CASE REPORT
HEAD AND NECK SURGERY AND ONCOLOGY
DOI: 10.5152/B-ENT. 2026.251647

Endobronchial Ultrasound-Guided Transbronchial Needle Aspiration as an Adjunctive Treatment in a Case of Descending Necrotizing Mediastinitis

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Cite this article as: Peetermans O, Basir S, Desuter G, *et al*. Endobronchial ultrasound-guided transbronchial needle aspiration as an adjunctive treatment in a case of descending necrotizing mediastinitis. B-ENT. 2026, 22, 1647. doi: 10.5152/B-ENT.2026.251647.

ABSTRACT

Retropharyngeal abscesses are deep neck space infections that may progress to life-threatening complications, including descending necrotizing mediastinitis (DNM). Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a minimally invasive technique primarily used for sampling mediastinal lesions, though selected reports describe its adjunctive use in mediastinal abscess drainage. We present the case of a 51-year-old man with a retropharyngeal abscess extending into the superior posterior mediastinum. After cervicotomy with drainage and intravenous antibiotics, a residual mediastinal abscess was noted on CT. Given the favorable anatomical accessibility and the patient's clinical stability, EBUS-TBNA was performed as an adjunctive drainage attempt, including intracavitary antiseptic irrigation. Follow-up CT demonstrated only minimal improvement, and definitive surgical debridement through uniportal video-assisted thoracic surgery was subsequently performed. The patient recovered without further complications. This case illustrates that EBUS-TBNA may serve as an adjunctive option for selected mediastinal abscesses when anatomical access is favorable. However, due to the limited drainage capacity of the needle, its therapeutic effect remains modest, and timely surgical debridement is essential in DNM. Further studies are required to clarify the role of EBUS-TBNA in mediastinal abscess management.

Keywords: Descending necrotizing mediastinitis, EBUS-TBNA, endoscopic ultrasound, mediastinal abscess, retropharyngeal abscess

Introduction

The retropharyngeal space is located anterior to the prevertebral fascia and posterior to the pharyngeal constrictor muscles, extending from the skull base to the mediastinum. Often, this space is further divided into 2 subspaces: an anterior "true" retropharyngeal space and a posterior "danger space."[1] A retropharyngeal abscess is an uncommon but potentially life-threatening deep neck space infection. The most common causes include suppurative adenitis of the retropharyngeal lymph nodes (children), dental or tonsillar infection, and trauma to the posterior pharynx. If not treated adequately, an infectious process in the retropharyngeal space may spread inferiorly along the cervical fascial planes, causing descending necrotizing mediastinitis (DNM). Despite adequate treatment, DNM has a mortality rate of up to 40% since it may rapidly progress to sepsis and multiple organ failure.[1] Treatment consists of prolonged courses of intravenous antibiotics and open surgical drainage/debridement.

Endobronchial ultrasound-guided transbronchial fine needle aspiration (EBUS-TBNA) is a minimally invasive method for sampling peribronchial masses using real-time guidance. The technique is currently recommended as the best first approach to mediastinal sampling in the diagnosis and nodal staging of patients with (suspected) lung carcinoma and the diagnosis of

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Received: August 16, 2025 **Revision Requested:** November 12, 2025 **Last Revision Received:** January 4, 2026 **Accepted:** January 25, 2026
Publication Date: October 2, 2026
Available online at www.b-ent.be

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unexplained mediastinal lymphadenopathy accessible via the major airways, including benign conditions such as sarcoidosis or tuberculosis. Endobronchial ultrasound-guided transbronchial fine-needle aspiration (EBUS-TBNA) is rarely used as a therapeutic method for drainage of collections.

Complications related to EBUS-TBNA are rare, but may occur. Possible complications are mediastinitis and/or abscess related to the procedure itself. However, paradoxically, in a very limited number of case reports, EBUS was used for the drainage of mediastinal abscesses. Here, we present such a rare case of EBUS-guided aspiration and irrigation of a mediastinal abscess originating from a retropharyngeal infection.

