

[CASE REPORT]

Nasogastric Tube Syndrome: The Size and Type of the Nasogastric Tube May Contribute to the Development of Nasogastric Tube Syndrome

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Abstract:

Nasogastric tube syndrome (NGTS) is a rare but life-threatening complication associated with nasogastric tube (NGT) placement. The effect of the NGT size and type on the development of NGTS has not yet been fully elucidated. We herein report the case of a 77-year-old man with cerebral infarction who was complicated with NGTS. The immediate removal of the NGT improved the symptoms of NGTS. Although the NGT was passed through the same route during reinsertion, the use of a softer and smaller-sized NGT did not cause any NGTS recurrence. To prevent the development of NGTS, using a NGT that is appropriate for the patient's condition is important.

Key words: nasogastric tube syndrome, nasogastric tube, vocal cord paresis, inspiratory stridor

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Introduction

Nasogastric tube syndrome (NGTS) is a rare but life-threatening complication caused by the placement of a nasogastric tube (NGT). NGTS is characterized by bilateral vocal cord paresis with a risk of suffocation (1). However, the exact occurrence frequency of NGTS remains unclear because the number of reports on this condition is limited.

There are few reports about the reinsertion of a NGT in patients with NGTS. Furthermore, whether the size and type of NGT may affect the development of NGTS has not been assessed and thus also remains unclear. We herein report a case of NGTS in which recurrence was prevented with the reinsertion of a softer and smaller-sized NGT.

Case Report

A 77-year-old man who had visited our outpatient department was found lying on the floor of the men's restroom in our hospital. He was then transported to the emergency room. He had been treated for hypertension and atrial fibrillation, and was taking an anticoagulant drug. Neurological

examinations revealed motor aphasia, right hemiparesis with a positive right Babinski sign, and conjugate deviation of the eyes to the left. Head computed tomography (CT) revealed early ischemic changes such as loss of the left insular ribbon and loss of gray-white differentiation on the left frontal lobe. Moreover, head magnetic resonance imaging showed acute phase cerebral infarction in the area of the left middle cerebral artery.

He was diagnosed with cardiogenic brain embolism in the area of the left middle cerebral artery and the administration of glycerol was initiated to reduce brain edema. On the day after admission, an NGT (Salem Sump tube, 16 French; outside diameter 5.30 mm) was inserted through the left nasal cavity for nutritional management and drug administration. Tube feeding from the NGT was continued because the patient could not take nutrition by mouth due to dysphagia, although no progression of symptoms was observed.

Two weeks after admission, the patient acutely presented with marked inspiratory stridor (Supplementary material 1). A follow-up head CT did not reveal a new cerebral infarction, and no findings indicative of pneumonia or heart failure were observed on chest CT. Although blood tests revealed hypoalbuminemia (3.0 g/dL), his body mass index

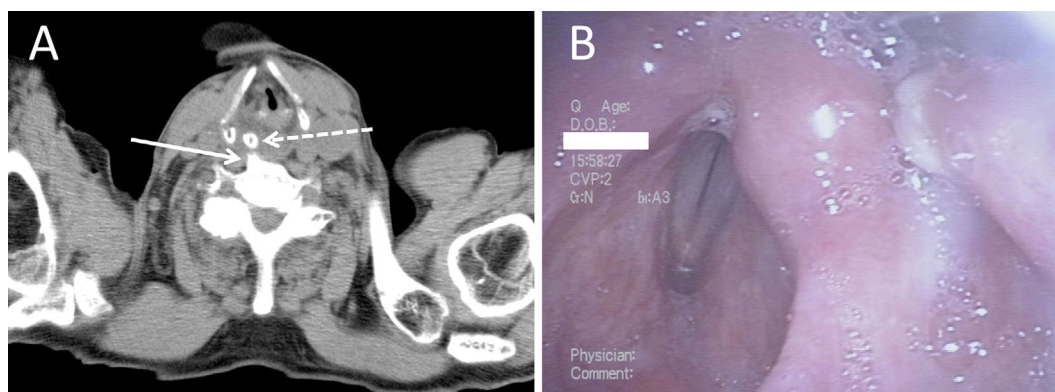


Figure. (A) Neck computed tomography revealed osteophyte formation protruding to the right front (arrow). The nasogastric tube passed through the right piriform (dotted arrow). (B) Laryngoscopy revealed bilateral vocal cord paresis without laryngeal edema or ulcer formation at the entrance of the esophagus.

