

A Case of Mediastinal Emphysema After Tubal Catheterization

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We report a 46-year-old man who developed mediastinal emphysema after catheterization of the eustachian tube. It is necessary to perform tubal ventilation therapy with care in patients aged 50 years or older due to the risk of complications. Furthermore, it is necessary to consider the possibility of complications when tubal catheterization causes pain.

Introduction

Tubal catheterization is a treatment for eustachian tube stenosis that is commonly employed by otolaryngologists in Japan. However, otolaryngologists in Europe and United States of America do not often perform this procedure, and instead use tubal insufflation (the Valsalva method), because tubal catheterization can cause many complications.

We experienced a patient with mediastinal emphysema after tubal catheterization, and we report this case here with a review of the literature.

Case Report

A 46-year-old man visited another otolaryngologist because of ear fullness on Sept. 26, 2000. A diagnosis of eustachian tube stenosis was made by audiometry, and tubal catheterization was performed. Pain occurred during ventilation therapy, which was discontinued at that time. However, pain on swallowing and respiratory distress occurred soon afterward, so he was referred to our hospital on the same day.

He had a past history of pneumothorax 20 years earlier.

On examination, tenderness and emphysema of the anterior neck were detected, and submucosal emphysema extended from the eustachian tube

to the larynx (Fig. 1). Submucosal emphysema was also seen on plain X-ray films (Fig. 2). Laboratory tests revealed a WBC of 15,400/ μ l and a CRP of 0.07 mg/dl. Emergency CT scanning was performed and mediastinal emphysema was diagnosed (Fig. 3).

He was admitted and treated with intravenous (cefotiam 2 g/day) and (clindamycin 1,200 mg/day) for 2 days, followed by (cefotiam 1g/day) and (clindamycin 600 mg/day) for 7 days. His symptoms resolved with this therapy. Laboratory tests revealed a WBC of 6,100/ μ l and a CRP of 0.00 mg/dl on Oct. 2, so he was discharged on Oct. 3.

Discussion

Many complications of tubal ventilation have been reported, such as acute otitis media, tympanic perforation, edema and emphysema of the nasopharynx, and meningitis.

When the tip of the catheter does not fit the eustachian tube well, air occasionally even enters the muscles or the submucosal tissue. When the catheter is pressurized, Kumazawa reported that hemorrhage, edema, and hyperemia were prominent around the eustachian tube soon after tubal ventilation. He also reported scarring and stenosis of the eustachian tube at 3 years after tubal catheterization. We consider that emphysema

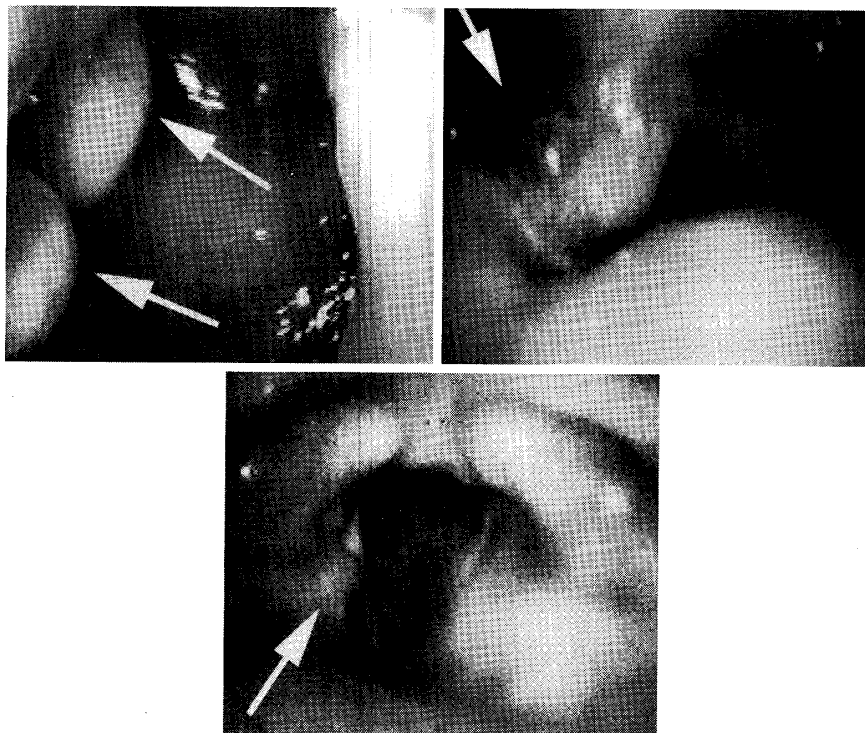


Fig. 1 Photograph of the nasopharynx, pharynx, and larynx
Submucosal emphysema can be seen around the eustachian tube orifice (nasopharynx), and the uvula (pharynx), as well as in the supraglottic region (larynx)