Case Report/Case Presentation

A 51-year-old man without significant medical history presented to his local hospital with a 3-day history of fever, odynophagia, dysphagia, and dysarthria. Lab tests showed increased inflammatory markers, including leukocytes 14 940/µL (normal range 3720/µL-10 540/µL) and C-reactive protein 176 mg/L (normal range ≤ 5 mg/L). Flexible fiberoptic laryngoscopy revealed a bulging of the right posterolateral wall of the oropharynx and hypopharynx. Computed tomography (CT) of the neck confirmed a right-sided peritonsillar and parapharyngeal cellulitis and a retropharyngeal abscess of 10 × 14 mm. The patient was hospitalized and treated conservatively with amoxicillin-clavulanic acid 1000 mg/200 mg 4 times a day and analgesics. After 3 days, the symptoms improved, whereas the bulging of the posterolateral pharyngeal wall and the inflammatory markers did not improve.

Consequently, the patient was referred to our hospital and admitted to the intensive care unit (ICU). A CT scan of the neck and thorax revealed extension of the retropharyngeal abscess into the superior posterior mediastinum, measuring 18.4 cm in length (Figure 1). An urgent broad cervicotomy was performed with dissection and drainage of the retropharyngeal space up to the level of the aortic arch. Pus samples for culture were obtained, drains were left in situ, the incision was left open for healing by secondary intention, and a tracheotomy was performed. The drains consisted of 3 passive multilamellar drains—in the neck and 1 in the superior posterior mediastinum—and 1 rinsing drain placed in the superior posterior mediastinum. The rinsing drain was put on low intermittent wall suction (40 mmHg) and flushed 3 times a day with diluted 10% iodine solution (1:10 dilution). The empirically selected intravenous antibiotic regimen included a combination of amoxicillin-clavulanic acid. 1000 mg/200 mg 4 times a day and metronidazole 500 mg 3 times a day.

The next day, a new CT showed a residual right-sided collection posteriorly in the superior mediastinum, measuring 26 × 19 × 41 mm (Figure 2). Despite the cervical drain being positioned sufficiently low, this collection did not appear to communicate with the drained compartment. Although the rinsing drain was flushed 3 times daily, the effluent never appeared purulent, and therefore increasing the flushing volume was not expected to improve drainage of the right-sided cavity. In consultation with the radiologist, the residual right-sided collection was interpreted as a true residual abscess not connected to the drained zone, rather than representing retained irrigation fluid. After multidisciplinary discussion and given the uncertainty whether cervical drainage alone was sufficient, it was decided to attempt additional drainage using EBUS-TBNA. This decision was supported by the favorable anatomical accessibility for EBUS-TBNA, its minimally invasive nature, and the overall good clinical condition of the patient.

An EBUS-TBNA was performed under procedural sedation via convex-probe EBUS bronchoscope (type UC180F, Olympus). Endobronchial ultrasound (EBUS) demonstrated, at the level 2R lymph node station, a posterior, heterogeneous, hypoechoic, thick-walled cystic lesion measuring 21.7 mm (Figure 2c). Doppler study showed no adjacent vascular structure that could pose a procedural hazard. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) was performed using a 19-gauge needle (Figure 2d). Because the viscous pus could not be aspirated initially, 5 lavages were administered using a total of 30 mL of sterile saline, after which 40 mL of yellow-brown mucopurulent-saline mixture was successfully obtained through syringe-applied vacuum aspiration. At the end, the cavity was irrigated with 5 mL of an undiluted 10% iodine solution.

Afterwards, EBUS showed a volume decrease of the lesion to a residual diameter of 7 × 8 mm (Figure 2e). The aspirated material was sent for microbiological analysis.

