Delayed Presentation of Hemothorax and Mediastinal Hematoma Requiring Surgical Intervention After Linear Endobronchial Ultrasound

To the Editor:

CASE PRESENTATION

A 55-year-old male with coronary artery disease status post drug-eluting stents in 2009, maintained on dual antiplatelet therapy (DAPT) with clopidogrel 75 mg daily and aspirin (ASA) 325 mg daily, and an 80 pack-year history of tobacco dependence was referred for evaluation of a right upper lobe lung nodule. No additional risk factors for bleeding were identified. Computed tomography of the chest showed a 29.0 mm spiculated right upper lobe nodule with right hilar and paratracheal lymphadenopathy. Poor functional status excluded him from possible curative intent surgery by previous thoracic surgery consultation.

The patient underwent staging endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) followed by navigation bronchoscopy with biopsy and fiducial marker placement for potential radiosurgery. Both ASA and clopidogrel were held 6 days before the procedure. One hour before the procedure, ASA 325 mg was administered out of the concern for potential elevated risk of periprocedural myocardial infarction. Lymph nodes at stations 4L, 7, 4R, and 11R (measuring in the shortest diameter 8, 12, 9, and 11 mm, respectively) were noted by EBUS without significant vascularity. Three passes per lymph node were obtained with a 21-G EBUS-TBNA needle. Rapid on-site cytologic evaluation was negative for malignancy. There was no excessive intraluminal bleeding or hematoma on ultrasound immediately following the procedure. The navigational portion of the procedure was uneventful. The patient was discharged the same afternoon with instructions to resume DAPT. Clopidogrel was restarted ~4 hours after the procedure.

On postprocedure day 4, the patient presented to the emergency department with acute right-sided chest pain associated with progressive dyspnea. Computed tomography revealed a large right pleural effusion with layering internal hyperdensity in apparent communication with a posterior mediastinal fluid collection (Fig. 1). A 14-Fr chest tube was placed, draining 1050 mL of hemorrhagic pleural fluid. The fluid hematocrit was 20% (systemic 32%), confirming the diagnosis of hemothorax. Progressive tachycardia and hypotension developed with 400 mL additional hemorrhagic fluid drained over the next hour. Four units of packed red blood cells were transfused emergently; however, the patient remained hypotensive and tachycardic.

Thoracic surgery performed emergent exploratory thoracotomy, revealing 1 L of thrombus in the right hemithorax and a large posterior mediastinal hematoma. Intraoperative transesophageal echocardiogram revealed left atrial compression with impaired cardiac function (Fig. 2). There was no clear evidence of injury to major cardiac or vascular structures, but hemorrhage appeared to originate in the subcarinal region. After an uneventful recovery, he was discharged on postoperative day 5.

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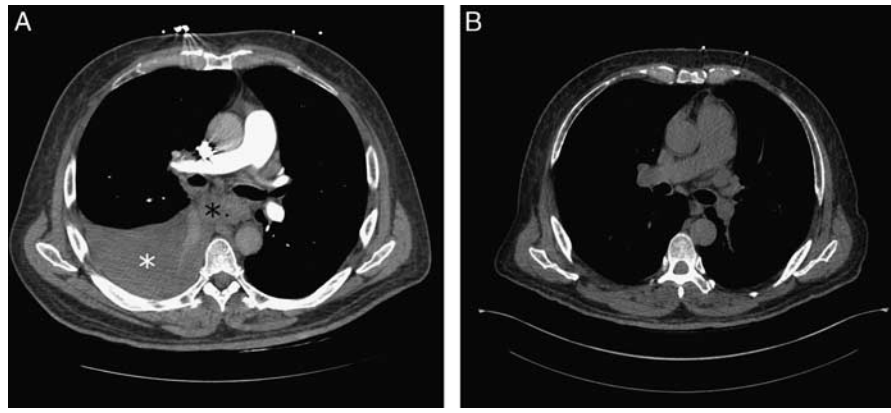

FIGURE 1. A, Computed tomography scan day of presentation with mediastinal hematoma (black asterisk) and right hemothorax (white asterisk). B, Preprocedural computed tomography.

DISCUSSION

EBUS-TBNA, shown in multiple studies to be a safe and cost-effective means of evaluating mediastinal and hilar lesions, is the first procedure of choice for mediastinal evaluation and staging in suspected bronchogenic carcinoma.[1,2] Rates of complications—including bleeding, pneumothorax, and infection—are low, ranging from 0.14% to 1.44%.[1,2] Our case demonstrates a previously unreported but potentially life-threatening complication of EBUS-TBNA: delayed major hemorrhage.

