Acute Endotracheal Tube Obstruction and Airway Bleeding from an Avulsed Presumed Upper-Airway Mucosal Tag Following Difficult Intubation: A Case Report

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ABSTRACT

Introduction: Airway bleeding alongside sudden peak airway pressure rise following endotracheal intubation is uncommon. In patients with a recent history of thrombocytopenia, a hematological cause may be misattributed. This case highlights a presumed avulsed upper-airway mucosal tag as an under-recognized cause of airway bleeding and obstruction.

Case Summary: A 61-year-old woman with ovarian carcinoma, recently treated for thrombocytopenia, with a normalized platelet count preoperatively, underwent difficult intubation for debulking surgery. Shortly after ventilation began, blood appeared in the endotracheal tube, with rise in peak airway pressures. Flexible bronchoscopy identified a presumed avulsed upper-airway mucosal tag obstructing the endotracheal tube. Removal of the tissue and exchange of the endotracheal tube led to normalization of airway pressures and resolution of bleeding. Postoperative airway examination showed mild erythema and the patient had an uncomplicated postoperative course.

Conclusion: Acute airway bleeding accompanied by raised peak airway pressures following intubation should prompt early bronchoscopy to exclude mechanical obstruction, even when a hematological cause coexists.

Keywords: Endotracheal intubation; airway bleeding; bronchoscopy; airway obstruction; difficult intubation.

Running Title: Endotracheal tube obstruction by a presumed avulsed upper-airway mucosal tag

INTRODUCTION

Airway bleeding following endotracheal intubation has several potential causes and can create a significant diagnostic and management challenge, particularly when accompanied by a sudden increase in airway pressure. In a patient with a recent history of thrombocytopenia, bleeding may initially be attributed to a hematological abnormality; however, concurrent ventilatory difficulty should prompt consideration of mechanical or traumatic causes. We report acute airway bleeding and increased peak airway pressure after difficult tracheal intubation in a patient with ovarian carcinoma and recently treated thrombocytopenia. Flexible bronchoscopy revealed a mobile, mucosa-covered structure, presumed to be an avulsed upper-airway mucosal tag, partially obstructing the distal endotracheal tube. This report highlights an unusual mechanical cause of post-intubation bleeding and obstruction and the diagnostic value of early bronchoscopy. The report was prepared in accordance with the CARE case-report framework. [1]

CASE PRESENTATION

The patient was a 61-year-old woman with a diagnosis of ovarian carcinoma, scheduled for debulking surgery under general anesthesia. She had a recent history of thrombocytopenia, for which she had been evaluated by the hematology team and commenced on eltrombopag; her platelet count had improved to within the normal range prior to surgery. She had no known drug allergies and no other significant presenting complaints. No other relevant family history, or prior airway interventions, were reported. The patient was induced with propofol, morphine, and cisatracurium. Direct laryngoscopy revealed a Cormack-Lehane grade IIb view, consistent with a difficult airway. Following bougie-assisted intubation, bilateral equal air entry was confirmed and correct endotracheal tube placement was verified clinically. Shortly after mechanical ventilation was commenced, blood was observed within the endotracheal tube with each breath, associated with an unexpected increase in peak airway pressures. The patient remained hemodynamically stable throughout.

INVESTIGATIONS

Given the patient's recent history of thrombocytopenia, a hematological cause was initially considered despite normalization of the platelet count before surgery. This did not, however, explain the concurrent rise in peak airway pressure. Flexible fiberoptic bronchoscopy was therefore performed and revealed a mobile, mucosa-covered tag-like structure at the distal end of the endotracheal tube, extending toward the region above the carina and partially obstructing the lumen (Figure 1). Following ear, nose and throat (ENT) consultation, the tissue was considered to be an avulsed presumed upper-airway mucosal tag,

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likely traumatized during airway instrumentation, with subsequent bleeding and distal migration along the tube; its exact site of origin could not be confirmed. Because of the patient's ovarian carcinoma, airway malignancy was also considered; the excised tissue was therefore submitted for histopathological examination.a

Table 1. Timeline of events

Phase	Clinical event	Key findings	Management and outcome
Preoperative	Assessment for debulking surgery	Recent thrombocytopenia treated with eltrombopag; platelet count normal before surgery	Proceeded with planned surgery
Induction	Difficult laryngoscopy	Cormack-Lehane grade IIb view	Bougie-assisted tracheal intubation; tube position confirmed
Intraoperative	Blood in endotracheal tube with rise in peak airway pressure	Flexible bronchoscopy showed presumed avulsed upper-airway mucosal tag partially obstructing the distal tube; ENT consulted	Tissue removed and tube exchanged; airway pressure normalized and bleeding ceased
End of surgery	Rigid airway examination (ENT)	Mild generalized erythema; no residual tissue or active bleeding	No further airway intervention
Postoperative	Histopathology and clinical follow-up	Fibrin with epithelium and histiocytes; no malignancy	Uneventful recovery; no airway symptoms

MANAGEMENT

The presumed avulsed upper-airway mucosal tag was carefully removed with suction and airway manipulation while the endotracheal tube was withdrawn (Figure 2). The endotracheal tube was then replaced with a new tube. No pharmacological therapy was directed at the bleeding itself, as it resolved with mechanical removal of the tissue and tube exchange.

