EJCRIM
European Journal
of Case Reports
in Internal Medicine

BRONCHOSCOPIC CUFF TAMPONADE FOR POST-INTUBATION TRACHEAL BLEEDING

Trinh Viet Anh[1], Phan Thao Nguyen[2], Nguyen Cong Huu[3], Dinh Huu Tuan[1], Pham Xuan Hieu[4], Do Quoc Phong[5]

[1] Department of Respiratory, E Hospital, Ha Noi, Vietnam
[2] Department of Adult Cardiology, E Hospital, Ha Noi, Vietnam
[3] Department of Cardiovascular Surgery, E Hospital, Ha Noi, Vietnam
[4] Department of Emergency, E Hospital, Ha Noi, Vietnam
[5] Intensive Care Unit, E Hospital, Ha Noi, Vietnam

Corresponding author's e-mail: bsphanthaonguyen@gmail.com

Received: 27/04/2026
Accepted: 11/05/2026
Published: 09/07/2026

Conflicts of Interests: The Authors declare that there are no competing interests.
Patient Consent: This study was approved by the institutional review board of the hospital. The patient has given written informed consent to participate and to publish the data.
This article is licensed under a CC Attribution-NonCommercial-NoDerivatives 4.0 License

How to cite this article: Anh TV, Nguyen PT, Huu NC, Tuan DH, Hieu PX, Phong DQ. Bronchoscopic cuff tamponade for post-intubation tracheal bleeding. *EJCRIM* 2026;**13**:doi:10.12890/2026_006824

ABSTRACT

Introduction: Post-intubation tracheal bleeding is a rare but potentially life-threatening cause of haemoptysis, particularly in patients on antithrombotic therapy after transcatheter aortic valve implantation (TAVI). Early source identification and airway control are essential, with bronchoscopy central to diagnosis and management.

Case description: We report the case of a 66-year-old female who developed massive haemoptysis following TAVI and subsequent endotracheal intubation. Laboratory findings revealed a significant drop in haemoglobin, while imaging showed no evidence of parenchymal or vascular bleeding. Emergency bronchoscopy identified an active bleeding site on the posterior wall of the distal trachea. Under bronchoscopic guidance, the endotracheal tube cuff was repositioned and inflated to achieve direct tamponade. This intervention resulted in immediate and complete haemostasis. The cuff was maintained for 30 hours with close monitoring, and follow-up bronchoscopy confirmed cessation of bleeding and progressive mucosal healing. The patient was successfully extubated and discharged without recurrence.

Conclusion: Bronchoscopically guided endotracheal tube cuff tamponade is an effective, minimally invasive, and readily applicable technique for controlling localized tracheal bleeding.

KEYWORDS

Tracheal bleeding, endotracheal intubation, cuff tamponade, bronchoscopy, transcatheter aortic valve implantation

LEARNING POINTS

- Tracheal bleeding after endotracheal intubation is a rare but potentially life-threatening cause of massive haemoptysis, particularly in patients receiving antithrombotic therapy after transcatheter aortic valve implantation.
- Early bronchoscopy is essential for accurate localization of the bleeding source and guidance of targeted, minimally invasive haemostatic interventions.
- Bronchoscopically guided endotracheal tube cuff tamponade is a simple, readily available, and effective bedside technique for controlling localized tracheal bleeding.

EFIM
European Federation of Internal Medicine

Publisher
smc media srl

INTRODUCTION

Massive haemoptysis is a life-threatening respiratory emergency in which even a limited volume of blood entering the airway can severely compromise oxygenation and ventilation, leading to asphyxia and cardiovascular collapse. Rapid airway control, prompt identification of the bleeding source, and stepwise haemostatic intervention within a very short timeframe are therefore essential. Bronchoscopy plays a central role in this context, as it not only facilitates clot removal and airway protection but also enables precise localization of the bleeding site to guide targeted therapy[1–4].

Among the causes of airway bleeding, tracheal injury related to endotracheal intubation or cuff pressure is relatively uncommon but may be overlooked when attention is focused primarily on the lung parenchyma or bronchial tree[5-7]. These injuries are typically associated with posterior tracheal wall mucosal laceration or erosion, ischemia due to prolonged cuff pressure, or mechanical friction during intubation, particularly in critically ill patients requiring urgent airway management[7–9].

