

## 'Nutrothorax' due to misplacement of a nasogastric feeding tube

### ABSTRACT

We report a serious complication of blind nasogastric feeding tube insertion in a 65-year-old female patient, which was overlooked and caused severe respiratory failure.

### KEYWORDS

Chemical pleuritis, (hydro)pneumothorax, nasogastric feeding tube, thoracostomy tube

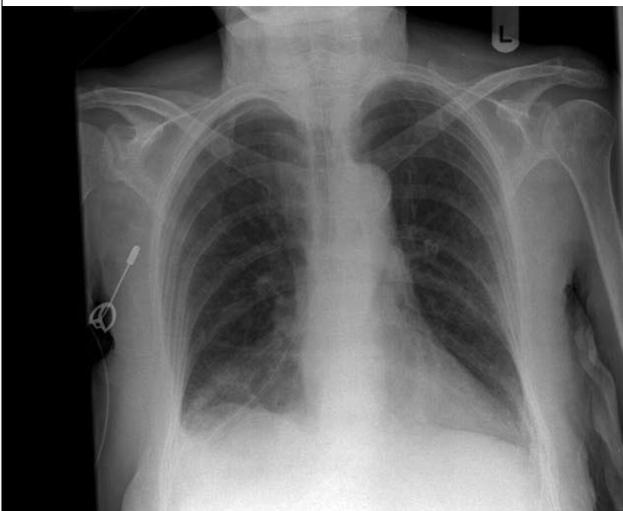
### CASE REPORT

A nasogastric tube (18 Ch, Kendall-Argyle feeding tube) was inserted for nutritional support by a home care nurse. The patient suffered from malnutrition caused by a vital depression. Blind insertion of the tube was difficult but gurgling was heard over the epigastrium during air insufflation. Control chest X-ray was assessed by an on-call junior doctor who confirmed the correct position of the tube (figure 1). Enteral feeding was started through the nasogastric tube.

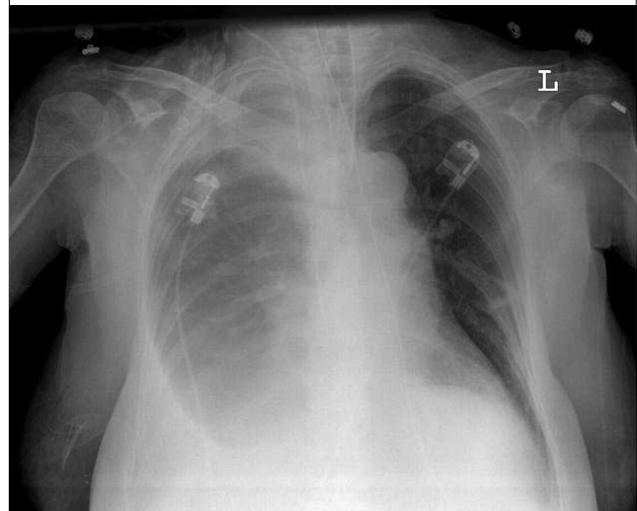
Next day, the patient presented to the emergency room with cough, tachypnoea and fever. Chest X-ray showed a significant right-sided pleural effusion and collapse of the right lower lobe (figure 2). Arterial blood gases showed a pH 7.17 (7.35 to 7.45), PaCO<sub>2</sub> 7.2 kPA (4.5 to 6.0 kPA), PaO<sub>2</sub> 6.5 kPA (9.5 to 13.0 kPA), HCO<sub>3</sub><sup>-</sup> 15.5 mmol/l (22 to 26 mmol/l), BE -11 mmol/l (-2.0 to 2.0 mmol/l), and SaO<sub>2</sub> 86% (92 to 99%) with 10 l/min O<sub>2</sub> through oxygen mask

The patient was immediately intubated and admitted to the intensive care unit. Laryngoscopy confirmed the endotracheal placement of the nasogastric tube. The tube could be removed without resistance. Control chest X-ray showed a massive pleural effusion and possible hydropneumothorax of the right lung. Revision of the initial chest X-ray revealed the malpositioned tube that was initially missed. A right-sided closed-tube thoracostomy was performed and returned approximately 900 ml of enteral nutrition (figure 3). Intercostal drainage did not resolve the pneumothorax even after insertion of a second thoracostomy tube. Computer tomography (CT) scan of the chest showed a right-sided anterior pneumothorax and a significant dorsal pleural effusion (figure 4). CT-guided insertion of an intercostal drain resulted in a complete resolution of the pneumothorax.

