



Internal Jugular Vein Injury; A Rare Complication of Nasogastric Tube Insertion

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Abstract

Nasogastric tube (NGT) insertion is a basic interventional procedure used during surgical patient follow-up. In our case, we described the complication that caused internal jugular vein (IJV) injury after NGT insertion. A NGT was inserted in a 55-year-old patient followed in the coronary intensive care unit (ICU). After tube insertion, a large amount of blood came from the tube. Upper gastrointestinal system endoscopy was performed and NGT was not seen in the stomach and esophagus. A neck and chest computed tomography (CT) were then taken. CT showed that NGT was in the left IJV. The patient was immediately taken to neck exploration surgery and the tube was successfully removed from the left IJV. The patient's treatment was completed on the 4th postoperative day in the coronary ICU. This case shows that nasogastric tube insertion, which seems simple, can lead to serious complications in patients.

Keywords: Nasogastric Tube; Internal Jugular Vein; Intensive Care Unit

Introduction

NGT insertion is a unique procedure used in the follow-up of surgical patients and ICU patients. Although this procedure carries a low risk, it can lead to rare serious complications. In our article, we presented a case that caused IJV injury during NGT insertion.

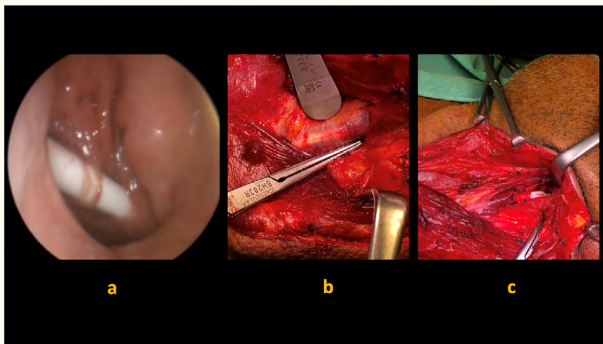
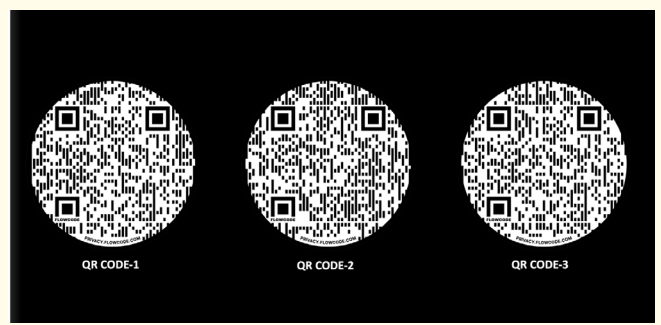
Case Report

A 55-year-old male patient with any known disease was admitted to the cardiology outpatient clinic due to chest and left leg pain. In the examinations, it was seen that he had inferior myocardial infarction and left leg ischemia. On the patient's right coronary artery and left external iliac artery angiography was performed and thrombolytic therapy was given through the catheter. Heparin infusion was started and he was followed up in the coronary ICU. The patient, who received both thrombolytic therapy and heparin infusion, had nausea and hematemesis. In the conscious patient, an 18 Fr NGT with a metallic guide was placed by cardiologist to rule out upper gastrointestinal bleeding in the ICU. After insertion massive hemorrhage came from the tube. NGT placement was checked by insufflation of air and auscultation over the epigastrium.

Auscultation confirmed that the tube was in the stomach. The incoming blood was thought to be due to upper gastrointestinal system (GIS) bleeding. After the procedure, the patient had hoarseness of voice. The patient's complaints of hematemesis continued to increase and the hemoglobin value decreased from 15 g/dl to 12.3 g/dl. A bedside upper GIS endoscopy was performed. No bleeding focus was observed in the esophagus and stomach. Since the NGT was not seen in the esophagus and stomach, the patient was consulted to our otolaryngology clinic. We performed bedside endoscopic laryngoscopy. We determined that the left vocal cord was paralytic and the NGT was not in the oropharynx and larynx. Thereupon, we performed nasopharyngoscopy with flexible endoscope and saw that the NGT penetrated the midline of the nasopharynx and progressed under the mucosa. (Figure 1a, QR Code 1) We thought that the NGT caused vascular injury in the neck and we performed neck and thorax CT of the patient. We aimed to detect the localization of the tube by sending a metallic guide through the tube before the CT imaging. CT showed that the NGT was directed to the left parapharyngeal region under the nasopharyngeal mucosa and cannulated into the left IJV (Figure 2 a,b). The tube followed the left IJV trace

and continued to the left brachiocephalic vein, vena cava superior, right atrium and vena cava inferior (Figure 3 a,b). We immediately took the patient to the operation room for neck exploration.

