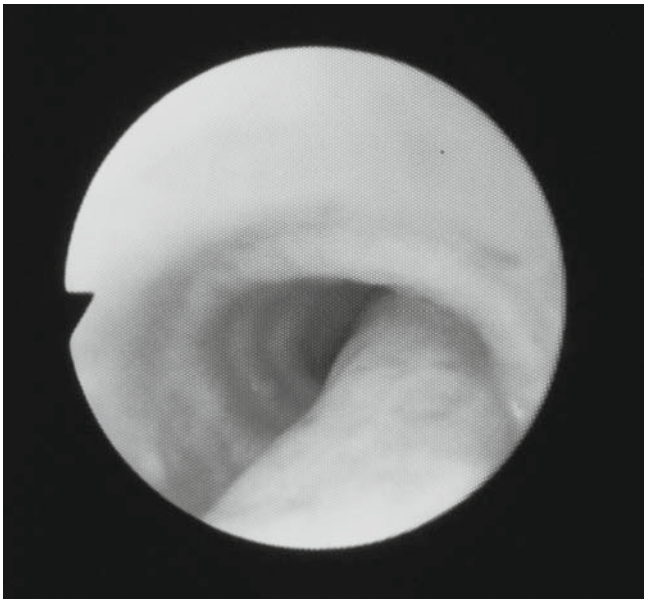

Fig. 1. Image of bronchofiberscopy, performed through the tracheal tube, just after the surgery. Edema was present in the entire circumference of the trachea, and the membranous region bulged homogeneously

The patient was transferred to an intensive care unit, with oropharyngeal intubation, and artificial respiration was performed under sedation until the edema was alleviated.

The edema seen in the eyelid, conjunctiva, and nasal and oral cavities resolved following furosemide (total 40 mg) and methylprednisolone (500 mg) i.v. administration on the next day (postoperative day 1), and the bulging of the membranous region, noted on the previous day, disappeared on bronchofiberscope observation. However, edema remained around the vocal cords, which prevented leakage from the tracheal tube when the air was released from the cuff. The edema disappeared on postoperative day 6 and leakage from the tracheal tube was noted with positive ventilation. Therefore, the tracheal tube was removed. The patient was transferred to a ward 8 days after the surgery, and she was discharged 1 week later without any problems.

Airway obstruction after surgery of the head and neck region has been occasionally reported [1–3], with the cause being edema of the upper airway, such as the larynx, in many cases. In most cases, the edema was seen homogeneously. However, there have been few reports of prolonged unilateral edema lasting for 6 days after surgery.

In the present patient, giving priority to the surgical procedure, the affected side was extended, which caused hyperflexion of the opposite side. The anesthesiologist noted the strong neck flexion prior to the surgery, and so the surgeon returned the head slightly toward the median position. However, the neck flexion was still harmful, due to the combination of the patient's short neck and the Trendelenburg position.

The edema noted after surgery was localized in the nasal to oral cavity, trachea, eyelid, and conjunctiva, but no edema was noted in other regions, such as the ends of the extremities. Considering dehydration due to urination, blood loss, insensible perspiration, and preoperative fasting, the infusion of 1100 ml of Ringer's acetate solution was not excessive. Central venous pressure was 3–5 mmHg, showing no increase from the preoperative pressure, nor was there any marked change in intraoperative electrocardiography. Based on these findings, heart failure induced by excess infusion or angina pectoris was ruled out. The severe airway edema may have been due to interference of the venous circulation caused by hyperflexion of the neck, and the lower head position may have enhanced this condition.

In conclusion, the surgical position is established giving priority to the surgical procedure in most cases, but attention should be paid to the position, depending on the degree of obesity of the patient, even when the operation time is short.

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