Case Report

How Safe is Ryle's Tube Feeding ?

Kuligod FS,* Jirli PS,** Hareesh SG, Gurudut KS,******

ABSTRACT

Administration of fluid diet by nasogastric tube is indicated in patients who are unable or unwilling to take sufficient nourishment by mouth. Ryle's tube is one among such devices, which is commonly used for feeding unconscious patients, and for performing stomach wash in cases of suspected poisoning. But before using this tube for any procedure it is imperative to check the correct position of the distal end of the tube. This is because, occasionally the tube may inadvertently enter the airway instead of the gastrointestinal tract. In rare cases, even when the tube is positioned in the gastrointestinal tract, fatality can result. A case is reported here in which, an adult male with a history of head injury was admitted to the hospital in an unconscious state, and died after a period of about 12 hours following admission. At autopsy, food particles were seen in the lung parenchyma, which indicated faulty positioning of Ryle's tube that had led to fatality. Chest X-ray showed the Ryle's tube curving at the fundus of the stomach and re-entering the oesophagus.

Key Words: *Ryle's tube, parenteral feeding, food aspiration*

Introduction

In today's medical practice a number of devices for diagnostic and therapeutic purposes are available. Ryle's tube is one among such devices. It is made of soft, clear, kink-resistant PVC tube that is inserted through the nose, down the back of the throat, through the oesophagus and into the stomach. Radiopaque lines are present throughout its length. The distal end of the tube is rounded, blunt, and contains stainless steel corrosion-resistant balls to assist the passage of the tube during intubation, and for X-ray identification. There are four lateral openings at the distal end for easy distribution of fluid into the stomach, or for easy aspiration of gastric contents. The proximal end has three markings at different levels which help in determining the position of the distal end inside the digestive tract.

Ryle's tube is used for feeding and administration of drugs to those who cannot imbibe enough quantities of the same,[1] for gastric decompression in cases of burns, especially when the patient has to be transported,[2] for stomach wash in cases of suspected poisoning,[3] and to deflate the upper gut in paralytic ileus or mechanical obstruction.[4] However, if the distal end of the tube is not properly positioned, it can lead to complications and death.

The Case

The victim was an adult male who had sustained head injury in an accident at around 2.30pm one afternoon, was admitted to the hospital on the same day at 5.40pm, and succumbed to his injuries while under treatment at 5.10am the next day. He had survived for about 15 hours. The deceased had been in an unconscious state since the time of accident, and there were no episodes of vomiting before or after admission to the hospital.

At the time of admission, all vital parameters were within normal limits. Glasgow coma scale (GCS) score was 3/15. Both pupils were dilated and non-reactive to light. Examination of other systems was essentially normal. CT scan revealed diffuse cerebral oedema with fracture of frontal and occipital bones. Ryle's tube was

*Professor (*Corresponding author*),
**Assistant Professor,
***Postgraduate Student,
Dept of Forensic Medicine, Jawahar Lal Nehru Medical College, Belgaum 590010, Karnataka, India

introduced one hour after admission. Subsequent examinations done at different intervals showed no improvement in the condition of the patient. On auscultation at 3.30am, bilateral coarse crepitations were heard over the lung fields. The doctor on duty advised X-ray of chest. The patient expired at 5.30am.

The attending doctor furnished the cause of death as "depressed fracture of left occipital bone, fracture of frontal bone, and fracture of both nasal bones, with diffuse cerebral oedema, and pneumocephalus due to road traffic accident."

Autopsy was performed at 9.30am later the same day and revealed the following findings:

External - Bleeding from both nostrils, bilateral black eyes, sutured wounds of scalp, and some abrasions over the face.

Internal - Haematoma of scalp over temporal and occipital areas, depressed fractures of frontal and occipital bones, multiple fissured fractures of the base of the skull, extradural haemorrhage over left temporal and occipital lobes, and diffuse subarachnoid haemorrhage. The brain was pale on cut section, with features of cerebral oedema. Trachea, bronchi, and both lungs were congested, with whitish food particles in the lumen of trachea, bronchi, and terminal alveoli. About 150ml of greenish fluid with some rice (without any specific smell) was present in the stomach. All other viscera were congested, but otherwise normal.

The cause of death was opined as "Respiratory failure due to cerebral oedema, as a result of head injury, and aggravated by aspirated material in the respiratory tract"

Discussion

Ryle's tube is commonly used for feeding unconscious patients, and for gastric lavage in cases of suspected poisoning for removal of unabsorbed poison from the stomach (though this is not one of its recommended uses). While undertaking this procedure, it is of paramount importance to ensure that the distal end of Ryle's tube is properly positioned. The markings present on the proximal end will help to ensure this to some extent. When the first marking approximates the nose it indicates that the tube has reached the level of the cardiac end of stomach; similarly the second marking denotes the fundus of stomach, and the third one the pylorus.

There are also two bedside tests that help in confirming the position of the distal end of the tube: pushing air with the help of syringe through proximal end and auscultating for the sound over the epigastrium, and aspiration of gastric contents and testing for its acidic nature by litmus paper (conversion of blue litmus to red).[5] But in this particular case, the chest X-ray reveals that the Ryle's tube curved upon itself at the fundus of stomach, and re-entered the oesophagus. This indicates that sufficient length of the tube was inside the digestive tract; which means that one cannot rely on the markings present at the proximal end in all cases for determining the position of the distal end. The X-ray film also shows the tip of the Ryle's tube at the level of T_8-T_9. The oesophagus ends by opening into the stomach at T_{11}, and the fourth hole of the tube lies about 10cm from the tip. So in this case there was the possibility of getting stomach contents on aspiration through the syringe. Therefore these two bedside tests might have been positive in this case. In the case of slightest doubt about the correct position of the distal end, it is always advisable to take an X-ray for confirmation.[6]

Conclusion

Textbooks always emphasize the importance of confirming the position of the distal end of Ryle's tube before beginning the feeding procedure, to make sure that it is in the digestive tract. This is because in an unconscious patient, there is always the possibility of Ryle's tube entering the respiratory tract. But in this case, though the tube was in the digestive tract, it caused complications due to entry of food particles into the lungs through the re-entered tube in the oesophagus. Thus the Ryle's tube, which is a life saving device, can contribute to death if its distal end is not in place at the time of feeding.

References

1. Ellis BW. Hamilton Bailey's Emergency Surgery. Oxford: Butterworth-Heinemann Ltd. 12th edn, 1995. p. 18-19.
2. Schwartz, Seymour I. Principles of Surgery - Companion Handbook. New York: McGraw-Hill. 7th edn,1999. p. 191
3. Mehta PJ. Practical Medicine for Students and Practitioners. Mumbai: National Book Depot. 13th edn, 1998: p. 343.
4. Hasler A, William L, Chung O. Approach to the Patient with Gastroenteric Disease. In: Harrison's Principles of Internal Medicine. New York: McGraw Hill. 17th edn, 2005. p. 1729.
5. Georgieff MK. Nutrition. In: Neonatlogy - Pathophysiology and Management of the Newborn. Avery BG, Fletcher MA, McDonald MG, editors. Philadelphia: Lippincott Williams & Wilkins. 5th edn, 1999. p. 383
6. Baron S, Robert B. Nutrition. In: Current Medical Diagnosis and Treatment. Tierney A, Lawrence M, Stephen J, Papadikis S, Maxine A, editors. New York: McGraw-Hill. 2005. p. 1237