

Nasogastric Tube Impaction with Metal-Like Stiffening: A Rare Long-Term Complication

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1. Abstract

1.1. Background: Nasogastric tube (Ryle's tube) is frequently used for enteral feeding in patients with inability to take oral nutrition. While rare, complications such as stiffening, chemical degradation, and impaction can present significant challenges.

1.2. Case Presentation: We report a case of Ryle's tube impaction in a 67-year-old female with multiple comorbidities, including intracerebral hemorrhage (ICH), Parkinson's disease, diabetes mellitus, and hypertension, who had been on prolonged levetiracetam therapy. During a routine tube replacement, impaction was noted, requiring endoscopic removal. The extracted tube was found to be abnormally rigid and structurally altered. Two additional cases with similar findings and a common history of long-term levetiracetam use raised concerns about a potential association between the medication and Ryle's tube degradation.

1.3. Conclusion: This case highlights the importance of timely Ryle's tube replacement and suggests the need for further research into the potential effects of levetiracetam and other medications on PVC-based feeding tubes.

2. Keywords: Ryle's tube/ Nasogastric tube impaction, PVC degradation, levetiracetam, endoscopic removal, gastric reaction

3. Introduction

Nasogastric (Ryle's) tubes are commonly used for enteral feeding in patients with swallowing difficulties or prolonged nutritional support requirements. While routine tube replacement is a standard practice, rare complications such as tube stiffening, degradation, and impaction can pose significant clinical challenges. Chemical degradation of polyvinyl chloride (PVC)-based Ryle's tubes due

to prolonged

exposure to gastric contents and medications remains poorly understood. This report presents a case of Ryle's tube impaction requiring endoscopic intervention and discusses two additional cases with similar findings, suggesting a possible link to long-term levetiracetam use.

4. Case Report

A 67-year-old female presented to the emergency department with complaints of difficulty in feeding through the nasogastric tube. She had a history of intracerebral haemorrhage (ICH), Parkinson's disease, diabetes mellitus, and hypertension and was on long-term levetiracetam therapy for seizure prophylaxis, along with Human Mixtard for diabetes and Arkamine 0.1 mg for hypertension.

On presentation, the patient was hemodynamically stable, and her general and physical examination were within normal limits. Systemic examination revealed reduced power in right upper and lower extremities along with difficulty in speaking, which was attributed to the sequelae of a previous cerebrovascular accident (CVA).

On initial evaluation, the nasogastric tube was found to be blocked, leading to inadequate enteral feeding. The patient was then managed with intravenous fluids, proton pump inhibitors, and supportive measures. A decision was made to replace the Ryle's tube; however, attempts at manual removal were unsuccessful and the patient exhibited signs of distress. The tube remained firmly in place despite traction attempts.

An ENT consultation was sought, during which the ENT team assessed the patient and noted that the Ryle's tube appeared to be impacted within the esophagus. Given the suspected lower esophageal impaction, the case was referred to the gastroenterology department for further evaluation and intervention.

The gastroenterology team attempted manual removal, but the tube remained fixed in place. Due to the failed extraction attempt, the patient was scheduled for esophagogastroduodenoscopy (OGD scopy) under sedation for endoscopic retrieval.

Under appropriate sedation and following standard protocols, the patient underwent OGD scopy to assess the level of impaction and facilitate the removal of the Ryle's tube.

