Traumatic False Passage of Nasogastric Tube Between The Esophageal Mucosa And Submucosa In Extreme Preterm Infant Without Perforation: The First Neonatal Case Report From Oman

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Abstract

Preterm infants in general are highly susceptible to traumatic injuries following any necessary medical interventions. Nasogastric Tube (NGT) is one of them. Many literatures reviewed the possible post NGT-insertion complications and challenges. This article presents one challenge which was not discussed before. It happened in our neonatal intensive care unit (NICU) to a neonate born at 27 weeks plus three days of gestation, with barium swallow study showing malposition of the NGT by going to a false tract between the esophageal mucosa and sub-mucosa, relatively without causing any perforation or complications. In addition, the article summarizes the diagnostic approach of NGT malposition, reviews similar cases in the literature, and discusses how to manage it successfully in neonates.

Keywords: preterm infant, nasogastric tube, barium swallow, esophageal mucosa and submucosa, perforation, malposition.

Introduction

Nasogastric tube (NGT) insertion is a routine and essential procedure in neonatal intensive care units (NICUs), especially for feeding extremely low birth weight (ELBW) infants. Despite being considered simple, NGT insertion carries the risk of malposition, which may lead to serious complications such as aspiration, mucosal trauma, esophageal perforation, or even pneumothorax. According to previous studies, the incidence of malpositioned NGTs in neonates can be as high as 21%.[1] ELBW infants are at particular risk due to their fragile tissues, anatomical immaturity, and the frequent need for prolonged enteral feeding. Most reported cases of NGT malposition involve perforation or pulmonary complications; however, submucosal passage without perforation is exceptionally rare and often underdiagnosed. Early detection and proper management are critical to preventing further injury. This report describes a rare and likely first neonatal case in Oman of false passage of NGT into the esophageal submucosa without perforation, confirmed via barium study.

Case Report

A female twin neonate was delivered at 26 weeks plus three days of gestation via emergency lower segment cesarean section due to draining liquor and clinical chorioamnionitis. Her birth weight was 740 grams. She required immediate intubation due to poor respiratory effort and was administered one dose of surfactant and started on antibiotics for presumed early-onset sepsis.

A 5 Fr polyvinyl nasogastric tube was inserted on day 3 of life for feeding. The tube was inserted blindly by a trained nurse with the standard procedure of auscultation using a stethoscope and checking for gastric aspirate pH <5.5 to confirm position. However, soon after feeding was initiated, the milk was noted to be regurgitating from the mouth and mixed with secretions. No signs of respiratory distress or desaturation were noted.

Chest and abdominal radiographs revealed the NGT tip was located higher than expected, at the gastroesophageal junction, raising suspicion for malposition [Figure 1].

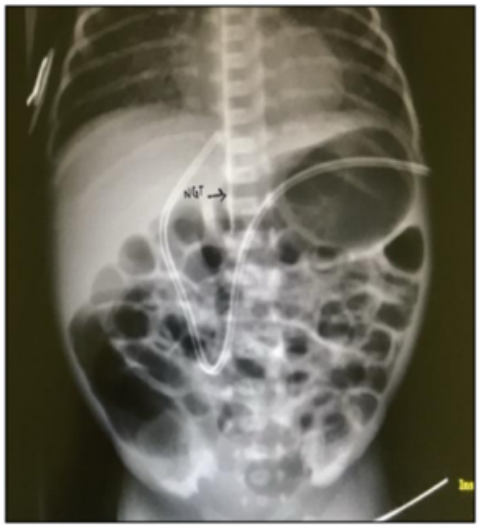

Figure 1: Chest and abdomen x ray showing NGT appears along the midline of the chest and upper abdomen, slightly high in the gastroesophsgeal junction, and not curling in the stomach.

A pediatric surgeon was consulted, and a barium swallow contrast study was performed. The study demonstrated that the NGT had entered a false tract between the esophageal mucosa and submucosa without any evidence of perforation, fistula, or leak (Figure 2).

Figure 2: Barium swallow, water-soluble contrast injected through oral esophageal tube using feeding tube. The esophagus is well opacified with contrast. No evidence of narrowing, leak or dilator ion. The distal end of feeding tube is passing through false lumen and hence it was withdrawn at the end of the study.

The tube was immediately removed, and a new NGT was inserted under fluoroscopic guidance, ensuring correct placement in the gastric lumen (Figure 3).

