

Right main bronchus bulge after capnothorax for thoracoscopic esophagectomy: An interesting finding on fiber-optic bronchoscopy through a double lumen tube!

The Editor,

A 48-year-old, American Society of Anesthesiologists grade 2, Mallampatti class 2, male patient was posted for elective video-assisted thoracoscopic surgery (VATS) for carcinoma of the mid-esophagus. After standard anesthesia induction and invasive monitoring, a 39 French left sided polyvinyl chloride double lumen tube (DLT) was inserted using direct laryngoscopy. Correct DLT placement was confirmed by fiber-optic bronchoscopy (FOB), where the bronchial lumen was visualized in the left main bronchus after seeing the carina. Lung separation was confirmed by clamping the two lumina alternately and auscultating both sides of the chest. The surgery was to be done in the lateral decubitus position, with right chest up and right lung deflated. After lateral positioning and before one-lung ventilation (OLV), DLT position was found to be in the correct position when viewed again using FOB. Before thoracoscope insertion for VATS into the right hemithorax, tracheal lumen was clamped, and OLV started. After CO₂ (carbon dioxide) insufflation, the thoracoscope was inserted into the right chest. Right lung deflation was found to be inadequate (visible on the camera screen connected to the thoracoscope). Suspecting a DLT displacement, FOB was repeated to identify and correct its position, so as to obtain adequate lung separation.

With the capnothorax persisting, FOB was inserted into the tracheal lumen of the DLT. Carina was visualized at the end of the tracheal lumen as well as the

blue bronchial cuff entering the left main bronchus. Then, the FOB was inserted into the right main bronchus. A linear bulge encroaching into the right bronchial lumen was visualized [Figures 1 and 2]. As we later realized, this bulge was due to the pressure exerted by the mid-esophageal mass (tumor and lymph nodes) which was to be dissected for Mckeowns esophagectomy.

Pressure due to the CO₂ insufflation was pressing the esophageal mass against the deficient posterior wall of the right bronchus. This was causing partial longitudinal luminal obstruction. This elongated bulge in the long axis of the right main bronchus was impeding the lung deflation, causing difficulty in surgical access. Hence, a decision to abandon the thoracoscopic approach was taken, and the procedure converted to open posterolateral thoracotomy. Changing the correctly placed *in situ* left DLT into a right sided DLT was not done, as its insertion and proper positioning in the lateral position is considered difficult and risky. Moreover, insertion of a right DLT to splint the right lung can lead to damage to the already inward bulging right bronchial lumen. After the discontinuation of capnothorax, the FOB was repeated. The DLT position was found to be appropriate, and there was no bulge as well in the right bronchus. Lung deflation was adequate during OLV, and the surgery proceeded without any complications. Following thoracic dissection, OLV was discontinued, and the patient was turned supine after chest closure. FOB was repeated again to look for any tracheobronchial injury, which was absent. DLT was removed

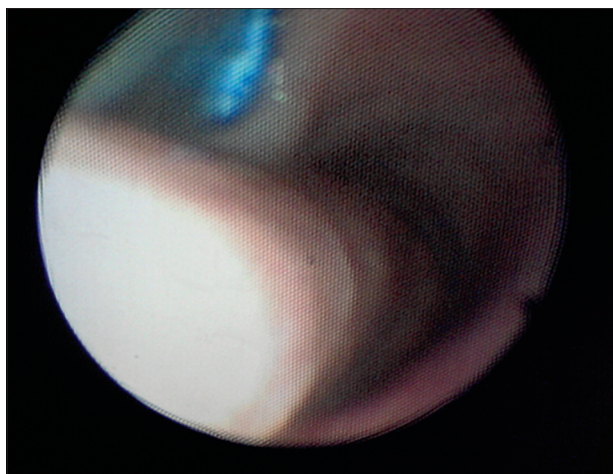


Figure 1: Image through the fiber-optic bronchoscope showing longitudinal bulge in the lumen of the right main bronchus

after a thorough suction and a normal portex cuffed endotracheal tube (size 8) was inserted over a tube exchanger device. Bilateral air entry was confirmed to be equal and adequate. Abdominal and cervical parts of the esophagectomy were done as per standard technique and finally, the patient was extubated after the surgery under neuromuscular monitoring. Postoperatively, the patient was shifted to the onco-surgical intensive care unit for monitoring and observation. The entire peri-operative course was uneventful, and the postoperative condition of the patient was stable.

