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Bronchoscopy-guided Cryotherapy for Airway Obstruction from Bronchial Cast

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Bronchoscopy-guided Cryotherapy for Airway Obstruction from Bronchial Cast

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Abstract

The application of cryotherapy in the extraction of airway blood clots has gained increased precedence over Fogarty catheter and biopsy forceps. The cryoprobe, passed through a flexible bronchoscope, adheres and aids in the removal of foreign body through cryoadhesion within minutes. Besides blood clots, this method was found to be extremely efficient in removing different kinds of foreign bodies including food particles like peanuts, pills, and inspissated mucus.

Keywords: Bronchial cast, Cryotherapy, Bronchoscopy

A 47-year-old female with B-Cell Acute lymphoblastic leukemia underwent an allogeneic bone marrow transplant after induction per the E1910 regimen. On day seventeen, post-transplant, she developed bleeding in the posterior oropharynx in association with severe pancytopenia and mucositis. Her bleeding was initially stabilized with nasal packing, transfusion of blood products (fresh frozen plasma, platelets), and vitamin K to correct the coagulopathy and severe thrombocytopenia. Unfortunately, she developed significant respiratory distress in the setting of persistent oropharyngeal bleeding within few hours. She was transferred to the ICU for emergent endotracheal intubation. Post-intubation, flexible bronchoscopy revealed a large obstructing clot in the endotracheal tube extending down to the carina, and the left and the right main bronchus, and distal bronchial trees. The clots were extracted from the bronchial tree utilizing a bronchoscopy-guided cryotherapy probe, thus relieving the patient of her respiratory distress. Upon further examination, the clot removed from the left mainstem bronchus was one intact bronchial cast (Fig. 1).

The application of cryotherapy in the extraction of airway blood clots has gained increased precedence in the past decade. Traditionally, Fogarty catheter and biopsy forceps were employed in their removal, however, it was very time-consuming. Cryotherapy causes necrosis of selective cells by freezing cells to −70 °C, inducing cellular crystallization, followed by the formation of local microthrombi. The cryoprobe, passed through a flexible bronchoscope, adheres and aids in the removal of the foreign body (FB) through cryo-adhesion within minutes. Besides blood clots, this method was found to be extremely efficient in removing different kinds of FBs including food particles like peanuts, pills, and inspissated mucus as well as destruction of tumors.[1–8]

For the management of airway obstruction, cryotherapy offers a substitute to Nd:YAG laser. Other advantages include it being inexpensive, safer for the operator as well as for other members of the team. The danger of bronchial wall perforation is negligible because cryotherapy does not affect the cartilage or collagen in the bronchus. Cryotherapy can be performed in an endoscopy suite under local anesthesia with conscious sedation.[9]

On the other hand, cryotherapy has a lower destructive power and a delayed effect. Therefore, its use in severe airway obstruction due to a large

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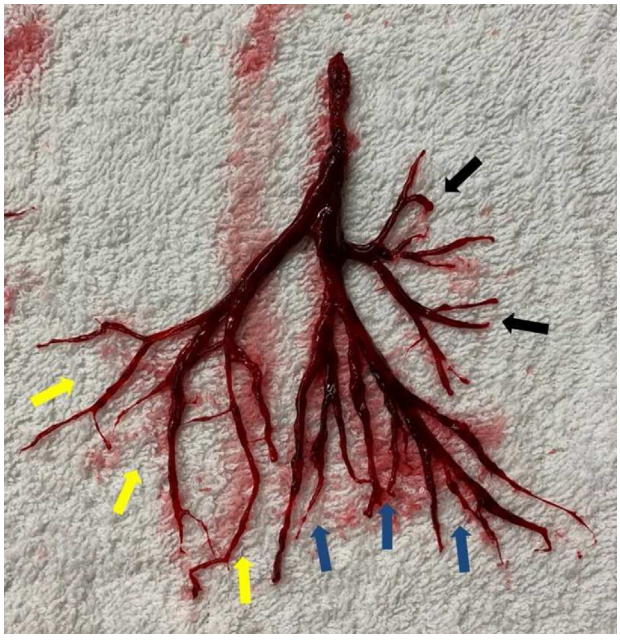

Fig. 1. The cast of the left bronchial tree consisted of two segmental branches of the lingula (black arrows), three segmental branches in the upper lobe (blue arrows), and three segmental branches in the lower lobe (yellow arrows).

tumor or foreign body is still under consideration.[8] The bronchoscopy itself may cause bronchospasm, making it difficult to complete the procedure.[9]

In conclusion, cryotherapy is a safe and effective procedure that improves symptoms, pulmonary function, and performance in patients with endobronchial obstruction. However, there is a lack of well-designed studies comparing cryotherapy with other methods of removal of tracheobronchial obstruction. Hence, there is a need to analyze and study more cases like this in order to understand cryotherapy to a greater extent.

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Conflicts of interest

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