was normal (20.4 kg/m²). The NGT was passed through the right piriform recess, and osteophyte formation protruding to the right front at the level of the vocal cord was observed on a neck CT (Figure A). Laryngoscopy was subsequently performed and revealed bilateral vocal cord paresis. However, no laryngeal edema or ulcer formation at the entrance of the esophagus were observed (Figure B). He was diagnosed with NGTS based on the bilateral vocal cord paresis during NGT insertion and the lack of any other causative diseases. We then immediately removed the NGT. On the day after removal of the NGT, inspiratory stridor tended to improve and thereafter it completely disappeared on the third day after removal (Supplementary material 2, 3). An improvement of the bilateral vocal cord paresis was observed by follow-up laryngoscopy on the seventh day after the removal of the NGT.

The patient's family did not wish to perform gastrostomy, although the patient was still having difficulty taking in food through the mouth. In order to maintain his nutritional status, we explained to his family about the risk of recurrence of NGTS and re-inserted an NGT with a smaller diameter than before (feeding tube, 12 French; outside diameter 4.05 mm) through the right nasal cavity. The NGT was again passed through the right piriform recess and in front of the anterior osteophyte of the cervical spine, but there was no recurrence of NGTS. Finally, about two months after admission, the patient was transferred to a rehabilitation hospital with the NGT still inserted.

Discussion

The term NGTS was coined by Sofferman et al. in 1990 (1). The mechanisms associated with the pathogenesis of NGTS are as follows: 1) vertically moving structures of the larynx rub against the fixed NGT during swallowing or coughing, 2) cricoid compression of the NGT toward the cervical spine while in the supine position, and 3) tonic contraction of the cricopharyngeal muscle pulling the NGT

against the delicate and thin postcricoid lamina. In addition, bone spur protrusion to the ventral at the level of the vocal cords has been considered to facilitate the second and third mechanisms mentioned above (2). Therefore, the clinical findings from the patient in this case indicated that he had a risk of developing NGTS.

In the present case, the recurrence of NGTS was not observed after the reinsertion of a smaller size NGT even though it was passed through the same route. Although there is a report mentioning that an NGT with a narrower diameter should be chosen to reduce the compression against the tissue caused by the NGT (3), the size of the inserted NGT is not described in some of the previous reports on NGTS. Therefore, the effect of NGT size on the development of NGTS remains unclear. However, based on the clinical course in this case, the size of the NGT may have contributed to the development of NGTS.

A Salem Sump tube was initially inserted in this patient, but the reinsertion was performed with a feeding tube after the improvement of NGTS. The Salem sump tube, which is a large-bore NGT, is often initially inserted for suction and gastrointestinal decompression in emergency care and for tube feeding in some cases. It has the advantage of being less prone to clogging. However, this type of tube becomes rigid over time due to the elution of the plasticizer (4). Therefore, if the patient's condition allows, a softer and smaller-sized NGT should be used to minimize patient discomfort and to reduce the risk of complications due to the insertion of a large-bore NGT (5, 6). The western guidelines for enteral nutrition also recommend using a soft, flexible, small size NGT (12 French or less) for long-term enteral feeding (7, 8). Some reports have described the development of NGTS despite the use of a smaller-sized feeding tube (1, 2). However, the type of NGT may also affect the onset of NGTS.

Apostolakis et al. reported in a review of NGTS that 77% of 31 patients with the condition required tracheotomy (9). NGTS causes life-threatening upper airway obstruction due

to vocal cord paresis. However, this complication is treatable, and a prompt and appropriate response improves the patient outcomes. NGTS is a rare condition and information about it is limited. Therefore, there is a possibility that NGTS might initially be misdiagnosed as bronchial asthma or heart failure, thus leading to a possible delay in the initial treatment. Throat pain is considered to be an important symptom of NGTS. However, NGTs are often inserted in patients who cannot complain of throat pain such as those with consciousness disturbance (10). Therefore, NGTS should always be considered in patients with an inserted NGT who present with stridor or dyspnea. The use of an appropriate size and type of NGT according to the patient's condition is important to prevent the development of NGTS.

The authors state that they have no Conflict of Interest (COI).

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