

Delayed Migration of an Intrathoracic Foreign Body with Endobronchial Erosion

AUTHORS:

Ahmed Khouqeer, MD; Peter C. Chen, MD; Hart Donahue, MD; Andres Espinoza, MD; Ravi Ghanta, MD; Kenneth Mattox, MD; Matthew Wall, MD

CORRESPONDENCE AUTHOR:

Andres Espinoza, MD
Baylor College of Medicine
Baylor Plaza
Houston, TX 77030
Phone: 248-250-0589
Email: andres.espinoza@bcm.edu

AUTHOR AFFILIATIONS:

Department of Cardiothoracic Surgery
Baylor College of Medicine
Ben Taub Hospital
Houston, TX 77030

Background	We report a rare case of delayed intrathoracic foreign body migration and erosion into the right lower lobe bronchus with resultant hemoptysis and postobstructive pneumonia in a patient presenting 10 years after a gunshot wound.
Summary	This case report represents an interesting and rare event of delayed endobronchial erosion of a foreign body 10 years after the initial trauma. Regarding the management of this patient, our safest option was bronchoscopy for missile localization, followed by open surgical resection. In reviewing prior case reports with a similar clinical course, we identified alternative preoperative considerations such as angioembolization for vascular involvement, and alternative retrieval methods such as bronchoscopy, or as a result of spontaneous expectoration.
Conclusion	Given our experience, in conjunction with previously reported cases of delayed endobronchial erosion of a foreign body, we developed a clinical management algorithm to aid clinical decision making when presented with this pathology. We believe this perioperative and operative management strategy will help guide decision making for this potentially complex clinical scenario. Delayed complications from retained intrathoracic foreign bodies are rare due to scarring and their fixed position after the initial postinjury period.
Keywords	Trauma, intrathoracic foreign body, delayed complication

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The authors have no conflicts of interest to disclose.

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Case Description

Delayed complications from retained intrathoracic foreign bodies are rare due to scarring and their fixed position after the initial postinjury period.¹ Various approaches towards intrathoracic foreign body retrieval include bronchoscopic, thoracoscopic, and surgical, with a few instances of spontaneous expectoration.²⁻⁵ We report a rare case report of delayed intrathoracic foreign body migration and erosion into the right lower lobe bronchus with resultant hemoptysis and post-obstructive pneumonia in a patient presenting 10 years after a gunshot wound. This work has been reported in line with the SCARE criteria.⁶

A 35-year-old female who had been shot in the right anterior chest 10 years prior to presentation was admitted to the hospital with increasing volume and frequency of hemoptysis over the past three months. No previous interventions had been performed for her gunshot wound, and she had remained otherwise asymptomatic. Chest X ray and computed tomography (CT) were performed (Figure 1), which demonstrated a retained missile in the right pleural cavity, with concern for erosion of the bullet into the right lower lobe bronchus and resultant superior segmental atelectasis.

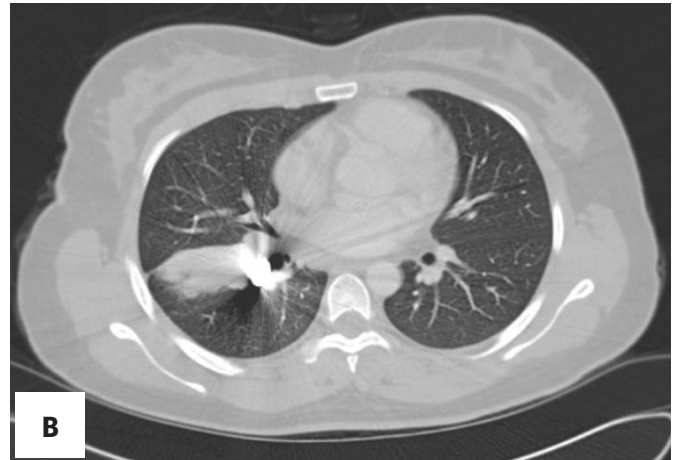
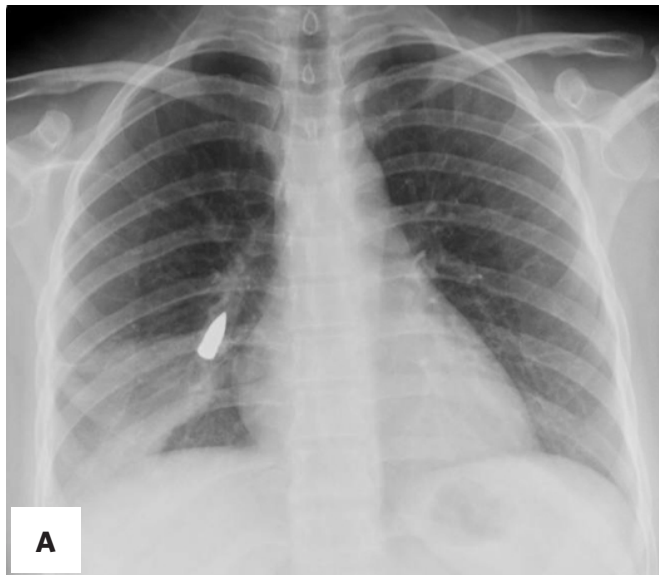


Figure 1. A: Chest X ray showing the central location of the retained missile in the right pleural cavity and **B:** CT imaging demonstrating potential missile erosion into the right lower lobe bronchus with resultant superior segment atelectasis.

