

## Case Report

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# Uniportal Video Assisted Thoracoscopic Surgery (U-VATS) with bronchotomy and bronchial reconstruction for removal of a key lodged in the bronchus intermedius, a novel case report front heart of Africa

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## Abstract

**Introduction:** Foreign Body (FB) aspiration is a potentially life-threatening condition, particularly in children, requiring prompt and effective management. While rigid and flexible bronchoscopy remain the primary extraction methods, persistent symptoms such as chronic cough or recurrent pneumonia may necessitate surgical intervention. In this report, we present the first documented case of FB extraction using uniportal Video-Assisted Thoracoscopic Surgery (uVATS) combined with bronchotomy and bronchial reconstruction, introducing a novel approach for complex cases.

**Case presentation:** A 14-year-old girl with a history of recurrent lung infections refractory to antibiotic therapy and failed bronchoscopic attempts to remove a key lodged in her airway for two years was referred for surgical intervention. Imaging revealed the key wedged between the right main bronchus and bronchus intermedius. A decision was made to proceed with thoracoscopic exploration and bronchotomy.

A 3 cm incision was made along the right fourth intercostal space. Using a 30-degree, high-definition, 10 mm thoracoscope and standard uVATS equipment, a right main bronchotomy was performed. Inflamed lymph nodes and purulent-like tissue were observed. The key was firmly lodged at the entrance of the right upper bronchus. With careful dissection using graspers, the key was successfully extracted. The bronchus was then reconstructed in an elliptical fashion and closed with a 4-0 polypropylene barbed suture, followed by intrathoracic lavage. The lung was inflated under direct vision, and a 24-French chest tube was placed in the apex of the right hemithorax.

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Total surgery time was 45 minutes. The postoperative course was uneventful, with the chest tube removed on postoperative day one. The patient was discharged home on day three without complications.

**Conclusion:** This case highlights the first documented bronchotomy and bronchial reconstruction via uVATS for foreign body extraction, demonstrating a safe, cost-effective, and complication-free procedure with minimal pain and excellent cosmetic outcomes. Furthermore, it emphasizes the importance of advanced surgical training opportunities in resource-limited settings.

**Keywords:** Foreign body extraction; Minimally invasive surgery; Video-assisted thoracoscopy; Single-port VATS; Uniportal VATS; Bronchotomy.

## Introduction

Foreign Body (FB) aspiration is a well-known and extensively documented condition, particularly in children and, less commonly, in adults, that can be life-threatening [1,2]. Effective management requires a thorough evaluation and a multidisciplinary approach to ensure successful extraction while minimizing complications. Rigid and flexible bronchoscopy, first introduced for FB extraction in 1897 (initially with rigid bronchoscopy), remain cornerstone techniques, with reported success rates exceeding 97% [3]. However, if conservative or interventional methods fail and symptoms such as chronic cough or recurrent pneumonia persist, surgical intervention may become necessary [4].

## Case presentation

A 14-year-old girl was referred for surgical exploration to extract a foreign body following recurrent lung infections refractory to antibiotic therapy. The patient had reportedly swallowed a key, which was misdirected into the trachea two years prior to her presentation at the surgical clinic. Multiple previous attempts to retrieve the key via bronchoscopy were unsuccessful, leaving the patient with persistent cough, shortness of breath, and recurrent infections. Her medical history was otherwise unremarkable. Chest X-ray and Computed Tomography (CT) revealed the key lodged between the right main bronchus and bronchus intermedius. The surgical team meticulously reviewed the patient's medical history and imaging. After a thorough discussion with the patient's family regarding the risks and benefits, informed consent was obtained, and thoracoscopic exploration was planned. The surgery was performed during a uVATS Masterclass at Kinshasa Hospital, in the Democratic Republic of Congo (DRC), in March 2023, providing local surgeons with an opportunity for advanced surgical training and case observation. On the day of surgery, standard preoperative protocols were followed. The patient was administered general anesthesia, and single-lung ventilation was achieved via endotracheal intubation. The patient was positioned in the left lateral decubitus position.

