

Nasogastric tube migration through a distal esophageal perforation into the pleural space in a nonagenarian woman with recurrent empyema: a case report

Reda Ibrahim¹

drredaahmed83@yahoo.com

Al Hammadi Hospital

Safouq Al-Anazi¹

Al Hammadi Hospital

Case Report

Keywords: nasogastric tube, esophageal perforation, pleural empyema, pleural space, enteral nutrition, iatrogenic complication

Posted Date: October 6th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11079033/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Nasogastric tube (NGT) placement is frequently used for enteral access in critically ill patients. Esophageal perforation with intrapleural tube migration is rare but can cause major pleural contamination, infection, and respiratory complications. We report an unusual case of recurrent right-sided empyema associated with an NGT traversing a distal esophageal perforation into the right pleural cavity.

Case presentation

A 90-year-old woman with hypertension, diabetes mellitus, chronic kidney disease, previous cerebrovascular accident, severe neurological impairment, tracheostomy, and chronic mechanical ventilation was transferred from another healthcare facility on 11 October 2023 for management of recurrent right pleural empyema. The NGT had been inserted at the referring facility during September 2023; the available records did not document how its position was verified before use, whether insertion was difficult, or whether repeated attempts were required. On admission she had a Glasgow Coma Scale score of 6/15 but was hemodynamically stable. A right intercostal chest tube was draining purulent material, and the original case documentation noted drainage resembling enteral feed. Chest CT demonstrated the distal NGT within the right pleural space, with pleural effusion and gas bubbles, consistent with an esophago-pleural communication. Following multidisciplinary review, she underwent urgent esophageal repair and right lung decortication on 14 October 2023. Postoperatively she remained nil per os and received total parenteral nutrition and culture-directed antimicrobial therapy. A Gastrografin study on 22 October was inconclusive, and CT raised concern for possible postoperative contrast extravasation; pharyngo-esophagoscopy on 23 October demonstrated no active leak. Enteral feeding was then restarted and tolerated. At the last documented assessment on 31 October she remained hemodynamically stable and ventilator-dependent through her tracheostomy while tolerating enteral feeding.

Conclusions

Enteral-feed-like material in a pleural drain should prompt urgent evaluation for gastrointestinal–pleural communication and feeding-tube malposition. CT can define the abnormal tube course and associated thoracic complications. This case highlights the importance of reliable NGT position verification before use and prompt multidisciplinary source control when esophageal perforation is accompanied by pleural contamination.

Background

Nasogastric tubes are widely used for gastric decompression, delivery of medication, and enteral nutrition. Although placement is often considered routine, misplacement and gastrointestinal or aerodigestive tract injury can cause severe harm. Contemporary competency guidance emphasizes structured placement and verification practices, while a 2026 systematic review of international guidelines found that radiographic confirmation is widely regarded as the most reliable reference method when tube position is uncertain and that auscultation alone is not a reliable verification strategy [1, 2]. An integrative review has likewise described

a spectrum of NGT-related adverse events, including respiratory misplacement, aspiration, pressure injury, and gastrointestinal trauma [3].

NGT-associated esophageal perforation is uncommon, but published reports extend over several decades and include injuries of the cervical, thoracic, and abdominal esophagus, sometimes with pneumothorax, pleural contamination, or passage of the tube into the thoracic cavity [4–16]. More recent reports of tubes entering the pleural space through non-esophageal routes have also documented feed-related pleural infection and empyema, reinforcing the clinical importance of recognizing intrathoracic malposition before enteral feeding is started [17–19].

We report a nonagenarian woman with recurrent right pleural empyema in whom chest drainage resembling enteral feed led to computed tomographic identification of an NGT traversing a lower esophageal perforation into the right pleural cavity. The case is clinically important because the diagnosis was suggested by an unexpected pleural-drain finding and required combined esophageal repair and pleural source control.

Case presentation

A 90-year-old woman was transferred from another healthcare facility to Al Hammadi Hospital on 11 October 2023 for further investigation and management of recurrent right-sided empyema. Her medical history included hypertension, diabetes mellitus, chronic kidney disease, and a previous cerebrovascular accident with severe residual neurological impairment. She was bedridden, had a tracheostomy, and was receiving chronic mechanical ventilation. The nasogastric tube had been inserted during September 2023 at the referring healthcare facility, before transfer to our hospital. The available referral and hospital records did not document the method used to confirm NGT position before enteral feeding. Likewise, there was no documentation regarding technical difficulty during insertion, the number of insertion attempts, or any abnormal finding noted at the time of placement. Therefore, the precise circumstances surrounding the original NGT insertion and initial position-verification process could not be established from the available records.