Two days later, a CT scan showed only a minor reduction of the mediastinal abscess. Eventually, a decision was made to perform more extensive drainage and debridement through uniportal video-assisted thoracic surgery (VATS). The patient tolerated the procedure well. In the following days, the inflammatory markers and fever gradually decreased. Cultures grew *Streptococcus anginosus*, and the antibiotic regimen was de-escalated to intravenous Penicillin G 3 million units 6 times daily and metronidazole 500 mg 3 times daily. The ICU stay was complicated by hospital-acquired pneumonia, for which the antibiotics were replaced with intravenous piperacillin-tazobactam 4 g 4 times daily for 7 days. Multiple CT scans showed a further decline of the mediastinal abscess and eventually complete resolution. The surgical drains and tracheotomy tube were removed, and the patient was transferred from the ICU after 12 days. Due to rapid recovery and wound healing, the patient was discharged 2 days later, with amoxicillin 1 g 3 times daily for 1 more week and daily wound care. During the follow-up visit at 1 month, the patient was doing well and resumed working. A detailed overview of the clinical course is provided in Table 1.

Main Points

- A mediastinal abscess is a potentially fatal condition that requires the performance of an invasive thoracotomy and long-term treatment with intravenous antibiotics.
- Endobronchial ultrasound is well established for the diagnosis and lymph node staging of lung carcinoma and for evaluating benign mediastinal lesions.
- Endobronchial ultrasound-guided transbronchial needle aspiration has a potential adjunctive role in the management of selected mediastinal abscesses.

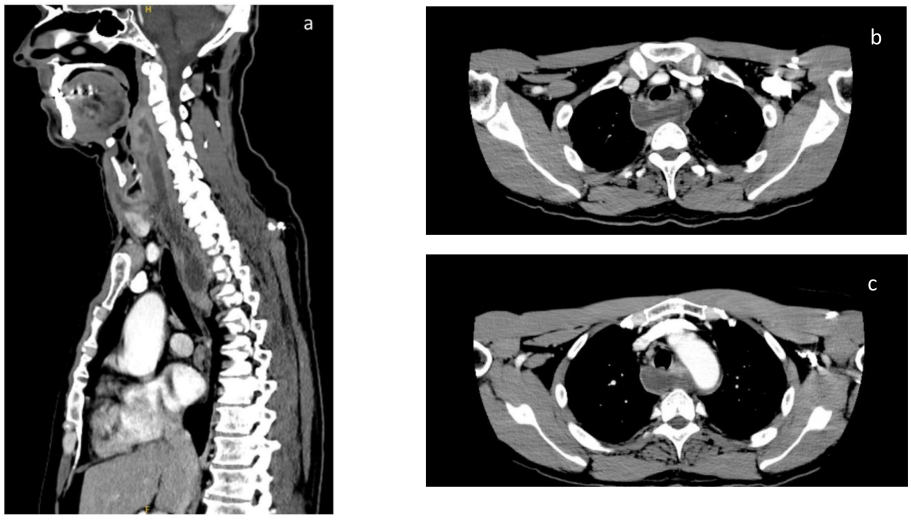

Figure 1. a. Computed tomography (CT) image showing retropharyngeal abscess with mediastinal extension, measuring 18.4 cm in length (sagittal plane). b-c. Computed tomography (CT) images showing the inferior extension of the abscess in the superior mediastinum (transverse plane).

Discussion

Due to the anatomic continuity between the neck and the superior mediastinal space, infection may spread downward, causing DNM. This spread is facilitated by negative intrathoracic pressure during inspiration, gravity, and the absence of barriers in the fascial planes. There are 3 possible routes by which a deep neck space infection can spread to the mediastinum and cause DNM, including the perivascular space, the pretracheal space, and the retropharyngeal space, the latter being the most common.[2] The high mortality rate of DNM can mainly be attributed to inadequate surgical management and delays in diagnosis.[3,4]

A standardized treatment for DNM, however, does not currently exist. Transcervical drainage provides only a limited approach to the superior mediastinum, making adequate drainage/debridement impossible. The mortality rate dropped below 20% in patients undergoing an immediate thoracotomy approach.[4] The optimal surgical approach in patients with DNM is dependent on the aggressiveness and extent of the infection. Therefore, additional mediastinal drainage by thoracotomy or