This case is of particular clinical relevance because the bleeding source was identified in the distal trachea and was successfully controlled using a simple and readily available bedside technique: targeted cuff tamponade under bronchoscopic guidance.

Notably, the patient had additional bleeding risk due to anticoagulant and antiplatelet therapy following transcatheter aortic valve implantation (TAVI), rendering even a localized mucosal injury capable of causing significant haemoptysis[9-10].

CASE DESCRIPTION

A 66-year-old female was admitted with progressive dyspnoea following an influenza infection. Cardiovascular evaluation revealed severe aortic stenosis, and she was indicated for transcatheter aortic valve implantation (TAVI). Following the procedure, the patient required endotracheal intubation and mechanical ventilation. During the immediate post-intervention period, she received anticoagulant and antiplatelet therapy as prescribed by the cardiology team. After extubation, she developed clinically significant anaemia and massive haemoptysis. Laboratory investigations demonstrated a marked drop in haemoglobin from 139 g/l to 66 g/l. Chest computed tomography scan showed no contrast extravasation or bronchial artery dilation. Although haemodynamics remained stable, the severity of bleeding posed a critical threat to airway control, prompting emergency bronchoscopy.

The initial bronchoscopy revealed a large amount of fresh blood and clots within the trachea. After suctioning, an active bleeding site was identified on the posterior wall of the distal trachea, approximately 5 cm above the carina. No bleeding source was detected in the lobar bronchi. These findings strongly suggested tracheal mucosal injury related to prior intubation rather than parenchymal or bronchial pathology *(Fig. 1)*.

The patient was re-intubated. Under direct bronchoscopic guidance, the endotracheal tube cuff was precisely positioned at the site of injury and inflated to approximately 25 cmH_2O to achieve direct tamponade. Immediately after optimal cuff placement, the bleeding markedly decreased and was subsequently completely controlled.

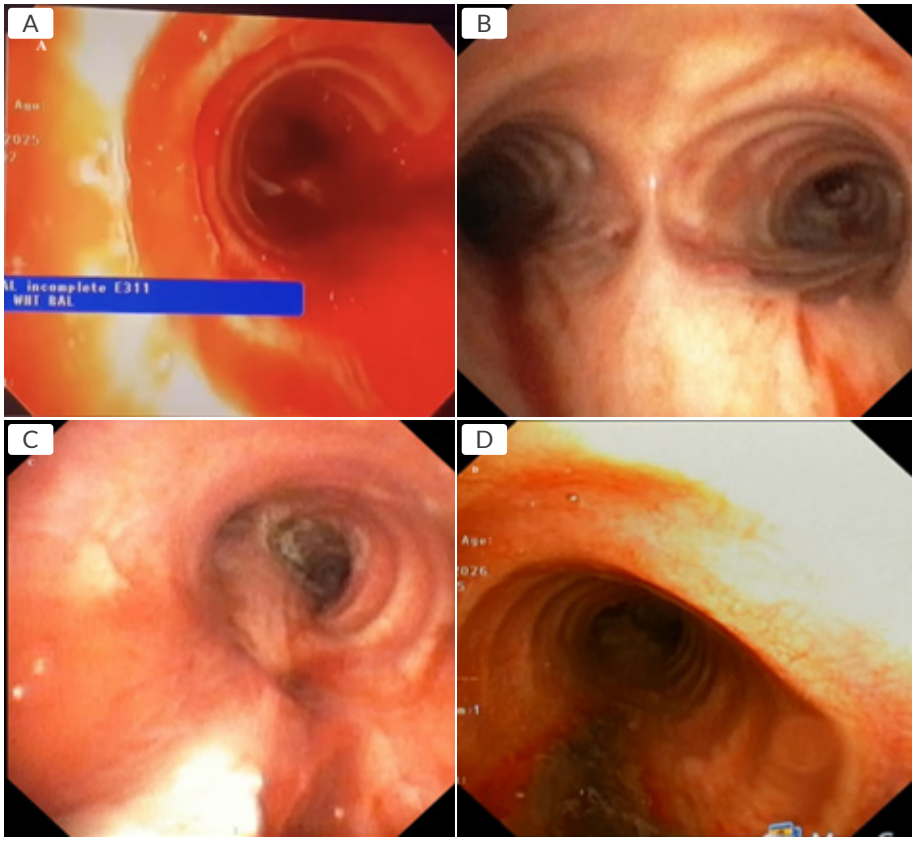


Figure 1. *Serial bronchoscopic findings over time. A) The initial bronchoscopy demonstrated fresh blood and an active bleeding site on the posterior wall of the lower trachea; B) Bronchoscopy performed 2 hours later showed the endotracheal tube cuff correctly positioned over the lesion; C) Bronchoscopy at 30 hours, after complete cuff deflation, revealed no evidence of active bleeding; D) Bronchoscopy on day 12 demonstrated a healing superficial ulcerative lesion.*