A 3 cm incision was made along the fourth intercostal space in the anterior axillary line on the right side. Through this work-

ing access and without rib spreading, a 30-degree, high-definition, 10 mm thoracoscope was introduced along with standard uVATS equipment. During the procedure, the team observed inflamed and enlarged peribronchial lymph nodes with reactive fibrosis, indicating a significant inflammatory response due to the foreign body. After dissecting minimal adhesions, access to the region between the right main bronchus and bronchus intermedius was achieved via the anterior aspect of the pulmonary hilum. A longitudinal incision, approximately 2.0 cm in length, was made along the anterior cartilage of the bronchus intermedius, extending toward the right main bronchus. Within the bronchus, tar-stained purulent-like tissue was present, further complicating the extraction. The foreign body, a key, was firmly lodged and adhered to the membranous portion at the entrance of the right upper bronchus. Using graspers and precise dissection, the key was carefully released and extracted without causing additional damage to the bronchial structures. The bronchial opening was then refashioned elliptically and sutured using a 4-0 polypropylene barbed suture, ensuring secure closure. Intrathoracic lavage was performed to cleanse the area, and the bronchus was carefully inspected for air leaks. To ensure proper lung function post-surgery, the lung was inflated under direct vision, and a single 24-French chest tube was placed at the apex of the right hemithorax to facilitate drainage and prevent pneumothorax. The total surgery time was 45 minutes, with blood loss <10 mL. The patient's postoperative course was uneventful, with no complications noted. The chest tube was successfully removed on the first postoperative day, and the patient was discharged home on day three in stable condition.

## Discussion

While thoracotomy is a widely used method for surgical Foreign Body Extraction (FBE) in the thorax [5], we present an alternative approach utilizing thoracoscopic exploration with bronchotomy. When comparing thoracotomy and VATS for FBE, studies have reported favorable outcomes for Video-Assisted Thoracoscopic Surgery (VATS), including reduced surgery-related pain and earlier chest tube removal, particularly in oncological settings [6,7]. Additionally, evidence suggests similar in-hospital mortality rates, lengths of stay, and hospitalization costs in resource-rich environments. However, surgeons must

also account for data indicating up to 1.6 times higher intra-operative complication rates associated with VATS [8]. The technical complexity of VATS underscores the need for robust training programs, like ours, to ensure surgical proficiency and optimize outcomes. Comprehensive training addresses the learning curve, enabling surgeons to fully realize VATS benefits—such as reduced trauma, faster recovery, and improved patient comfort—while maintaining safety and efficacy. This approach balances innovation with patient-centered care.

In our case, the key was firmly adhered to the surrounding inflamed tissue, adding complexity to the extraction process. While challenging cases like this can arise, VATS for Foreign Body Extraction (FBE) is generally considered a safe and effective approach in both emergency and, as demonstrated here, elective settings [8]. Importantly, minimally invasive surgery offers significantly better outcomes regarding postoperative infection rates when compared to open surgery techniques [3], a critical advantage in regions like Central Africa, where antimicrobial resistance is prevalent. According to the World Health Organization (WHO) Africa Region, antimicrobial resistance has been linked to over one million deaths annually, with more than 250,000 directly attributed to it [9].

Uniportal VATS (uVATS), an advancement over traditional VATS, offers further advantages, including reduced postoperative pain, shorter hospital stays, faster recovery, and better cosmetic outcomes [10,11]. The latter is even more significant when compared to conventional thoracotomy.

Kawano and colleagues reported a case similar to ours, in which a dental crown was successfully removed via VATS and bronchotomy of the right lower bronchus. As in our case, multiple attempts at bronchoscopic Foreign Body Extraction (FBE) were unsuccessful. This case represented the first instance of bronchotomy for FBE performed using conventional VATS [4].

To the best of our knowledge, our case represents the first bronchotomy and bronchial reconstruction performed by uVATS, marking another advancement in the field of minimally invasive surgery. Most literature assumes optimal conditions typically found in resource-rich settings [4,13]. In our case, uVATS in combination with bronchotomy proved highly effective even in a resource-limited setting such as the DRC. Nevertheless, some limitations must be acknowledged. Diagnostic methods and equipment in such settings often fall short of standards in the Global North, impacting preoperative preparation. Furthermore, due to incomplete medical records and lack of follow-up data, we can only report on the immediate postoperative outcome rather than long-term results.

