

# Misplacement of nasogastric tube in two different cases: Case report

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**Abstract.** Although the insertion of nasogastric tube has been described as an easy and simple procedure, it may cause severe complications and death. It is therefore important to verify correct nasogastric tube placement. Placement of a nasogastric tube is confirmed using several methods, including auscultation over the epigastric area, aspiration of gastric content from the tube, measuring pH of gastric content and radiological methods. We present the inadvertent insertion of nasogastric tube into the airways, that resulted in respiratory distress, in two different patients to serve as a reminder that malpositioning may cause severe complications.

Key words: Complication, nasogastric tube, respiratory distress, pneumothorax

## 1. Introduction

A nasogastric tube (NGT) is commonly used for stomach lavage and decompression, administration of oral medications and enteral nutrition in critically ill patients (1). The insertion of NGT has been described as an easy and requiring little training. Nevertheless NGT placement may cause severe complications; such as pneumonia, acute respiratory failure, esophageal perforation, bronchopleural fistula, tracheal perforation, bleeding, laryngeal injury, vocal cord paralyses, intracranial entry, intravascular penetration, pulmonary hemorrhage, pneumothorax, pneumomediastinum and death (2-5). Placement of NGT is confirmed several methods; including observing signs of respiratory problems, auscultation, aspiration of gastric content from the tube, measuring pH of gastric content, capnography, chest X-ray, ultrasonography and electromagnetic trace (5-7).

## 2. Case reports

### 2.1. Case

A 61-year-old female patient with hypertension, diabetes mellitus, and heart failure was admitted to the emergency service for gastric pain, nausea and vomiting. The patient has low urinary output, anorexia and constipation for the last three days. The patient was conscious and cooperative. On physical examination, the patient had tachycardia (105 beats/min), hypotension (100/55 mmHg), decreased breathing sounds and saturation (SpO<sub>2</sub>: 91%, obtained while breathing 4L/min oxygen via a face mask), increased abdominal distention and rebound tenderness. The patient's laboratory findings were normal except hemoglobin: 10.3 gr/dL (12.2-18.1), Na: 127 mEq/L (136-145), creatinin: 4.6 mg/dL (0.7-1.4) and glucose: 11.71 mmol/L (4.0-5.6). The NGT was inserted after repeated attempts. The patient suffered coughing, agitation, respiratory distress and decreased SpO<sub>2</sub> levels to 60-63% during NGT placement. After oxygen therapy with face mask had been applied, the patient's saturation was increased to 86%. Desaturation during the NGT insertion was thought to be associated with laryngospasm due to local irritation. NGT position was evaluated firstly by auscultation. On auscultation, the rhonchus was heard on the left hemithorax merely. Insufflation of air through the NGT over the epigastric area was heard muffled low sound

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like gurgling by auscultation, but the gastric content was not aspirated. And then, the patient was taken to the X-ray room for chest and abdominal radiography as scheduledly. Chest radiography revealed the NGT had bent over itself to travel into the both main bronchi (Fig. 1). The NGT removed immediately. The bronchodilators and oxygen via a face mask were given to the patient. SpO<sub>2</sub> level was increased to over 90% again. After the patient was monitorized and followed up in emergency unit, who consulted for first present problems by clinics of gastroenterology and general surgery.



Fig. 1. (Case 1) Placement of nasogastric tube is into the main bronchi.

### 2. 2. Case

A 33-year-old male patient was hospitalized at the intensive care unit (ICU) as the result of a traffic accident. The patient had one dilated pupil than another, paraplegia due to C2 spine fracture, localized pain on his right upper extremity with extension on his left upper extremity. The patient was intubated and mechanically ventilated. The patient's Glasgow coma scale (GCS) was 7. The other physical examination and laboratory findings were normal. The NGT was changed on the 30<sup>th</sup> day. Correct positioning of the NGT was evaluated by clinical means using insufflation of 50 mL of air into the tube. The 50 mL of air was insufflated and gurgling like low sound was heard over the epigastrium by auscultation. Any respiratory problem was not seen during NGT insertion. But on the first day of insertion of the NGT, respiratory sounds decreased on the right

side, also tidal volume decreased and airway pressures increased. A chest radiography revealed the tip of NGT lay in the pleural space on the right side (Fig. 2). A chest tube was inserted on the right side. On the follow-up, the pneumothorax decreased and eventually ceased.



Fig. 2. (Case 2) Nasogastric tube placement is in the right hemithorax.

### 3. Discussion

In these cases, NGT misplacement was seen into the both main bronchi in first case and in the pleural space on the right hemithorax in second case. Because desaturation, during NGT insertion, had been treated with oxygen, the possibility of malpositioning was not thought in first case. Additionally, our second case had no respiratory problem during NGT insertion. In both cases, despite low sounds like gurgling were determined by epigastric auscultation, radiography was revealed misplacement. Respiratory problems associated with airway were a common finding in both cases.

Where gastrointestinal access is safe, it is routinely used to administer enteral medicines and nutrition in critically ill patients. The insertion of NGT is an easy and simple procedure, but it can be misplacement. Unconscious patients, supine position, absence of gag reflexes, preexisting lung disease and mechanical ventilated patients may predispose to misplacement of NGT (5,6). Head trauma may predispose to intracranial penetration (4). Sparks

et al (5) reported to the incidence of inadvertent insertion of NGTs into the airways as 1.9% and mortality is approached over 20% in patients with respiratory tract misplacement. Inadvertent insertion of NGTs can occur in high-risk patients, such as unconscious, awaked, agitated, traumatized, mechanically ventilated patients and patients with endotracheal intubation or tracheostomy (5,6,8-11). Most misplacements of NGTs in intubated patients involved small-bore tubes inserted using a guide-wire (8,10,12). In two cases of misplacement in conscious patients (11,13), both occurred using fine-bore tubes, one with a guide-wire, one without. Our first case was conscious and agitated, and the large-bore NGT, without a guide-wire was placed. This has not been previously reported in the literature. Our second case was sedated and had tracheostomy and we used a wire-guided fine-bore tube.

Conventional signs to verify correct tube placement includes absence of coughing or respiratory distress during the placement, auscultation over the epigastric area and aspiration of gastric content from the tube. However, these methods fail to detect most misplacements. Auscultation is a simple, convenient method and commonly used to evaluate the NGT position in most of clinics. But it cannot distinguish between esophageal, gastric, bowel and respiratory tract placement (7,14). So that the incorrect confirmation of NGT placement in the stomach by epigastric auscultation is not rare. Taylor (7) reported that measuring pH of gastric content was recommended as first-line confirming method. But most of clinics have not used this method because of requiring pH meters and strips. Kim et al. (6) did not recommend that this method in emergency unit due to false negative results in some patients with no gastric aspirate. Kim et al. (6) stated to use verified method to first-line as auscultation, second-line as ultrasonography, and if this method could not verify correct placement, chest X-ray would be necessary. A chest X-ray is regarded as the gold standard for verifying correct tube placement (3). The NGT should be made of radiopaque material therefore position can be confirmed radiologically but at the expense of the procedure and delay before feeding (7).

We corrected the misplacement of NGT by conventional technique by the aid of the findings about the misplacement of NGT determined on chest X-ray.

It is important to verify correct place of a NGT in high risk patients. The insertion of NGT can be incorrect especially in awake, agitated,

traumatized patients, and patients with tracheostomy or intubation. Nevertheless, chest X-ray indicates the correct position of NGT accurately without other innovative methods; such as pH meter, ultrasonography and electromagnetic trace. In conclusion, in high risk patients, radiography is better method of verifying tube placement than other conventional methods.

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