The cuff was maintained continuously for approximately 30 hours. During this period, the patient was closely monitored for hemodynamic status, blood gas parameters, and ongoing blood loss, with follow-up bronchoscopic evaluations performed at 2 hours and prior to cuff deflation. Repeat bronchoscopy at 30 hours demonstrated complete cessation of active bleeding after cuff removal.

Twelve hours later, the patient was successfully extubated. No further haemoptysis occurred, and there were no clinical or laboratory signs of ongoing blood loss. Hemodynamic status remained stable.

Follow-up bronchoscopy on day 12 showed a superficial ulcer on the posterior tracheal wall with good healing, without residual blood or recurrent bleeding. The patient was discharged in stable condition.

DISCUSSION

The most distinctive feature of this case is that the bleeding source originated from the distal trachea rather than the bronchial tree or lung parenchyma. In the emergency management of massive haemoptysis, early bronchoscopy is essential not only to differentiate tracheal bleeding from bronchial sources but also to clear blood clots and assess the activity of the bleeding site[1–5]. In this patient, bronchoscopy was pivotal, as it not only established the diagnosis but also directly guided the haemostatic strategy.

Regarding pathophysiology, the most likely mechanism is mucosal injury or a superficial laceration of the posterior tracheal wall during endotracheal intubation. The literature indicates that tracheal injury related to intubation is an uncommon but potentially life-threatening complication. The posterior tracheal wall is particularly vulnerable due to its membranous structure, especially in cases involving difficult or repeated intubation attempts, excessive force, large-diameter tubes, or altered airway anatomy[6,7]. Cardillo et al. emphasized that post-intubation tracheal injuries may initially be subtle but can later manifest as bleeding, air leak, pneumomediastinum, or respiratory failure; thus, a high index of clinical suspicion and bronchoscopic confirmation are required[6].

An important factor exacerbating bleeding in this case is the post-TAVI setting. Patients undergoing TAVI are commonly treated with antiplatelet and/or anticoagulant therapy depending on cardiology indications, requiring a delicate balance between thrombotic and bleeding risks[9-10]. Recent reviews and consensus statements have highlighted that bleeding complications after TAVI remain a significant clinical concern, associated with prolonged hospitalization and worse outcomes[9-10]. In this context, a localized tracheal mucosal injury that might otherwise be self-limited likely became clinically significant due to the underlying antithrombotic therapy.

In addition to mechanical injury during intubation, cuff pressure represents another key pathophysiological factor. Excessive or prolonged cuff pressure can impair mucosal capillary perfusion, leading to ischemia, ulceration, and even necrosis of the tracheal wall[8]. However, in the setting of active bleeding, the cuff can be repurposed as a therapeutic tool for direct tamponade if accurately positioned. In this case, a cuff pressure of approximately 25 cmH_2O was sufficient to achieve airway sealing while minimizing the risk of excessive mucosal ischemia, consistent with commonly accepted practice thresholds[8]. Crucially, cuff positioning should be guided by bronchoscopy, cuff pressure ideally monitored with a manometer, and early follow-up bronchoscopy performed to prevent secondary injury from prolonged compression.

Current bronchoscopic haemostatic options are diverse, including cold saline instillation, diluted adrenaline, topical tranexamic acid, electrocautery or argon plasma coagulation, balloon tamponade, biological glue, and airway stenting in selected cases[2–4]. However, these techniques are not always immediately available in the intensive care setting, and some require advanced interventional expertise. In contrast, endotracheal cuff tamponade is a simple, readily available technique that simultaneously secures the airway and provides direct compression at the bleeding site. Reviews on iatrogenic tracheal injury have also described “bridging” or “lesion coverage” with an endotracheal tube as a reasonable conservative strategy in localized injuries, particularly in stable patients without evidence of large perforation or mediastinitis[7].

