Perforation of abdominal esophagus following nasogastric feeding tube intubation: A case report

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**ARTICLE INFO**

**Article history:**
Received 12 February 2018
Received in revised form 1 March 2018
Accepted 5 March 2018
Available online 15 March 2018

**Keywords:**
Perforation of abdominal esophagus
Nasogastric feeding tube intubation
Deformity of abdominal esophagus
A case report

**ABSTRACT**

**INTRODUCTION:** Perforation of the abdominal esophagus caused by nasogastric tube (NGT) intubation has been rarely reported in adults.

**PRESENTATION OF CASE:** A 73-year-old man was admitted to our hospital with pneumonia. He had been bedridden long-term and had previously undergone a gastrectomy for gastric ulcer. Since admission was prolonged, and he required enteral feeding because of his inability to swallow, a NGT was inserted blindly. The next day, he had a high fever and abdominal pain. Abdominal computed tomography scan revealed that the tube was inserted through the wall of the abdominal esophagus into the abdominal cavity. In the emergency surgery, we sutured the perforated site of abdominal esophagus and patched it with lesser omentum. The postoperative course was good.

**DISCUSSION:** Abdominal esophageal perforation due to NGT insertion is very rare. The cause of perforation was suggested to be an abnormal deformity created by adhesion due to previous distal gastrectomy and long-term bedridden status.

A chest X-ray usually is performed to confirm the position of the NGT tube. In this case, a frontal radiographic view apparently showed the NGT placed in the stomach.

**CONCLUSION:** When NGT is inserted to such patients, frontal and lateral radiographic views or fluoroscopic guidance should be obtained.

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1. Introduction

Nasogastric tube (NGT) intubation is performed for administration of enteral feedings or medications and for gastric decompression. It is usually considered to be a safe procedure.

Esophageal perforation is a rare complication of NGT intubation, and can be fatal. The common site of perforation is the thoracic esophageal region, followed by the cervical esophageal region [1]. Perforation of the abdominal esophagus caused by NGT intubation has been rarely reported in adults.

The work in this case has been reported in line with the SCARE criteria [2].

2. Presentation of case

A 73-year-old man was admitted to the internal medicine ward of our hospital following a diagnosis of pneumonia. He had been bedridden due to severe Parkinson syndrome; therefore, he repeatedly suffered from aspiration pneumonia. His past medical history was significant for cerebral hemorrhage and gastric ulcer, for which he underwent distal gastrectomy.

The patient’s condition gradually improved following treatment with antibiotics against pneumonia, but long-term admission resulted in loss of swallowing function and poor nutritional status, requiring enteral feeding via NGT. On laboratory examination, the serum total protein (TP) was 4.8 g/dL and albumin (Alb) was 1.6 g/dL.

A 12-French normal plastic NGT was inserted at the bedside, and its position was checked by X-ray. Enteral nutrition through the NGT was begun (Fig. 1).

The next day, he had high fever with a temperature of 38.0°C and abdominal pain. A laboratory examination revealed a white blood count (WBC) of 16,200/μL and C-reactive protein (CRP) level of 16.5 mg/dL. Abdominal computed tomography (CT) revealed that the tip of the NGT was inserted through the right sidewall of the

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https://doi.org/10.1016/j.jscr.2018.03.007
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abdominal esophagus into the abdominal cavity, with free air and fluid collection around the NGT (Fig. 2). Following a physician’s consultation, we performed an emergency surgery for perforation of the abdominal esophagus by an enteral NGT.

During an upper median incisional laparotomy, few ascites were observed. Initially, we could not find the feeding tube. We detected a fluid collection under the lesser omentum and found the tip of the tube following incision of the omentum. The dirty fluid collection was irrigated out, NGT was removed, and the edge of the perforated hole was trimmed (Fig. 3). The abdominal esophageal wall seemed weak due to its thin muscular layer. The hole was sutured layer to layer and patched with lesser omentum. A jejunostomy tube was used to administer enteral nutrition postoperatively.