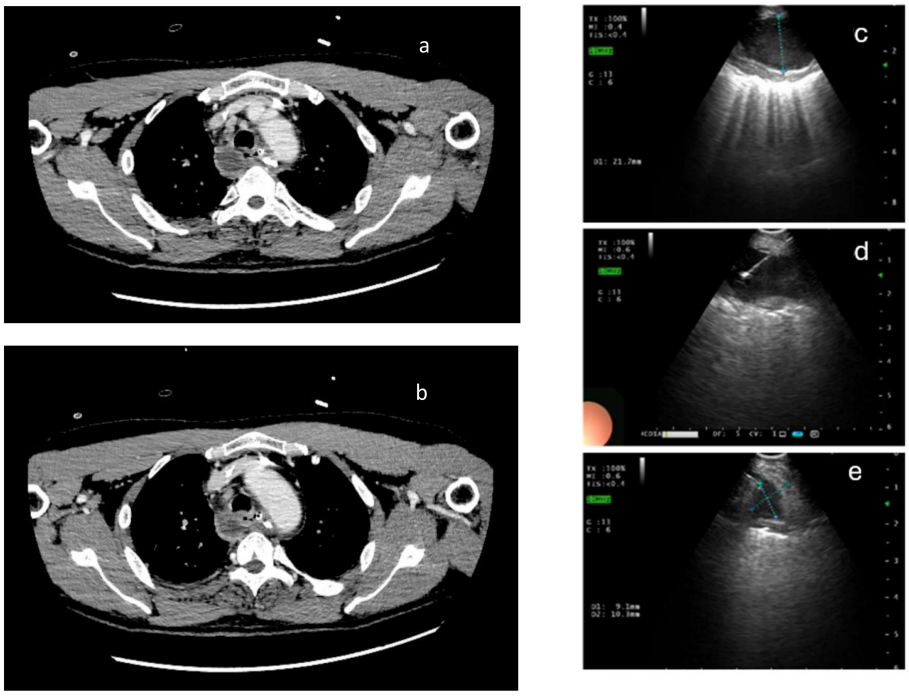

Figure 2. a-b. Computed tomography (CT) images showing residual abscess in the superior mediastinum after transcervical drainage, with a multilamellar drain and nasogastric tube in place (transverse plane). c. Endobronchial ultrasound (EBUS) image of the mediastinal abscess at the start of the procedure. d. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) image showing the 19-gauge needle positioned in the center of the abscess cavity. e. Endobronchial ultrasound (EBUS) image of the residual mediastinal collection after drainage and irrigation of the lesion with 10% iodine solution.

Table 1. Timeline of the Clinical Course, Diagnostic Findings, and Therapeutic Interventions

Day	Key Events and Interventions
0	Presentation in local hospital with fever, odynophagia, and dysphagia. CT showed right-sided peritonsillar/parapharyngeal cellulitis and a retropharyngeal abscess. Start IV amoxicillin–clavulanic acid.
3	Transfer to tertiary care hospital ICU due to lack of improvement. CT showed extension of the retropharyngeal abscess into the superior posterior mediastinum (18.4 cm). Urgent cervicotomy with drain placement and tracheotomy, followed by initiation of IV amoxicillin–clavulanic acid and metronidazole.
4	CT showed a residual right-sided posterior superior mediastinal collection (26 × 19 × 41 mm) not communicating with the drained compartment. Drainage was achieved using EBUS-TBNA.
6	CT showed only minor improvement. Uniportal video-assisted thoracic surgery was performed.
7-12	Gradual clinical and laboratory improvement. Cultures grew ***Streptococcus anginosus***; antibiotics were de-escalated to IV Penicillin G and metronidazole. The course was complicated by hospital-acquired pneumonia, requiring a switch to IV piperacillin-tazobactam for 7 days.
12	Removal of drains and tracheotomy.
14	Discharged with a 1-week course of oral amoxicillin and daily wound care.
30	Full recovery; returned to work.