On admission, the patient had a Glasgow Coma Scale score of 6/15 but remained hemodynamically stable. She was mechanically ventilated through the pre-existing tracheostomy. A right intercostal chest tube was in place and draining purulent material; according to the original case documentation, pleural drainage was also noted to resemble enteral feeding milk. She had already been receiving culture-directed intravenous antimicrobial therapy at the referring facility and was tolerating enteral feeding. Chest computed tomography (CT) demonstrated malposition of the NGT, with its distal end within the right pleural space together with mild right pleural effusion and gas bubbles, producing an imaging appearance suggestive of an esophago-pleural communication (Figs. 1 and 2). On 14 October 2023, laboratory investigations included a white blood cell count of $5.44 \times 10^9/\text{L}$, hemoglobin 9.9 g/dL, platelet count $151 \times 10^9/\text{L}$, and C-reactive protein 63.6 mg/L. During the ICU course, blood culture grew yeast, prompting intravenous antifungal therapy and removal and reinsertion of the central venous catheter.

The patient was reviewed by a multidisciplinary team that included intensive care consultants, pulmonology, and thoracic surgery. Reda Ibrahim and Safouq Al-Anazi, consultant intensivists, directly supervised the patient's ICU care and participated in the multidisciplinary management. In view of the esophageal perforation and associated infected pleural space, operative source control was selected. On 14 October 2023, the patient

underwent urgent surgical repair of the esophageal perforation together with right lung decortication, and a right intercostal chest drain was maintained postoperatively.

Postoperatively, the patient remained nil per os (NPO) and received total parenteral nutrition (TPN). Culture-directed antimicrobial therapy included ciprofloxacin, linezolid, and caspofungin. When thrombocytopenia developed, linezolid was discontinued and daptomycin was substituted. A Gastrografin swallow/meal study performed on 22 October 2023 was inconclusive. Subsequent chest CT demonstrated hyperdense material adjacent to the lower esophagus and within the anteromedial right pleural cavity close to the chest tube, raising concern for possible postoperative contrast extravasation. Because of this uncertainty, further evaluation was undertaken. Pharyngo-esophagoscopy performed on 23 October 2023 showed no evidence of an active esophageal leak. Enteral feeding through the NGT was subsequently restarted and was well tolerated, allowing TPN to be discontinued.

The postoperative course was additionally complicated by anemia, with hemoglobin falling to approximately 6.7–6.8 g/dL and requiring packed red blood cell transfusion, and by transient thrombocytopenia with minor vaginal bleeding. Pharmacological venous thromboembolism prophylaxis was temporarily withheld and later resumed after platelet recovery and cessation of bleeding. At the last documented assessment on 31 October 2023, the patient remained at a Glasgow Coma Scale score of 6/15 because of her pre-existing neurological condition. She was hemodynamically stable, continued to require mechanical ventilation through her tracheostomy, was tolerating enteral feeding, and had fair urine output.

Discussion

The principal diagnostic clue in this case was the appearance of enteral-feed-like material in the pleural drain. CT then directly demonstrated the abnormal route of the NGT through a lower-third esophageal perforation into the right pleural cavity. In a chronically ventilated, neurologically impaired older patient, clinical symptoms of esophageal perforation may be difficult to elicit; therefore, unexpected pleural-fluid characteristics, new pleural collections, unexplained respiratory deterioration, or an unusual tube course on imaging should prompt immediate reassessment.

The published literature confirms that esophageal perforation during nasogastric or nasoenteral tube placement is rare but well recognized. Early reports described pleural effusion aspiration through an NGT, fine-bore feeding-tube perforation, pneumothorax, and esophageal injury requiring surgical drainage or repair [4–10]. More recent cases have demonstrated a broad range of anatomic trajectories and outcomes. Isik et al. described a 70-year-old man with right pleural contamination who underwent thoracotomy, washout, esophageal repair, and feeding jejunostomy [11]. Numata et al. reported abdominal esophageal perforation into the peritoneal cavity in a 73-year-old bedridden man after blind NGT insertion; operative suture repair and an omental patch resulted in recovery [12]. Gidda et al. reported distal esophageal injury associated with hydropneumothorax and hydropneumoperitoneum requiring emergency surgery [13]. Vadgaonkar et al. described migration of a Ryles tube into the mediastinum in a 72-year-old woman with previous cerebrovascular accidents, with eventual closure after nonoperative enteral management using a nasojejunal tube [14]. Coco and Leanza reported an 80-year-old woman in whom an NGT perforated the esophagus and entered the pleural cavity, causing pneumothorax and pleural effusion [15]. A 2026 report described small-bore

