Dear Editor,

Cryotherapy can be used for endoscopic management of tracheobronchial obstruction. Its use has been described for treatment of obstructing malignant lesions or foreign bodies.[1] A flexible cryoprobe uses nitrous oxide as a cryogen via a fiberoptic bronchoscope to facilitate retrieval of foreign body from the airways; moreover, the probe freezes and adheres to the target material allowing for its removal en bloc with removal of the bronchoscope.[2] Its use in the critical care setting is discussed below in the management of obstructing clot burden secondary to diffuse alveolar hemorrhage.

A 45-year-old female who presented for aortic dissection repair via left thoracotomy. She was unable to be weaned off of bypass secondary to pulmonary contusions and concern for pulmonary hemorrhage; venoarterial (VA) extracorporeal membrane oxygenation (ECMO) was placed intraoperatively. She remained on VA ECMO for 4 days postoperatively. However, after decannulation she developed adult respiratory distress syndrome and was unable to maintain adequate oxygenation despite efforts with oscillatory ventilation. As a result, venovenous (VV) ECMO was initiated. She subsequently developed diffuse alveolar hemorrhage that manifested as large blood clots throughout the tracheobronchial tree completely obstructing the airway, necessitating nearly daily bronchoscopy without resolution [Figure 1]. Furthermore, the clot could not be removed either with suction or biopsy forceps. Cryotherapy was employed to attempt to remove the clot burden and ameliorate her respiratory failure. Cryotherapy was performed in the trachea, left mainstem bronchus, right mainstem bronchus, the right upper lobe (RUL), left upper lobe (LUL), and in the left lower lobe (LLL) of the lung. There were 10 cryoprobe applications to the airway and each application was for 20 s. Extensive clots were removed, but some still remained in the RUL and LLL [Figure 2]. Overall, the post procedure lumen size was substantially improved as compared to before the procedure.

In this case, cryotherapy had the advantage of aiding the removal of the extensive clot burden in the tracheobronchial tree without further damage to the already friable mucosa. Freezing of the target is dependent upon water content and as such, cartilage and fibrous tissues are spared, reducing the risk of airway perforation. Moreover, cryotherapy has hemostatic effects and so the risk of bleeding is also reduced.[3] Its safety profile and effectiveness make it an excellent choice for removal of clot burden in the setting of diffuse alveolar hemorrhage.

Meghan Iona Cook, Thomas John Papadimos
Department of Anesthesiology, Division of Critical Care Medicine, Wexner Medical Center, The Ohio State University, Columbus, Ohio, United States of America

Address for correspondence: Dr. Thomas J. Papadimos, Department of Anesthesiology, Division of Critical Care Medicine, Wexner Medical Center, The Ohio State University, Columbus, Ohio, United States of America.
E-mail: Thomas.Papadimos@osumc.edu

Figure 1: Obstructing blood clot in left lower lobe

Figure 2: Blood clot from tracheobronchial tree after cryoadhesion and extraction
REFERENCES

1. Mathur PN, Wolf KM, Busk MF, Briete WM, Datzman M. Fiberoptic bronchoscopic cryotherapy in the management of tracheobronchial obstruction. Chest 1996;110:718-23.
2. Asimakopoulos G, Beeson J, Evans J, Maiwand MO. Cryosurgery for malignant endobronchial tumors: Analysis of outcome. Chest 2005;127:2007-14.
3. Ernst A, Feller-Kopman D, Becker HD, Mehta AC. Central airway obstruction. Am J Respir Crit Care Med 2004;169:1278-97.