Airway foreign body during bronchoscopy: an unexpected complication when using a dual-axis swivel adapter

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DESCRIPTION

Reported causes of an airway foreign body (AFB) from anaesthesia airway equipment include endotracheal tube (ETT) fragments, laryngoscope lightbulbs and shearing of fragments from double lumen tubes and bougies. 1–5 AFBs from a dislodged fragment of a bronchoscope dual-axis swivel adapter are potentially life-threatening. Such adapters are commonly used during the airway procedures where the adapter allows access of a bronchoscope to the airway while maintaining ventilation and oxygenation without disconnection from the ventilator circuit. We report a rare case where a fragment from an airway swivel adapter dislodged into the patient’s airway during an endobronchial ultrasound (EBUS).

A woman in her 50s presented for an urgent EBUS to investigate the cause of a large left hilar mass causing extrinsic compression of the left main bronchus. To facilitate the procedure, a double swivel elbow adapter with port, manufactured by Southern Cross Medical, New South Wales, Australia, was attached distally to the patient’s ETT and proximally to the ventilation circuit. The connector port has a fenestrated plastic membrane (inner diameter 12.8 mm) that allows the passage of the bronchoscope, without compromising the air seal for ventilation (figure 1). As the Fujifilm EB530 ultrasound bronchoscope (outer diameter 6.7 mm) was passed through the swivel adapter, a fragment of the plastic membrane dislodged into the patient’s trachea. Fortunately, the AFB was visualised in the distal trachea, approximately 22 mm proximal to the carina (figure 2) and the bronchoscopist was able to retrieve the fragment without incident (video 1).

Fragmentation of the plastic membrane may be explained by the factors related to the swivel connector itself, the bronchoscope or the proceduralist. A defect in the dual-axis swivel adapter may be due to an isolated manufacturing defect in the plastic membrane, or that the integrity of the membrane was compromised by incorrect storage or handling. In the present case, we postulate that the reason for the defect in the dual-axis swivel adapter was because the EBUS had a larger outer diameter compared with a standard bronchoscope, so it is likely that the rotational and linear forces of the EBUS damaged the membrane. The proceduralist’s level of experience may also have played a role in the amount of stress placed on the plastic membrane during the EBUS insertion.

Although early recognition of the AFB and an appropriate response by the bronchoscopist ensured a good outcome for this patient, the potential consequences of the fragmented swivel connector were serious. In retrieving the AFB, the procedure duration was extended and further instrumentation within the airway was required, both of which increased the risk of airway trauma, hypoxia and respiratory compromise. Furthermore,
the incomplete plastic membrane caused leakage from the circuit, thus reducing the ventilation volumes and ventilation pressures being delivered to the patient, placing them at risk of hypoventilation. Had the AFB lodged more distally in the airway and remained unnoticed, it could have precipitated the development of a pneumonia, lung abscess or systemic inflammatory response. It also had the potential to obstruct the distal airways during the bronchoscopy. This case serves as a reminder to thoroughly check airway equipment for defects before and after use. Appropriate airway instrumentation checks may mitigate the risk of unnoticed AFBs.

This adverse event did not result in patient harm, however, open disclosure was made to the patient following the national open disclosure framework, which included (1) an apology and expression of regret, (2) a factual explanation of what happened, (3) an opportunity for the patient to relate their experience, (4) a discussion of the potential consequences of the adverse event and (5) an explanation of the steps taken to manage the adverse event and prevent recurrence.

Contributors LW was the anaesthetist caring for the patient. He is responsible for the collation of all images, preparation of the video, literature review and writing of the manuscript. NS, DMCD and TN-W were responsible for the literature review, preparation of images and helped draft the report.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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REFERENCES

Patient’s perspective
The patient respectfully declined to comment.

Learning points
► Formal airway equipment checks before and after bronchoscopy is paramount.
► Instrumentation checks before and after bronchoscopy may reduce the risk of unnoticed airway foreign bodies (AFBs).
► AFBs should be considered in patients who have undergone bronchoscopy and who display new-onset respiratory symptoms.

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