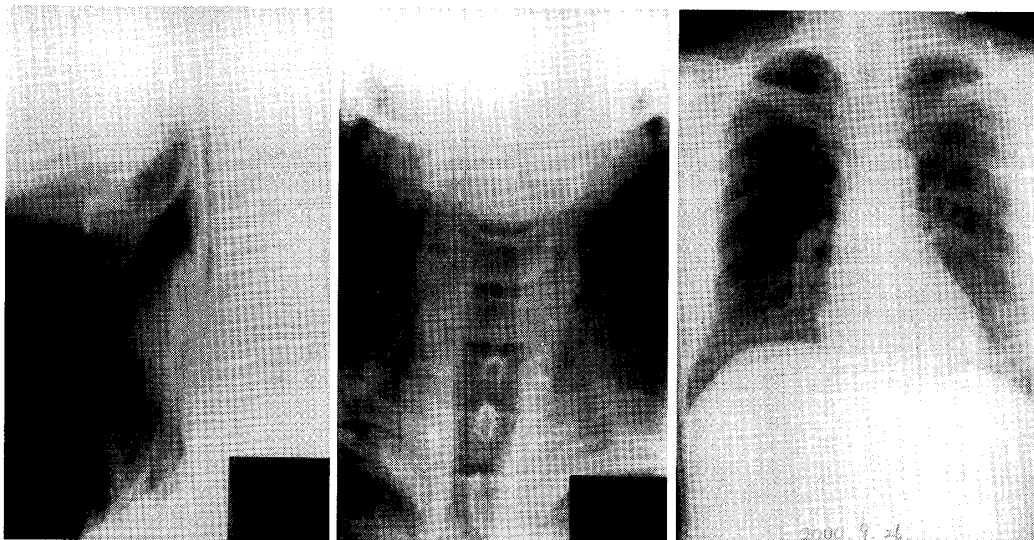


Fig. 2 Plain X-ray film of the neck and chest
Emphysema extends from the nasopharynx to the larynx (neck), and then from the neck to the mediastinum.

probably occurred in the present patient because the catheter did not fit the eustachian tube properly.

It seems likely that air entered the submucosal

tissue at the time when pain occurred in our patient. Therefore when a patient complains of pain, it is necessary to discontinue catheterization at once.