FOLLOW-UP AND OUTCOME

Following tube exchange, airway pressures returned to normal and no further blood was observed within the endotracheal tube. The patient remained hemodynamically stable for the remainder of the debulking surgery. At the end of the procedure, the ENT team performed diagnostic rigid airway examination after obtaining consent from the patient's family; this showed no residual tissue or active bleeding, with only mild generalized erythema (Figure 3). Histopathological examination of the excised tissue showed predominantly fibrin admixed with epithelium and histiocytes and was negative for malignancy, supporting a benign reactive process. In the post-anesthesia care unit, the patient was monitored for throat pain, voice change, and other evidence of upper-airway injury. No significant airway-related symptoms or complications occurred during the remainder of her admission.

Figure 1. Flexible bronchoscopic view showing a mobile, mucosa-covered structure (presumed avulsed upper-airway mucosal tissue) at the distal end of the endotracheal tube, partially occluding the lumen.

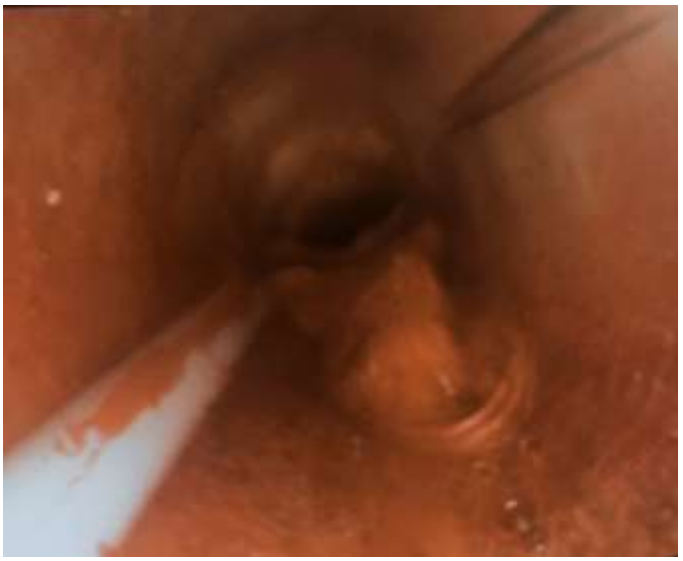


Figure 2. Retrieved specimen of presumed avulsed upper-airway mucosal tag after removal.



Figure 3. Rigid airway examination after extubation at the end of surgery, showing mild generalized erythema with no residual tissue or active bleeding.



DISCUSSION

This case highlights an unusual but clinically important mechanical cause of airway bleeding associated with increased peak airway pressure after tracheal intubation. The immediate resolution of both abnormalities after removal of the obstructing tissue and exchange of the endotracheal tube strongly supported a mechanical component to the event rather than an isolated hematological cause.

Histopathology demonstrated fibrin, epithelium, and histiocytes without malignancy, supporting a benign reactive process. A limitation of this report is that the exact anatomical origin of the tissue could not be definitively established. Although its appearance, timing, and association with difficult airway instrumentation were consistent with traumatic avulsion of upper-airway mucosa, the precise site of origin and whether a pre-existing mucosal tag was present before intubation could not be confirmed.

The differential diagnosis of airway bleeding following tracheal intubation includes traumatic mucosal injury, coagulopathy, and underlying airway pathology. Given the patient's recent history of thrombocytopenia, a hematological cause was initially considered; however, her platelet count had normalized preoperatively, and platelet count alone does not reliably predict perioperative bleeding risk. [2]

Difficult airway instrumentation itself may result in airway trauma. Although bougies are commonly used to facilitate tracheal intubation, direct trauma to abnormal or friable airway tissue has been reported, including severe hemoptysis following bougie contact with endobronchial lesions. [3] Airway bleeding has also been described following placement of double-lumen tracheal tubes, further highlighting airway instrumentation as a potential source of traumatic bleeding. [4]

Similar to our case, acute intratracheal bleeding may be accompanied by mechanical airway obstruction. Usman et al. reported acute airway obstruction from tracheobronchial blood clots following airway instrumentation, with bronchoscopy identifying the obstruction and subsequent airway examination demonstrating mucosal trauma as the likely bleeding source. [5] Endotracheal tube obstruction from secretions or blood clot may also present as sudden ventilatory difficulty, and flexible bronchoscopy can be valuable in establishing the diagnosis and facilitating treatment. [6,7]

Pre-existing laryngeal polyps may themselves cause significant or even complete airway obstruction when displaced during airway manipulation. [8,9] However, evidence that such lesions are specifically avulsed by airway devices is limited; therefore, in our patient, traumatic mucosal avulsion remains a presumed rather than proven mechanism. Partial endotracheal tube obstruction may still permit ventilation but require high inspiratory pressures, and a ball-valve mechanism can result in progressive intrathoracic pressure and cardiovascular compromise. [10]

CONCLUSION

Acute airway bleeding accompanied by an unexplained rise in peak airway pressure following tracheal intubation should prompt consideration of mechanical airway obstruction, even when a potential hematological cause of bleeding coexists. Early bronchoscopy can rapidly identify the cause and facilitate definitive management.

Ethical Approval

Ethical approval was not required for this case report, in accordance with institutional policies. Written informed consent was obtained from the patient for publication of the case and any accompanying clinical details.

Data Availability

All data supporting the findings of this case report are included within the manuscript.

Author Contributions

SI: Conceptualization, Supervision, Review & Editing.
AR: Investigation, writing – Original Draft, Writing – Review & Editing. Both authors have read and approved the final manuscript.

Informed Consent

The intraoperative findings and their management were explained to the patient and her guardian postoperatively and consent was obtained. Consent form will be available for review upon request.

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Conflict of Interest

The authors declare no conflict of interest.

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Declaration of AI-Assisted Language Editing

Claude was used for language refinement and improvement of manuscript readability only.

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