Minimally invasive approach^[1] to the thoracic part of the esophagus is a promising technique to decrease postoperative morbidity in esophagectomy patients. Not only does it enhance early recovery, but also there is less pain and better respiratory function after surgery. Nevertheless, such problems during lung separation can occur, and anesthesiologists must be prepared to face the challenges. DLT insertion is required for right lung deflation (for both open and thoracoscopic esophagectomy), as usually the right sided chest is approached for mobilizing the esophagus. DLTs can get displaced^[2] with position changes (especially during lateral decubitus positioning) as well as with CO₂ insufflation into the thorax. FOB confirmation^[3] is a routine practice for verifying correct DLT placement in most thoracic surgery centers.

Rent in the trachea or bronchus, especially on the membranous posterior aspect, following difficult DLT placement is a known complication.^[4] This could have caused a bulge in the right bronchus if a right sided DLT was placed, or the left sided DLT was misplaced into the right bronchus. Both possibilities were ruled out

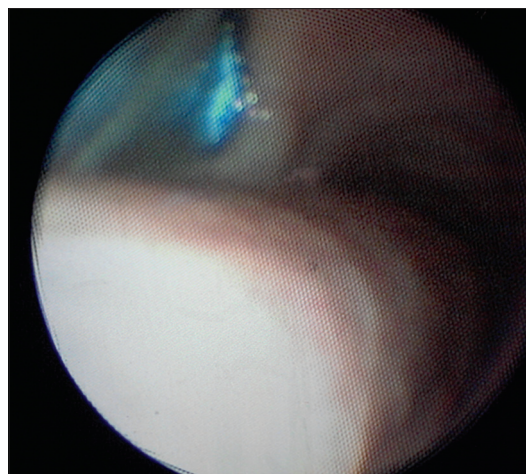


Figure 2: Right bronchial bulge occluding its lumen and the blue left bronchial cuff

in our case. The linear bulge in the right bronchus was due to the esophagus (especially the tumor and lymph nodes in the mid-esophagus) pressing on the bronchial wall following increase in intra-thoracic pressure by the continuous CO₂ insufflation.^[5] The bulge disappeared on discontinuing capnothorax. Tracheal and bronchial walls are naturally deficient posteriorly, as there is no cartilaginous support. The longitudinal indentation was partially occluding the right bronchial lumen, thus impeding air egress from the right lung. Hence, right lung deflation was found to be inadequate while doing thoracoscopy. As soon as the CO₂ insufflation was stopped, the bulge also disappeared, and the lung separation was adequate. Hence, VATS was converted to open thoracotomy, and the rest of the esophagectomy was done as per standard procedure. Repeat bronchoscopy and the rest of the peri-operative course were uneventful.

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REFERENCES

1. Wakabayashi A. Expanded applications of diagnostic and therapeutic thoracoscopy. *J Thorac Cardiovasc Surg* 1991;102:721-3.
2. Araki K, Nomura R, Urushibara R, Yoshikawa Y, Hatano Y. Displacement of the double-lumen endobronchial tube can be detected by bronchial cuff pressure change. *Anesth Analg* 1997;84:1349-53.

3. Benumof JL. The position of a double-lumen tube should be routinely determined by fiberoptic bronchoscopy. *J Cardiothorac Vasc Anesth* 1993;7:513-4.
4. Marty-Ané CH, Picard E, Jonquet O, Mary H. Membranous tracheal rupture after endotracheal intubation. *Ann Thorac Surg* 1995;60:1367-71.
5. Baraka A. Hazards of carbon dioxide insufflation during thoracoscopy. *Br J Anaesth* 1998;81:100.

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