NGT advancement through the cervical esophageal mucosa with long submucosal tracking and distal perforation, requiring thoracic and abdominal surgical exploration [16].

Table 1

Updated review of directly comparable adult reports of NGT-associated esophageal/upper aerodigestive perforation

Report	Patient	Tube/perforation course	Thoracic consequence	Management/outcome
James, 1978 [4]	Older adult; female	Esophageal perforation; NGT aspirated pleural effusion	Pleural involvement	Case report; emphasizes confirmation before feeding
Iyer & Reichel, 1984 [5]	Aged; female	Esophageal perforation by fine feeding tube	Not detailed in indexed record	Case report/letter
Tiller & Rhea, 1984 [6]	Middle-aged; male	NGT-associated esophageal perforation	Contaminated area requiring drainage	Prompt surgical intervention; successful outcome
Queralt-Solari et al., 1988 [7]	Adult	Nasoenteral feeding-tube esophageal perforation	Not detailed in abstract	Case report; stressed radiographic verification
Tronnier et al., 1991 [8]	Adult; female	Esophageal perforation after gastric-tube placement	Pneumothorax	Case report; stressed rapid diagnosis
Ahmed et al., 1998 [9]	Adult	NGT-associated esophageal perforation	Not specified in indexed abstract	Brief report
Gruen et al., 1998 [10]	Adults	Perforation during nasogastric/orogastric tube insertion	Variable	Case reports
Isik et al., 2014 [11]	70-year-old man	Thoracic esophageal perforation after NGT placement	Right pleural effusion; contrast in pleural cavity	Thoracotomy, washout, repair, feeding jejunostomy; well at 6 months
Numata et al., 2018 [12]	73-year-old man	Abdominal esophageal perforation into abdominal cavity	No primary pleural complication	Suture repair + omental patch; good postoperative course
Gidda et al., 2023 [13]	41-year-old man	Distal esophageal injury extending to proximal stomach	Hydropneumothorax + hydropneumoperitoneum	Emergency surgical repair; clinical improvement
Vadgaonkar et al., 2024 [14]	72-year-old woman	Ryles tube migrated into mediastinum; tear enlarged during manipulation	Mediastinal rather than pleural	Nasojejunal feeding; perforation closed without further intervention
Coco & Leanza, 2025 [15]	80-year-old woman	NGT-related esophageal perforation with tube in pleural cavity	Pneumothorax + pleural effusion	Conservative management; improvement

Report	Patient	Tube/perforation course	Thoracic consequence	Management/outcome
Sanner Dixon et al., 2026 [16]	61-year-old man	Cervical mucosal penetration with submucosal tracking and distal perforation	No primary pleural complication described	Thoracotomy/laparotomy and feeding access; later gastrostomy dependence
Present case	90-year-old woman	Lower-third/distal esophageal perforation with NGT in right pleural space	Recurrent empyema; purulent and feed-like pleural drainage	Thoracotomy, esophageal repair and right lung decortication; no active leak on pharyngo-esophagoscopy; enteral feeding resumed; hemodynamically stable but remained ventilator-dependent via tracheostomy at last documented assessment

The table summarizes directly comparable adult reports identified in an updated targeted literature search through September 2026. Because terminology has varied historically (nasogastric, nasoenteral, orogastric, and Ryles tubes), older reports with limited indexed details are retained to show the published continuum of this complication.

Pleural contamination from feeding-tube malposition can also occur without direct esophageal perforation. Zafran et al. reported nasopharyngeal perforation with mediastinal passage of an NGT into the right pleural space followed by empyema and pneumothorax [17]. Matsuda et al. described fistulous empyema after bronchopulmonary laceration by a misinserted NGT in an older neurologically impaired patient [18]. Kawamoto et al. reported two cases of NGT feeding-induced iatrogenic empyema after intrathoracic misplacement via the airway; both recovered after drainage, with emergency surgery required in the unstable case [19]. These reports are mechanistically different from the present case but reinforce the shared hazard of administering enteral feed through an unrecognized intrathoracic tube.