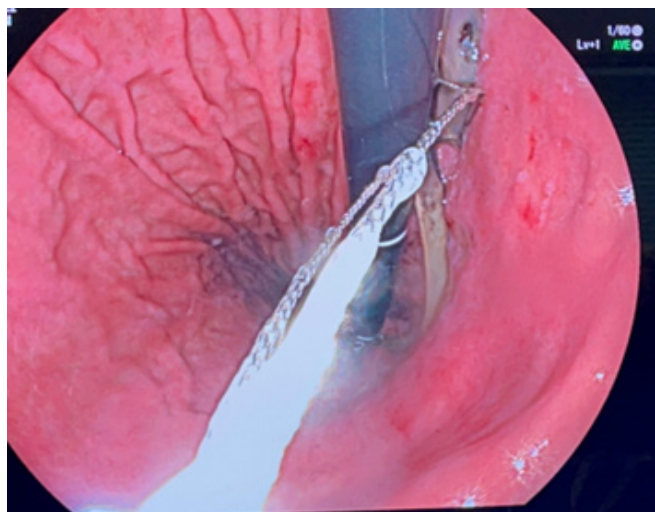
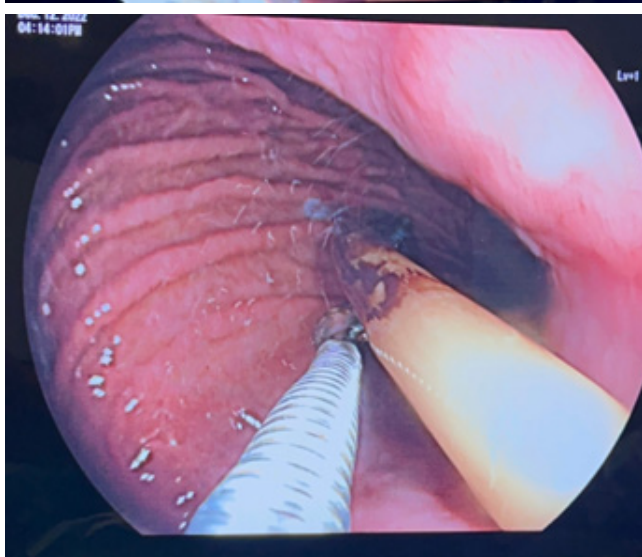
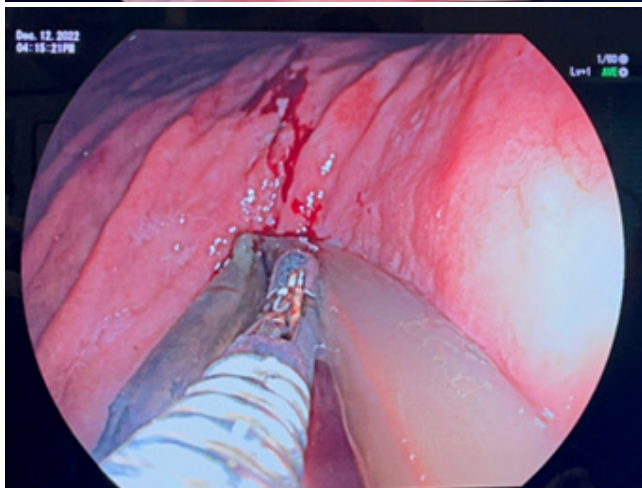
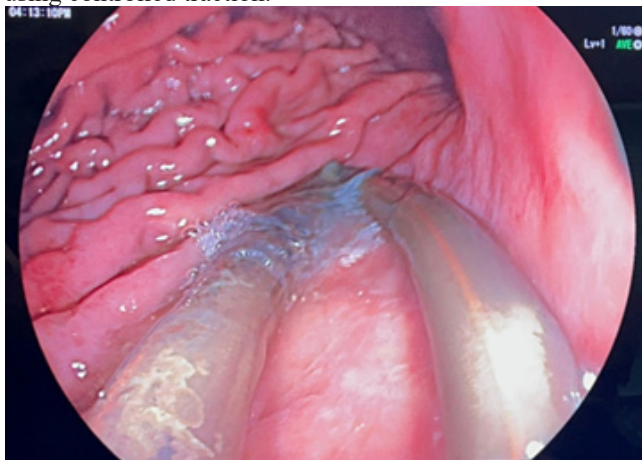
5. Endoscopic Findings and Procedure

The Ryle's tube was impacted within the esophagus, causing mucosal erosions. The tube was kinked and embedded in the esophageal mucosa, complicating removal. Additionally, the tube exhibited significant stiffening, making

International Journal of Gastroenterology and Hepatology

standard cutting tools ineffective.

A snare and forceps were introduced through the endoscope, and attempts were made to straighten the Ryle's tube. However, due to the tube's extreme thickness and rigidity, correcting the kinking was unsuccessful. As a result, a snare was passed through the endoscope, and the kinked Ryle's tube was tightly secured to the endoscope. The tube was then removed along with the endoscope using controlled traction.



Upon removal, the tube was found to be extremely rigid, exhibiting metal-like stiffness, raising suspicion of chemical degradation secondary to long-term medication exposure.

Following the procedure, a plain chest X-ray (PA view) was performed to rule out perforation. After confirming the absence of perforation, a new Ryle's tube was inserted, and enteral feeding was resumed without complications.

6. Similar Cases

Two additional patients presented with Ryle's tube impaction, necessitating endoscopic retrieval. Both patients had a history of prolonged levetiracetam therapy for seizure prophylaxis. In both cases, manual removal of the tube was unsuccessful, and OGD scopy was required for extraction. These cases raise concerns about a possible association between long-term levetiracetam use and PVC degradation.

7. Discussion

Nasogastric tubes have long been utilised for nutritional support in stroke patients and individuals with swallowing impairments. However, their prolonged use is increasingly being replaced by percutaneous gastrostomy due to the risk of complications. While nasogastric tubes are generally well tolerated, complications occur in approximately 0.3–0.8% of patients[1].

Chemical interactions between polyvinyl chloride (PVC)-based Ryle's tubes and gastric contents, particularly in the presence of certain medications, may lead to tube degradation, stiffening, and eventual impaction[2]. Although the exact role of levetiracetam in this process remains unclear, its common usage among affected patients raises suspicion of a potential link. Prolonged exposure to gastric acidity and potential drug-induced chemical reactions may weaken the tube structure, increasing the risk of impaction. Structural changes, such as stiffening and kinking, can complicate removal and necessitate endoscopic intervention, as observed in this case.

Timely replacement of Ryle's tubes is essential to prevent structural

International Journal of Gastroenterology and Hepatology

degradation. Current guidelines recommend a maximum duration of seven days for wide-bore tubes and up to two months for fine-bore tubes[3]. Regular monitoring of patients with long-term Ryle's tube placement is equally important to detect early signs of tube degradation and prevent complications.

Further research is warranted to assess whether levetiracetam or other medications contribute to PVC degradation and whether alternative materials or coated tubes could mitigate such complications.

8. Conclusion

Ryle's tube impaction is a rare but significant complication requiring endoscopic intervention. This case highlights the need for vigilant monitoring in patients with long-term nasogastric tube placement, particularly those on medications like levetiracetam. Regular tube changes and exploration of alternative tube materials may help mitigate such risks. Further research is warranted to investigate medication-induced PVC degradation and its implications for patient safety.

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