Under general anesthesia, we made a “J incision” on the left side of the patient’s neck, starting from the mastoid apex and following the anterior border of sternocleidomastoid (SCM) muscle. After skin, subcutaneous and platysma incision, we continued dissection from the anterior border of the SCM muscle. We dissected the IJV from level 4 to level 2. We detected the NGT reflection inside the IJV (Figure 1b, QR Code 2) and determined the NGT was cannulated to the IJV where the IJV crossed the posterior digastric muscle (Figure 1c, QR Code 3). We exposed the jugular vein by dissecting it proximal and distal to the point where the tube enters the vein. We incised the NGT in the vein by clamping it. We removed the distal part of the tube from the jugular vein and the proximal part from the nose and ligated the IJV. We checked with endoscopy whether there is any bleeding at the nasopharyngeal entrance of the NGT. No active bleeding was observed. We placed a NGT to the patient with endoscopy in the operation and fixed the tube securely at 50. cm. After surgical bleeding control, we placed a drain in the surgical field and ended the operation without complications. We transferred the patient to the coronary ICU in a stable condition.



Discussion and Conclusion

NGT insertion is the process of sending a tube from the nose to the stomach, which is used during surgical patient follow-ups. This procedure is performed for many purposes such as gastric lavage in patients after intoxication, enteral nutrition in patients with impaired oral intake, prevention of gastric aspiration in unconscious patients and gastric decompression in patients with ileus.

By sending the NGT through the nostril, it is aimed to pass through the nasopharynx, oropharynx, esophagus and to reach the stomach. During the procedure, patients should be in a slightly sitting position at an angle of 30 - 45. In the presence of nasal septum deviation, the tube may not progress through the nose. In such cases, the tube should not be tried to be advanced through the same nostril again and should be tried to the opposite nostril. The patient should be instructed to swallow when he feels the NGT in his oropharynx. The tube should be advanced while the patient is swallowing. This makes it easier to advance the tube into the esophagus. In unconscious patients, there is no possibility of cooperation with the patient, so there is a risk of the tube may insert to other anatomical regions. To prevent this complication, tube insertion

can be performed with endoscopy. After the NGT is inserted, lavage should be done from the tube and it should be checked whether the stomach contents have come. If gastric contents are coming, it is confirmed that the tube is in the stomach. Another clinical confirmation method is to give 10 - 20 cc of saline or air through the tube. Gastric region auscultation is performed during saline or air administration to check whether the tube is in the stomach. Air or saline should not be given through the tube in patients who do not have gastric contents in the tube lavage. Because additional complications may occur despite the possibility of the tube being in the wrong anatomical region. Other complications during nasogastric tube insertion in the literature include retropharyngeal hematoma [1], tracheal perforation [2], esophageal perforation and stomach perforation [3], intracranial orientation [4]. In some cases, vascular complications such as aorto-esophageal fistula formation [5], subclavian artery injury [6] and jugular vein injury [7] have been reported. Nasogastric tube insertion is contraindicated in the presence of skull base fractures and skull base surgeries due to intracranial orientation [8].

In our case, IJV injury occurred during the NGT insertion. In our patient, the NGT was penetrating to the midline of the nasopharynx and directed to the left parapharyngeal region. It perforated the left IJV and followed the IJV trace. The tube continued to the left brachiocephalic vein, superior vena cava, right atrium, and reached the inferior vena cava. Massive hemorrhage from the tube during lavage was attributed to upper gastrointestinal bleeding due to our patient's pre-procedural complaint of bloody vomiting and presence of suspicion upper GIS bleeding. So 20 cc air was given through the tube which is thought to be in stomach. Since the NGT is in the inferior vena cava, sending air through the tube caused reflected auscultation voice in the stomach. This made the clinician think that the tube was in the stomach. After the patient had massive bleeding from the NGT, bedside upper GIS endoscopy was performed and it was also noticed during this endoscopy that the NGT is not in the stomach and esophagus. In order to accurately determine the location of the tube in the patient neck, a metallic guide was sent through the tube before the CT imaging. In case of presence blood in the tube aspiration after NGT insertion, emergency radiographic confirmation should be performed and the tube location should be determined. In such a case, air or saline should not be introduced into the tube. Air embolism complication of vascular structures may occur in case of vascular placement of the tube. The onset of hoarseness after NGT insertion was also a warning symptom in terms of vagus nerve injury. This case shows how serious complications can be caused by NGT insertion, which seems like a simple interventional procedure.

In a case presented by Smith, *et al.* a 79-year-old patient had IJV perforation during NGT insertion and the patient died. It should be kept in mind that NGT insertion can lead to fatal complications [7]. As in every interventional procedure, systematic evaluation of patients is important.

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