CT, computed tomography; EBUS-TBNA, endobronchial ultrasound-guided transbronchial needle aspiration; ICU, intensive care unit.

thoracoscopic surgery is advised by most authors, except in patients with an isolated anterosuperior mediastinal infection that responds well to transcervical mediastinal drainage alone.[5]

Reformation of collections after initial drainage, however, is frequent, requiring repeated surgical drainage. Less invasive alternatives to thoracotomy, such as thoracoscopic surgery or CT/ultrasound-guided percutaneous drainage, may reduce the morbidity in these critically ill patients.[6] Video-assisted thoracic surgery (VATS) has been successfully applied in many cases and may serve as an appropriate, less invasive option in hemodynamically stable patients with posterior mediastinal involvement.[7,8]

Furthermore, a limited number of case reports describe real-time EBUS-TBNA as a safe and minimally invasive method to diagnose and drain mediastinal abscesses. An EBUS-TBNA system equipped with color Doppler study can help to locate and characterize mediastinal lesions in real-time. It guarantees a precise approach when the aspiration needle is advanced through the bronchial wall into the lesion during the intervention. It provides better access to mediastinal abscesses compared to CT-guided procedures, with a shorter procedure time when performed by experienced bronchoscopists.

Although the procedure is not sterile and comes with the risk of introducing infection by a respiratory pathogen, as the needle and scope need to pass through the respiratory tract, it was still preferred in this case. The reasons for this choice were the good anatomical accessibility for EBUS-TBNA, the minimally invasive nature of EBUS-TBNA, and the overall good clinical state of the patient. The goal was to prevent more invasive approaches to the superior mediastinum. However, a CT scan after 2 days showed only a minor reduction of the mediastinal abscess. A second EBUS-TBNA session was briefly considered, but given the limited evidence supporting repeated procedures in this context and the aggressive course of DNM, the multidisciplinary team decided to proceed with a drainage method with more established efficacy. Video-assisted thoracic surgery (ATS) was therefore performed, allowing for more extensive drainage and debridement. Caution is advised when using minimally invasive procedures, as insufficient drainage may lead to undertreatment and further spread of infection. In DNM, transcervical or mediastinal surgical debridement remains essential, and EBUS-TBNA drainage should be used only as an adjunct in carefully selected cases. If close clinical or radiographic follow-up does not show improvement, escalation to a more aggressive approach, including thoracotomy, should be pursued.

Only a few case reports have described a therapeutic role for EBUS-TBNA in mediastinal infections.[9-15] In these reports, mediastinal abscesses were successfully treated by single or repeated EBUS-guided aspiration in combination with systemic antibiotics, with or without intracavitary antimicrobial administration. Reported etiologies include tuberculous mediastinal lymph node abscesses, infected mediastinal cysts, and mediastinal infections secondary to esophageal perforation. Importantly, these published cases involve limited, primary mediastinal abscesses, whereas DNM, as illustrated by our case, is a more extensive and aggressive infection in which meticulous cervical source control is essential. From these case reports, the main insight is that the use of EBUS-TBNA for mediastinal abscess drainage is technically feasible; nonetheless, its therapeutic impact is restricted by the small core diameter of the needle, which makes aspiration of viscous purulent material difficult and often necessitates repeated procedures for complete evacuation. To the best of our knowledge, the use of EBUS-TBNA drainage as an adjunctive treatment in DNM has not been previously described.

In our case, a small amount (5 mL) of undiluted iodine solution was instilled at the end of the EBUS-TBNA procedure as an adjunctive measure, intended to potentially enhance the therapeutic effect of the drainage, in accordance with descriptions of similar approaches in selected EBUS-guided mediastinal drainage cases.[10,15] Although antiseptic irrigations such as povidone-iodine are commonly used in the management of deep

head and neck space abscesses, no clinical advantage over saline has been demonstrated, and repeated use may have cytotoxic effects. Therefore, this single instillation of undiluted iodine solution was applied cautiously and should not be considered routine practice in mediastinal abscess management.

In conclusion, EBUS-TBNA is a minimally invasive technique that may assist in draining mediastinal abscesses. In DNM, transcervical and/or mediastinal surgical debridement remains the cornerstone of treatment. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) drainage should therefore be regarded only as an adjunctive treatment in carefully selected cases. When clinical or radiographic improvement is absent on close follow-up, escalation to more aggressive surgical management is required.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Artificial Intelligence Usage Statement: The authors declared that no artificial intelligence tool was used in the preparation of the manuscript.