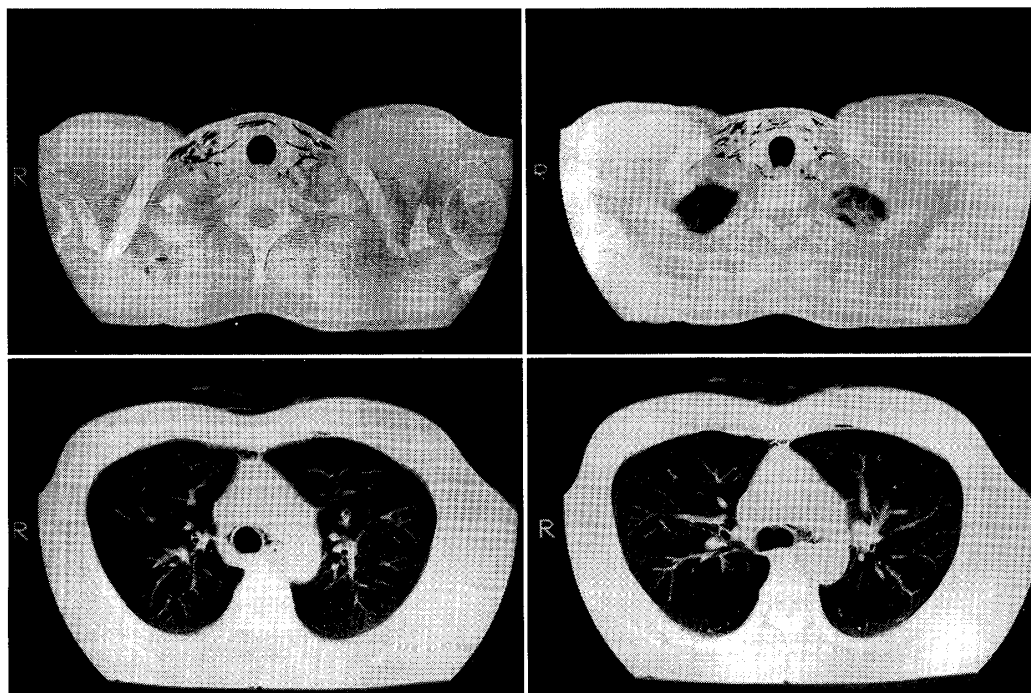


Fig. 3 CT scan obtained on admission.
Mediastinal emphysema is evident.

Table Complications of tubal catheterization

Year	Authors	Age	Sex	Side	Method of tubal ventilation	Pain on inflation	Symptoms	Complications
1985	Ishiguro et al ¹⁾	54	female	right	catheter	-	swelling of the temporal skin, pneumohypoderma	pneumocephalus
1985	Kitamura et al ²⁾	52	female	left	catheter	-	temporal headache, parietal headache, occipital headache, vertigo	pneumocephalus, liquorrhea
1987	Hosaka et al ³⁾	57	male	left	catheter	-	unconsciousness, left hemiplegia	pneumocephalus
1989	Fujii et al	74	female	right	catheter	-	swelling of the right face and the neck	cervical + mediastinal emphysema
1990	Tanaka et al ⁵⁾	6	male	left	catheter	+ ?	swelling of the neck, parotid pain, sore throat	cervical + mediastinal emphysema
1990	Ohbayashi et al	24	female	left	catheter	+	painful, cheek, side of neck and chest, chest pain during respiration	mediastinal emphysema, subcutaneous cervical emphysema
1996	Okita et al ⁴⁾	66	female	right	catheter	+	swelling of the neck, respiratory distress	submucosal hemorrhage
1998	Suzuki et al	73	male	?	catheter	-	swelling of the face	subcutaneous cervical emphysema, mediastinal emphysema
2000	Takano et al (our present case)	46	male	right	catheter	+	pain on swallowing, respiratory distress	cervical + mediastinal emphysema

After air entered the submucosal tissue around the eustachian tube, it traveled to the mediasti-

num via the temporal bone fascia, parapharyngeal space, prelaryngeal space, and pretracheal

space.

Reports on the complications of tubal catheterization that we could retrieve are summarized in the Table. Submucosal emphysema has not been previously reported as a complication of tubal ventilation, and only reports about intracranial complications have been published in Europe and America. The patients were aged 50 years or older^{1)~4)}, apart from a six-year-old boy who became hysterical during the ventilation procedure⁵⁾ and a 24-year-old woman. The average age of the patients was 50.2 years. It seems desirable to reduce the use of tubal catheterization in children. Moreover, it is necessary to perform ventilation therapy carefully in patients aged 50 years or older and keep the risk of complications in mind.

Ahren⁶⁾ reported that 21.3% of human temporal bone specimens (20/94) showed a congenital bone defect in the tympanic cavity. Moreover, Lang⁷⁾ found that 25.7% (9/35) of autopsy temporal bone specimens had a similar bone defect. Thus, there is the possibility that this bone defects could give rise to intracranial complications during catheterization. However, it is impractical to perform CT scanning in all patients undergoing tubal ventilation to detect bone defects in the tympanic cavity. In this context, Bernard reported a 41-year-old man with *Haemophilus influenzae* meningitis caused by Polizer's maneuver⁸⁾.

Three of the nine patients with complications developed pain at the time of tubal catheterization and they also had emphysema or submucosal hemorrhage (Table). Thus, it is necessary to consider the possibility complications like submu-

cosal emphysema when tubal catheterization causes pain.

Conclusion

We reported a case of mediastinal emphysema after tubal catheterization.

1) It is necessary to perform ventilation therapy with care in patients aged 50 years or older due to the risk of complications.

2) It is also necessary to consider the possibility of complications when tubal catheterization causes pain.

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通気による縦隔気腫の1例

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通気後に頸部皮下気腫および縦隔気腫を来した46歳男性症例について報告した。通気中に疼痛を訴えた場合は粘膜下気腫等の合併症を考慮し、通気を中止すべきである。