The postoperative course generally was good. Antibiotics were discontinued on postoperative day 7. An upper gastrointestinal series on postoperative day 4 showed no leakage from the abdominal esophagus and abdominal esophageal flexion toward the left and back sides. There was no remarkable stenosis (Fig. 4). Enteral nutrition via a jejunostomy tube was begun on postoperative day 1, and dysphagia rehabilitation was performed at the same time.

After his general condition improved, the patient was moved to the internal medicine ward on postoperative day 8. His swallowing function did not improve following the long-term rehabilitation, and therefore he was discharged with the jejunostomy tube for enteral nutrition.

3. Discussion

Traditionally, esophageal perforation is a rare clinical emergency with a high mortality and morbidity rate. Very low annual incidences of 3–6/1,000,000 patients have been reported from several studies [3,4]. Additionally, iatrogenic esophageal perforation is more unusual.

A national study conducted on 2564 patients in England revealed that the etiology of esophageal perforation was spontaneous in 81.9% and iatrogenic in 5.9% patients. In this study, the 30- and 90-day mortality rates in patients with esophageal perforation were 30.0% and 38.8%, respectively [5].

Few studies have reported esophageal perforation due to NGT intubation. Of these, one study reported of only three such incidences from 52 cases [6], and other study reported of one such incidence from 33 cases [7].

The most common site of iatrogenic esophageal perforation was the thoracic region followed by the cervical esophageal region [1], possibly because of physiologically narrowed segments in these regions [1,8].

To the best of our knowledge, only one case of abdominal esophageal perforation due to NGT insertion has been reported in a local Japanese journal [9], and we considered that our case was very rare.
Upper gastrointestinal series performed postoperatively showed that the abdominal esophagus curved forward to the left and dorsal sides. Therefore, we considered that the tip of the NGT penetrated the right wall of the abdominal esophagus vertically due to this abnormal deformity (Fig. 4). The cause of the perforation was suggested to be the previous distal gastrectomy, postoperative adhesion, and prolonged bedrest that resulted in the deformity of the abdominal esophagus. A retrospective study reported that pre-existing anatomical abnormalities was a factor that may predispose to an esophageal perforation by NGT insertion [10]. We consider that his anatomical abnormalities and the poor nutritional status which resulted in the tissue weakness of esophageal wall led to iatrogenic lower esophageal perforation.

Another problem in our case was insufficient confirmation of tube placement. A chest X-ray usually is performed to confirm the position of the NGT tube. In our case, a frontal radiographic view showed the NGT placed in the stomach (Fig. 1). However, in addition to a frontal radiograph, a lateral radiograph is needed to determine the exact position of the NGT.

According to a summary of all reported incidents relating to misplaced NGTs between September 2005 and March 31, 2010 by the National Patient Safety Agency (NPSA), there have been 21 deaths and 79 other cases of adverse effects due to feeding into the respiratory tract through misplaced NGTs. In 45% of the cases, the harm was due to misinterpreted X-rays [11].
Fig 3. Intraoperative findings. The tip of the feeding tube was placed through the right sidewall of the abdominal esophagus into the abdominal cavity.

Fig 4. Upper gastrointestinal series on postoperative day four. Abdominal esophageal flexion toward the left and back sides.
4. Conclusion

If we insert NGTs to patients who are bedridden long-term and previously underwent gastrectomy, we must keep an eye on the possibility of anatomical abnormality of abdominal esophagus and should insert it carefully, not blindly, with a use of frontal and lateral radiograph view or under fluoroscopic guidance.

Conflicts of interest

The authors declare that they have no competing interests.

Funding

This research did not receive any specific funding from agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

I certify that this kind of manuscript does not require ethical approval by the Ethical Committee of Kei’yu Hospital.

Consent

Written informed consent was obtained from the patients and his wife for publication of this case report and any accompanying images.

Author contribution

KI and YN performed the surgery, wrote the paper, made the literature review, and drafted the manuscript. HS, NY, MS, AS, HM advised on the management of this patient as expert surgeons.

Guarantor

Guarantor is Kenjiro Ishii.
The manuscript has been read and approved by all of the authors.

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