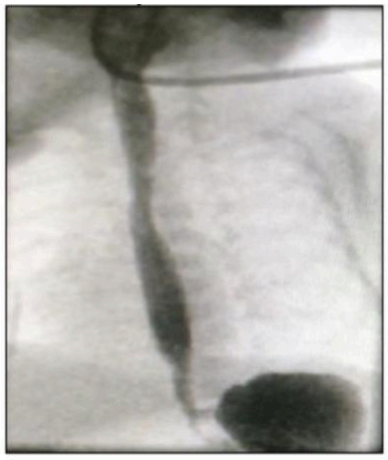

Figure 3: Barium swallow: water soluble GI contrast study is performed through esophageal feeding tube. The stomach outlines the esophagus and stomach. The opacified tract is the true lumen; NGT pushed into the stomach.

Position was reconfirmed on a follow-up chest X-ray (Figure 4).

Figure 4: NGT in situ.

The new tube was kept in place for 4 weeks, and feeds were gradually advanced as the baby gained weight and tolerated feeding well. At corrected age of 35 weeks plus 3 days, the infant was discharged home in good condition, feeding orally and attending neonatal follow-up.

Discussion

NGT malposition is a well-recognized yet underreported complication, particularly in preterm and ELBW infants due to their delicate tissues. The most common signs of malposition include failure to aspirate gastric contents, feeding intolerance, regurgitation, or respiratory symptoms. In our case, the only clinical clue was regurgitation of milk mixed with secretions.

The etiology of this malposition may relate to multiple factors: the type and stiffness of the feeding tube (in this case polyvinyl, which is less flexible than silastic), anatomical immaturity of the esophagus, and the blind insertion technique. Studies from neighboring Gulf countries and global literature have reported NGT complications such as pulmonary placement or esophageal perforation.[2–4] However, submucosal malposition without perforation is extremely rare.

Prevention requires adherence to protocols including pH testing, radiographic confirmation of tube position before first feed, and early suspicion when feed intolerance occurs. Use of softer tubes such as silastic or polyurethane might reduce the risk of mucosal trauma. Repeated attempts at NGT insertion should be avoided. In cases of doubt, contrast studies and fluoroscopy provide definitive diagnosis and safe re-insertion.

The Lessons learned: Clinicians should maintain a high index of suspicion for NGT malposition in preterm infants with feeding intolerance, even if no acute signs of perforation or distress are present. A careful review of radiographs, consideration of tube type, and prompt use of contrast imaging can prevent serious complications.

Comparison with literatures

A review of the literature reveals multiple reported cases of nasogastric/orogastric tube–related esophageal injuries in preterm or extremely low birth weight (ELBW < 1000 g) infants, including gulf cases [Table 1].[5-15] While many involve perforation and serious complications, false passage between the esophageal mucosa and submucosa without overt perforation—as observed in our report—is rare or previously undocumented.

Table 1: Review of literature.

Study Location	GA / Birth Weight	Tube Type	Complication	Diagnosis & Management	Outcome
Austria	ELBW (<1000 g)	Narrow-bore NGT	Esophageal perforation with fluidothorax	Contrast X-ray; conservative	Survived
Canada	GA 25+5 weeks, 430 g	Oro-gastric tube	Esophageal perforation, pneumomediastinum	X-ray; antibiotics, drainage	Died at 49 hours
Poland (multicenter)	<750 g group	Polyvinyl NGT	Pleural, high, and intra-abdominal perforations	Radiographic confirmation, drainage, antibiotics	~37% mortality in <750 g
Iran	Term, 2800 g	NG tube	Esophageal perforation	X-ray; conservative management	Complete recovery
Italy	VLBW (<1500 g)	NGT (unspecified)	Esophageal, gastric, hepatic perforations	Surgery or conservative care	Survived; prompted tube change
Kuwait	Preterm infant (N/R)	NG tube	Esophageal perforation with pericardial sac injury	X-ray, CT, surgical drainage	Survived
Saudi Arabia	1.7 kg preterm twin, 28 wks	Orogastric tube	Misdiagnosed airway obstruction / esophageal perforation	Contrast study, conservative care	Survived (discharged at 2 mo)
India	26 wks, 700 g	NGT/orogastric tube	Esophageal perforation with pneumothorax	Contrast X-ray, chest tube, conservative	Survived

Oman (this report)	26+3 wks, 740 g	5 Fr polyvinyl NGT	Submucosal false passage without perforation	Barium swallow; fluoroscopic-guided reinsertion	Survived, full recovery

Disclosure

There is no conflict of interest regarding the publication of this paper. Verbal consent was taken.

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