The favourable outcome of this case highlights several important clinical implications. First, a tracheal source of bleeding should be considered in patients presenting with haemoptysis shortly after intubation, especially when no clear bronchial lesion is identified. Second, early bronchoscopy enables accurate localization and facilitates targeted, minimally invasive intervention, thereby avoiding unnecessary procedures. Third, when cuff tamponade is employed, close multidisciplinary coordination between bronchoscopists, intensivists, and cardiologists is essential to ensure both effective haemostasis and appropriate management of antithrombotic therapy following TAVI.

This report has limitations, as it represents a single case and does not allow direct comparison with other haemostatic strategies such as topical agents, dedicated balloon devices, or surgical intervention. Nevertheless, the pathophysiological rationale, sequential bronchoscopic findings, and favourable clinical outcome suggest that this technique may serve as a valuable rescue option in settings where emergency bronchoscopy is available.

To conclude, tracheal bleeding following endotracheal intubation is a rare but potentially life-threatening complication, particularly in patients receiving antithrombotic therapy after TAVI. Early bronchoscopy is essential for accurate localization of the bleeding source, airway clearance, and therapeutic guidance. In cases of localized tracheal bleeding, targeted endotracheal cuff tamponade at approximately 25 cm H_2O under bronchoscopic guidance may be an effective, minimally invasive, and readily applicable bedside intervention,

provided that close monitoring and timely reassessment are performed to minimize the risk of pressure-related injury.

REFERENCES

1. Davidson K, Shojaee S. Managing Massive Hemoptysis. *Chest* 2020;**157**:77-88. doi: 10.1016/j.chest.2019.07.012
2. Kathuria H, Hollingsworth HM, Vilvendhan R, Reardon C. Management of life-threatening hemoptysis. *J Intensive Care* 2020;**8**:23. doi: 10.1186/s40560-020-00441-8
3. Charya AV, Holden VK, Pickering EM. Management of life-threatening hemoptysis in the ICU. *J Thorac Dis* 2021;**13**:5139-5158. doi: 10.21037/jtd-19-3991
4. Prey B, Francis A, Williams J, Krishnadasan B. Evaluation and Treatment of Massive Hemoptysis. *Surg Clin North Am* 2022;**102**:465-481. doi: 10.1016/j.suc.2021.11.002
5. Mondoni M, Carlucci P, Cipolla G, Fois A, Gasparini S, Marani S, et al. Bronchoscopy to assess patients with hemoptysis: which is the optimal timing? *BMC Pulm Med* 2019;**19**:36. doi: 10.1186/s12890-019-0795-9
6. Cardillo G, Ricciardi S, Forcione AR, Carbone L, Carleo F, Di Martino M, et al. Post-intubation tracheal lacerations: Risk-stratification and treatment protocol according to morphological classification. *Front Surg* 2022;**9**:1049126. doi: 10.3389/fsurg.2022.1049126
7. Passera E, Orlandi R, Calderoni M, Cassina EM, Cioffi U, Guttadauro A, et al. Post-intubation iatrogenic tracheobronchial injuries: The state of art. *Front Surg* 2023;**10**:1125997. doi: 10.3389/fsurg.2023.1125997
8. Khan AB, Thandrayen K, Omar S. Tracheal tube cuff pressure monitoring: Assessing current practice in critically ill patients at Chris Hani Baragwanath Academic Hospital. *South Afr J Crit Care* 2019;**35**:10.7196/SAJCC.2019.v35i1.373. doi: 10.7196/SAJCC.2019.v35i1.373
9. Ten Berg J, Sibbing D, Rocca B, Van Belle E, Chevalier B, Collet JP, et al. Management of antithrombotic therapy in patients undergoing transcatheter aortic valve implantation: a consensus document of the ESC Working Group on Thrombosis and the European Association of Percutaneous Cardiovascular Interventions (EAPCI), in collaboration with the ESC Council on Valvular Heart Disease. *Eur Heart J* 2021;**42**:2265-2269. doi: 10.1093/eurheartj/ehab196
10. van Nieuwkerk AC, Aarts HM, Hemelrijk KI, Cantón T, Tchétché D, de Brito FS Jr, et al. Bleeding after transcatheter aortic valve replacement. *JACC Cardiovasc Interv* 2023;16:2825-2839. doi: 10.1016/j.jcin.2023.10.011