Due to the patient's persistent symptoms and concern for continued missile erosion into the bronchus, the decision was made to take the patient to the operating room for a flexible bronchoscopy to confirm localization of the involved lung segments, and for retrieval of the retained missile.

A flexible bronchoscopy was performed, and a foreign body was identified eroding into the right lower lobe bronchus, which was obstructing the orifice of the right lower lobe superior segmental bronchus (Figure 2A). There was intermittent drainage of blood and purulent secretions from behind the retained missile, explaining the patient's recent symptoms. Given these findings, we decided to proceed with retrieval of the retained missile. A right muscle-sparing thoracotomy was performed. Dense adhesions were encountered and carefully taken down to mobilize the right lung. The missile was easily palpated directly adjacent to the right lower lobe bronchus, but not visualized. An anatomic right lower lobectomy was planned due to the erosion of the missile into the proximal right lower lobe bronchus. The inferior pulmonary vein and arterial branches to the right lower lobe were isolated and sequentially stapled and ligated. Next the right lower lobe bronchus was isolated, and prior to its division, flexible bronchoscopy was performed to ensure the staple line was proximal to the retained missile. Further inspection of the resected specimen confirmed that the blunt end of the retained missile was protruding into the right lower lobe bronchus (Figure 2B) as previously seen on bronchoscopy. The bronchial stump and lung edges were assessed for air leak, and the chest was irrigated and closed.

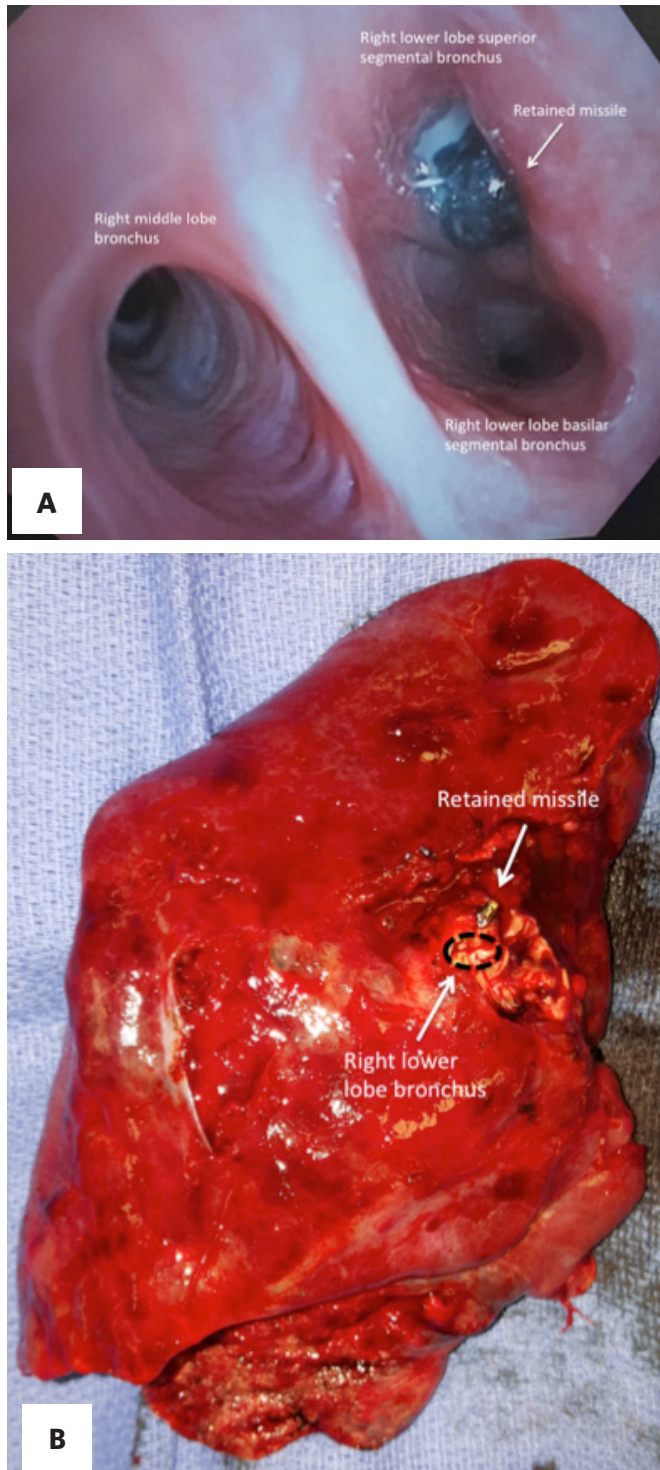


Figure 2. A: Intraoperative flexible bronchoscopy showing protrusion of the retained missile into the right lower lobe bronchus obstructing the superior segmental bronchus with adjacent purulent drainage. **B:** Photograph demonstrating protrusion of the blunt end of the retained missile into the right lower lobe bronchus.