**Figure 1.** Control chest X-ray after blind insertion of the nasogastric tube, showing malpositioning of the tube



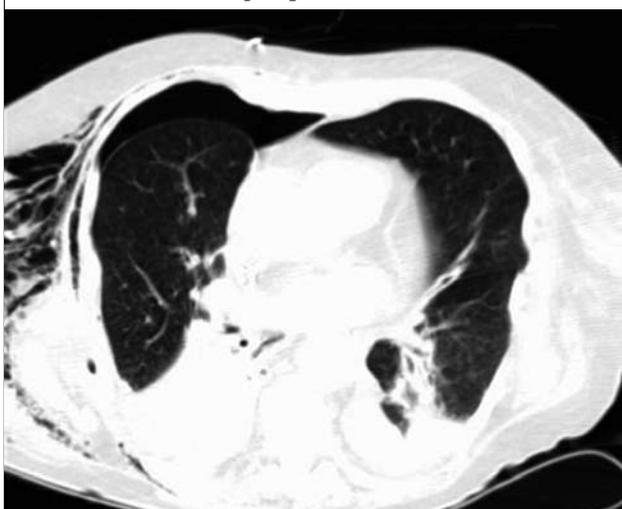
**Figure 2.** Chest X-ray the next day, showing right sided pleural effusion and collapse of the right lower lobe



**Figure 3.** Enteral nutrition that was drained after insertion of a right-sided thoracostomy tube



**Figure 4.** CT-scan of the chest, showing a right-sided pneumothorax and a significant dorsal pleural effusion, with the thoracostomy in place



## DISCUSSION

Nasogastric feeding tubes are frequently used in conscious patients. Introduction is performed blindly and is considered a safe procedure. However, complications do exist especially in patients with an altered mental status with decreased cough or gag reflex.<sup>1</sup> Misplacement of a nasogastric tube is a well-known complication of a blind insertion technique.<sup>2</sup>

The rate of inadvertent insertion of nasogastric tubes into the trachea and distal airways varies from 0.3 to 15%.<sup>3</sup> Introduction of chemicals into the lungs and pleural spaces may cause severe aspiration pneumonia, hydrothorax, haemothorax, empyema, delayed pneumothorax and in our case a 'nutrothorax'.<sup>3</sup>

Physical examination is a poor predictor of tube malpositioning. The placement of a nasogastric tube is usually evaluated by aspirating fluid from the proximal port or insufflating air while auscultating the epigastric area. However, both techniques may yield false-positive results. Penetration into the pleural cavity has been reported and is a potentially lethal complication. It is always necessary to be alert with respect to the tube position, especially if the patient develops respiratory symptoms after insertion. Radiological confirmation is the gold standard. However, as our case shows, correct interpretation of the chest radiograph is an essential final step in the proper confirmation of the position of the nasogastric tube.<sup>4,5</sup> If this had been done correctly, our patient would not have experienced this rare complication.

## ACKNOWLEDGEMENT

We would like to express our gratitude to R.H.A.M. Kneepkens, radiologist, for his contribution.

**L.E.M. Haas, D.H.T. Tjan\*, A.R.H. van Zanten**

Department of Intensive Care Medicine, Gelderse Vallei Hospital, Ede, the Netherlands, \*corresponding author: tel.: +31 (0)318-43 41 15, fax: +31 (0)318-43 41 16, e-mail:icu@zgv.nl

## REFERENCES

1. Kawati R, Rubertsson S. Malpositioning of fine bore feeding tube: a serious complication. *Acta Anaesthesiol Scand* 2005;49:58-61.
2. Marderstein EL, Simmons RL, Ochoa JB. Patient safety: effects of institutional protocols on adverse events related to feeding tube placement in the critically ill. *J Am Coll Surg* 2004;199:39-50.
3. Boyes RJ, Kruse JA. Nasogastric and nasoenteric intubation. *Crit Care Clin* 1992;8:865-78.
4. Torrington KG, Bowman MA. Fatal hydrothorax and empyema complicating a malpositioned nasogastric tube. *Chest* 1981;79:240-2.
5. Hendry PJ, Akyurekli Y, McIntyre R, Quarrington A, Keon J. Bronchopleural complications of nasogastric feeding tubes. *Crit Care Med* 1986;14:892-4.