## Conclusion

This case highlights the complexities of foreign body extraction, particularly in pediatric patients, and presents the first documented bronchotomy and bronchial reconstruction performed via uniportal Video-Assisted Thoracic Surgery (uVATS). The minimally invasive approach facilitated a successful outcome while minimizing complications. Conducted as part of the uVATS Master Class at Kinshasa Hospital, this procedure emphasizes the value of advanced surgical training in resource-limited settings, demonstrating that with proper training and equipment, high-quality care can be achieved even in challenging environments.

## References

1. Shostak E. Foreign body removal in children and adults: review of available techniques and emerging technologies. *AME Med J*. 2018; 3: 75. doi: 10.21037/amj.2018.07.02.
2. Bajaj D, Sachdeva A, Deepak D. Foreign body aspiration. *J Thorac Dis*. 2021; 13(8): 5159-75. doi: 10.21037/jtd.2020.03.94.
3. Wan YI, Patel A, Abbott TEF, Achary C, MacDonald N, et al. Prospective observational study of postoperative infection and outcomes after noncardiac surgery: analysis of prospective data from the VISION cohort. *Br J Anaesth*. 2020; 125(1): 87-97. doi: 10.1016/j.bja.2020.03.027.
4. Kawano F, Inomata M, Yamada R, Maeda R. Video-assisted thoracoscopic surgery involving a bronchotomy in the removal of a bronchial foreign body: A novel case report. *Int J Surg Case Rep*. 2024; 121: 110018. doi: 10.1016/j.ijscr.2024.110018.
5. Marín Giraldo AF, Bustillos Serna CF, Figueroa Gutiérrez LM, Osorno Moncayo JF. Bronchotomy for metal foreign object removal in pediatric airway. *J Pediatr Surg Case Rep*. 2023; 89: 102549. doi: 10.1016/j.epsc.2022.102549.
6. Batihan G, Ceylan KC, Usluer O, Kaya SÖ. Video-assisted thoracoscopic surgery vs thoracotomy for non-small cell lung cancer greater than 5 cm: Is VATS a feasible approach for large tumors? *J Cardiothorac Surg*. 2020; 15(1): 261. doi: 10.1186/s13019-020-01305-w.
7. Pan H, Chen H, Kong W, Ning J, Ge Z, et al. Video-assisted thoracoscopic surgery versus thoracotomy following neoadjuvant immunochemotherapy in resectable stage III non-small cell lung cancer among Chinese populations: A multi-center retrospective cohort study. *Clin Lung Cancer*. 2024; 25(5): 395-406.e5. doi: 10.1016/j.clcc.2024.03.008.
8. Gopaldas RR, Bakaeen FG, Dao TK, Walsh GL, Swisher SG, et al. Video-assisted thoracoscopic versus open thoracotomy lobectomy in a cohort of 13,619 patients. *Ann Thorac Surg*. 2010; 89(5): 1563-70. doi: 10.1016/j.athoracsurg.2010.02.026.
9. Kakamad FH, Ali RK, Amin BJH, Mohammed SH, Omar DA, et al. The role of VATS in the removal of intrathoracic foreign bodies: a systematic review. *Indian J Thorac Cardiovasc Surg*. 2023; 39(2): 125-36. doi: 10.1007/s12055-022-01445-9.
10. Sartorius B. Antimicrobial Resistance Collaborators. The burden of bacterial antimicrobial resistance in the WHO African region in 2019: A cross-country systematic analysis. *Lancet Glob Health*. 2023; 12(2): e201-16. doi: 10.1016/S2214-109X(23)00539-9.
11. González-Rivas D, Fieira E, Delgado M, Mendez L, Fernandez R, et al. Evolving from conventional video-assisted thoracoscopic lobectomy to uniportal: the story behind the evolution. *J Thorac Dis*. 2014; 6(Suppl 6): S599-603. doi: 10.3978/j.issn.2072-1439.2014.08.44.
12. Wang L, Cao J, Feng Y, Jia R, Ren Y. Application of uniportal video-assisted thoracoscopic surgery for segmentectomy in early-stage non-small cell lung cancer: A narrative review. *Heliyon*. 2024; 10(9): e30735. doi: 10.1016/j.heliyon.2024.e30735.
13. Hewlett JC, Rickman OB, Lentz RJ, Prakash UB, Maldonado F. Foreign body aspiration in adult airways: therapeutic approach. *J Thorac Dis*. 2017; 9(9): 3398-409. doi: 10.21037/jtd.2017.06.137.