Discussion

Delayed migration of intrathoracic foreign bodies with endobronchial erosion is rare due to their fixed position after the initial post-injury period. Complications such as hemoptysis, pneumonia, empyema, and even pulmonary embolus have previously been reported.^{2,7-10} These manuscripts have detailed foreign body retrieval utilizing bronchoscopic and surgical approaches, as well as several instances of spontaneous foreign body expectoration. We were able to identify eight case reports (Table 1) of delayed intrathoracic foreign body migration with endobronchial erosion, with the frequency of approach for foreign body retrieval similar between bronchoscopic, surgical, or spontaneous expectoration.

In our patient, we first performed a flexible bronchoscopy to localize the affected bronchopulmonary segments. The retained missile was partially visualized within the lumen of the right lower lobe bronchus, and obstructing the orifice of the superior segment. Therefore, we believed the only option for safe retrieval was with surgical resection of the affected bronchus and associated lung parenchyma, as bronchoscopic retrieval would have left a bronchopleural fistula. Ultimately, our patient required a right lower lobectomy as the missile was eroding into the proximal right lower lobe bronchus.

In our specific case, we did not believe preoperative angiobolization was necessary due to limited clinical suspicion of vascular involvement. This judgment was based on a lack of pulmonary vessel filling defects on CT angiogram of the chest, and limited bleeding during bronchoscopic evaluation. Additionally, our planned open approach provided direct access to the pulmonary artery and veins if control of these structures were needed. However, as detailed in our proposed schematic for the management of delayed migration of intrathoracic foreign bodies with endobronchial erosion (Figure 3), we do believe that in cases where a bronchoscopic approach is performed, if there is high clinical suspicion for vascular involvement, preprocedural angiography and embolization of collateral vessels, specifically bronchial vessels, may be warranted.¹¹

Author	Year	Foreign Body	Intrathoracic Location	Time to Definitive Therapy	Method of Foreign Body Retrieval
Leslie	1917	Missile	Right hemithorax	4.5 months	Spontaneous expectoration
Bland et al.	1966	Shrapnel	Right hemithorax	15 years	Right pneumonectomy
Kovnat et al.	1974	Shrapnel	Right hemithorax	28 years	Right thoracotomy; local resection
Kelley et al.	1976	Missile	Left hemithorax	7 years	Left thoracotomy, left upper lobectomy
Bogedain et al.	1984	Shrapnel	Left hemithorax	64 years	Rigid bronchoscopic removal
Saunders et al.	1992	Missile	Left hemithorax	3 months	Spontaneous expectoration
Voskuil et al.	2005	Missile	Right hemithorax	10 years	Rigid bronchoscopic removal
Hesami et al.	2012	Missile	Right hemithorax	3 months	Spontaneous expectoration

Table 1. Case Reports of Delayed Intrathoracic Foreign Body Migration with Endobronchial Erosion

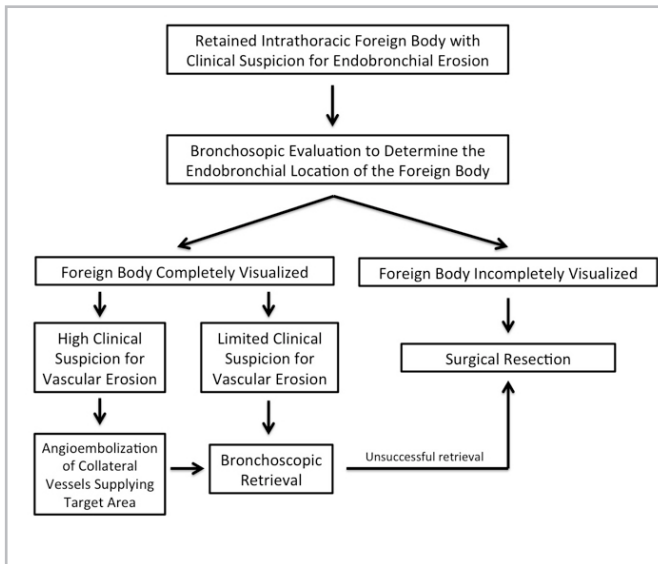


Figure 3. Proposed management scheme for the retrieval of an intrathoracic foreign body after delayed migration with endobronchial erosion

Conclusion

Delayed complications from retained intrathoracic foreign bodies are rare events that may result in hemoptysis, pneumonia, or empyema. The strategy for foreign body retrieval in symptomatic patients depends on the degree of endobronchial erosion during bronchoscopic evaluation, with judicious use of preprocedural angioembolization of collateral bronchial vessels in patients at high risk for vascular involvement.¹¹

Lessons Learned

Delayed complications from retained intrathoracic foreign bodies are rare due to scarring and their fixed position after the initial postinjury period, making their management complex. We have developed a clinical management algorithm to help clinical decision making.

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