Management of esophageal perforation must be individualized according to perforation location, containment, degree of contamination, clinical stability, and timing of diagnosis. Surgical repair and drainage remain appropriate when there is free contamination, sepsis, tissue disruption, or a need for definitive source control, whereas carefully selected contained perforations may be managed nonoperatively with drainage, antibiotics, nutritional support, and close imaging; endoscopic stenting is another option in selected patients [20–23]. In the present patient, the combination of direct esophageal perforation and an infected pleural space was managed with thoracotomy, esophageal repair, and pleural decortication, followed by temporary bowel rest and parenteral nutrition. Because the postoperative Gastrografin study was inconclusive and CT raised concern for possible extravasation, pharyngo-esophagoscopy was performed and showed no active leak; enteral feeding was then gradually reintroduced.

Prevention should be framed carefully. Position verification after NGT insertion cannot necessarily prevent a perforation that has already occurred during tube advancement; however, reliable verification before the tube is used can identify malposition and may prevent further tissue injury, intrathoracic delivery of feed or

medication, and subsequent pleural contamination. Current guidance therefore emphasizes competency in insertion and verification and discourages reliance on auscultation alone [1, 2]. In high-risk patients—particularly those with altered consciousness, neurologic disease, structural upper gastrointestinal abnormalities, difficult insertion, or an unexpected tube course—a low threshold for radiographic or other definitive confirmation is appropriate before use.

This report has limitations inherent to the available retrospective clinical record. Although the NGT was known to have been inserted at the referring healthcare facility during September 2023, the precise insertion date, insertion technique, number of attempts, and initial position-verification method were not documented.. These limitations restrict reconstruction of the exact mechanism and timing of injury but do not alter the CT-documented intrapleural tube position and the subsequent operative management.

Conclusions

NGT-associated esophageal perforation with intrapleural migration is rare but potentially life-threatening. In a patient with pleural infection, drainage that resembles enteral feed should trigger immediate reassessment of the feeding-tube position and investigation for gastrointestinal–pleural communication. CT can clearly delineate the abnormal tube course and associated thoracic complications. When perforation is accompanied by significant pleural contamination, multidisciplinary source control—including surgical repair and pleural drainage or decortication when indicated—may be required. Reliable NGT position verification before use remains a central patient-safety measure.

Abbreviations

CT
computed tomography
ICU
intensive care unit
NGT
nasogastric tube
NPO
nil per os
TPN
total parenteral nutrition

Declarations

Ethics approval and consent to participate

Ethical approval for publication of this case report was obtained through the institutional ethics committee. The case was prepared using de-identified clinical information in accordance with institutional confidentiality and ethical requirements.

Consent for publication

Written informed consent for publication of this anonymized case report and the accompanying de-identified images was obtained from the patient's son on behalf of the family. The manuscript does not include the patient's name or other direct personal identifiers.

Competing interests

The authors declare that they have no competing interests.

Use of generative artificial intelligence

ChatGPT (OpenAI) was used to assist with English-language editing, journal-specific manuscript restructuring, and organization of the literature review. Both authors independently reviewed the complete clinical files, all manuscript content, and the cited literature and accept full responsibility for the accuracy and integrity of the final manuscript.

Funding

This work received no specific funding.

Author Contribution

R.I. conceived and prepared the case report, reviewed the clinical records, conducted the literature review, drafted the main manuscript, and performed the final revision. R.I. is the corresponding author. S.A. reviewed the manuscript, provided critical comments, and approved the final version. Both authors read and approved the final manuscript and agree to be accountable for the work.

Acknowledgements

Not applicable.

Availability of data and materials

All clinical data reported in this case are contained within the manuscript. Additional de-identified information may be available from the corresponding author on reasonable request, subject to institutional policy and protection of patient privacy.

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Figures



Figure 1

Chest CT showing NGT passage through the distal esophagus. Chest computed tomography demonstrates the nasogastric tube traversing the lower third of the esophagus through an esophageal perforation and extending into the right pleural space.



Figure 2

Additional chest CT view of intrapleural NGT migration. Additional computed tomography image demonstrates the course of the nasogastric tube from the lower esophageal perforation into the right pleural cavity.