Informed Consent: Verbal informed consent was obtained from the patient who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: .Concept – O.P., S.B.; Design – O.P., S.B. D.V.; Supervision – G.D., R.W.; Resources – O.P., S.B.; Materials – O.P., S.B.; Data Collection and/or Processing – O.P., S.B., P.C.; Analysis and/or Interpretation – O.P., S.B., P.C.; Literature Search – O.P., S.B., P.C.; Writing – O.P., S.B., D.V.; Critical Review – G.D., R.W., O.V.

Declaration of Interests: Olivier Vanderveken is a member of the editorial board of B-ENT.

Funding: The authors declared that this study has received no financial support.

References

1. Gavid M, Dumollard JM, Habougit C, et al. Anatomical and histological study of the deep neck fasciae: does the alar fascia exist? *Surg Radiol Anat*. 2018;40(8):917-922. [CrossRef]
2. Moncada R, Warpeha R, Pickleman J, et al. Mediastinitis from odontogenic and deep cervical infection. Anatomic pathways of propagation. *Chest*. 1978;73(4):497-500. [CrossRef]
3. Makeieff M, Gresillon N, Berthet JP, et al. Management of descending necrotizing mediastinitis. *Laryngoscope*. 2004;114(4):772-775. [CrossRef]
4. Corsten MJ, Shamji FM, Odell PF, et al. Optimal treatment of descending necrotising mediastinitis. *Thorax*. 1997;52(8):702-708. [CrossRef]
5. Guan X, Liang X, Liang X, et al. A new classification of descending necrotizing mediastinitis and surgical strategies. *Ann Transl Med*. 2021;9(4):356. [CrossRef]
6. Singhal P, Kejriwal N, Lin Z, et al. Optimal surgical management of descending necrotising mediastinitis: our experience and review of literature. *Heart Lung Circ*. 2008;17(2):124-128. [CrossRef]
7. Min HK, Choi YS, Shim YM, et al. Descending necrotizing mediastinitis: a minimally invasive approach using video-assisted thoracoscopic surgery. *Ann Thorac Surg*. 2004;77(1):306-310. [CrossRef]
8. Isowa N, Yamada T, Kijima T, et al. Successful thoracoscopic debridement of descending necrotizing mediastinitis. *Ann Thorac Surg*. 2004;77(5):1834-1837. [CrossRef]
9. Ghalayni R, Gowda S. Using endobronchial ultrasound-guided transbronchial needle aspiration for the diagnosis and treatment of a mediastinal mass with eccentric calcifications: A case report. *J Investig Med High Impact Case Rep*. 2024;12:23247096241235534. [CrossRef]
10. Tian L, Krimsky WS, Wu Q, et al. Risks and benefits in treatment of mediastinal abscess by endobronchial ultrasound-guided transbronchial needle aspiration. *Clin Respir J*. 2017;11(4):448-452. [CrossRef]
11. Fang Y, Cheng L, Guo J, et al. Application of endobronchial ultrasound-guided transbronchial needle aspiration in the diagnosis and treatment of mediastinal lymph node tuberculous abscess: a case report and literature review. *J Cardiothorac Surg*. 2020;15(1):331. [CrossRef]
12. Casal RF, Jimenez CA, Mehran RJ, et al. Infected mediastinal bronchogenic cyst successfully treated by endobronchial ultrasound-guided fine-needle aspiration. *Ann Thorac Surg*. 2010;90(4):e52-e53. [CrossRef]
13. Ikeda Y, Ono M, Maeda M. Endoscopic ultrasound-guided drainage of a mediastinal abscess related to endobronchial ultrasound-guided transbronchial needle aspiration. *Dig Endosc*. 2022;34(5):e90-e91. [CrossRef]
14. Chen YF, Ho CC, Chen CY, et al. Endobronchial ultrasonographically guided transbronchial needle aspiration in mediastinal abscesses. *J Thorac Cardiovasc Surg*. 2013;145(6):e54-e57. [CrossRef]
15. Huang ZS, Xiang Q, Wu XL, et al. Endobronchial ultrasound-guided transbronchial incision and drainage in the treatment of mediastinal abscess. *Respiration*. 2022;101(10):948-952. [CrossRef]