Being the first reported case, there are some features that warrant discussion. Current recommendations suggest holding only clopidogrel for 5 to 7 days,[3,4] while our patient held both ASA and clopidogrel due to the unusual combination of 325 mg of ASA with clopidogrel, which raised concern for potential bleeding complications. In addition, our patient developed clinically evident bleeding several days post-procedure, different from prior studies which focus on periprocedural bleeding.[5–9] Finally, prior publications report endobronchial and intramural bleeding,[10,11] whereas our patient had significant hemorrhage into the mediastinum and pleura.

One explanation for our patient's presentation is the combination of full dose ASA the morning of the procedure and clopidogrel ~4 hours after the procedure, resulting in prolonged mediastinal bleeding due to ASA-induced platelet dysfunction exacerbated by resuming clopidogrel shortly thereafter. Prior case series suggest that EBUS-TBNA is safe in patients taking clopidogrel. Stather et al[5] report 12 patients on clopidogrel who underwent sampling of 24 lymph node stations (2 to 4 passes per station) with no cases of severe bleeding. These findings were replicated by Meena et al[6] in 28 patients on clopidogrel undergoing EBUS-TBNA and 55 patients undergoing EUS-TBNA. In contrast, Karnyski et al[10] describe a case of hemorrhage from a right lower lobe mass after EBUS-TBNA requiring temporary placement of an endobronchial balloon to achieve hemostasis. Furthermore, a prospective study by Ernst et al[12] of 604 patients undergoing transbronchial biopsy was stopped early due to an 89% rate of major hemorrhage in patients continuing clopidogrel alone and 100% in

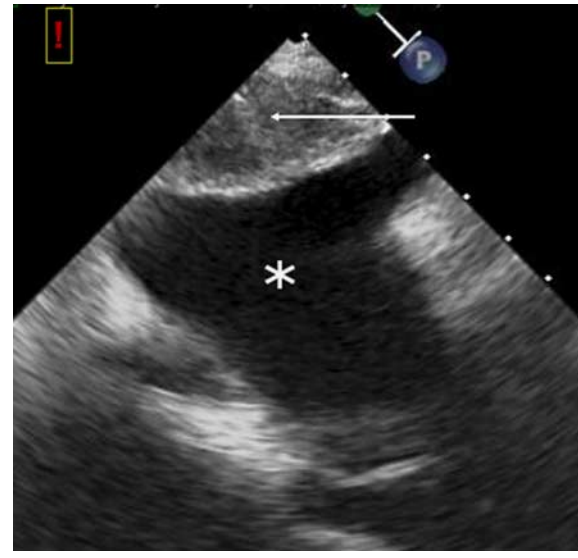

FIGURE 2. Mediastinal hematoma (arrow) compressing left atrium (white asterisk) on intraoperative transesophageal echocardiogram.

those continuing DAPT, leading to the recommendation for stopping clopidogrel 5 to 7 days before transbronchial biopsy and suggesting that aspirin exacerbates the bleeding risk of clopidogrel. Regarding the optimal time to reinitiate DAPT, expert opinion suggests reinitiation 12 to 24 hours postprocedure; however, there are no published data evaluating this question.[3,4]

A second possible explanation is unrecognized transvascular or atrial passage of the needle during mediastinal lymph node biopsy. Published case series suggest low risk of bleeding from EBUS-TBNA in the setting of transvascular needle aspiration[7–9]; however, the technique is not without risk—as shown by Botana-Rial et al,[11] who report the development of intramural hematoma after EBUS-TBNA pulmonary arterial puncture. The authors note that, had they not seen the hematoma on immediate postpuncture ultrasound, no further investigation would have been performed. Thus, asymptomatic bleeding may be underrecognized due to lack of routine radiographic follow-up. In addition, this procedure was performed in a training setting, raising the possibility of inadvertent vascular puncture or laceration due to operator inexperience. Although the primary operator in this case was a subspecialty trainee with 249 recorded EBUS-TBNA cases, Stather et al[13] demonstrate that skill with EBUS-TBNA continues to improve even after 200 cases.

CONCLUSIONS

EBUS-TBNA is a safe, effective, and minimally invasive means of sampling mediastinal and hilar lesions. Although complications are rare, special consideration should be taken in patients requiring DAPT. The proceduralist should identify patients in whom clopidogrel can be safely stopped and determine the optimal time to resume DAPT. Clinicians should have a high index of suspicion for postprocedural complications in patients restarting DAPT after EBUS-TBNA who present up to several days later with unexplained chest pain or respiratory and/or hemodynamic compromise.

David M. Chambers, MD*
Jason A. Akulian, MD†
Sohini Ghosh, MD†
Christina R. MacRosty, DO†
Adam R. Belanger, MD†
Jason M. Long, MD‡
Benjamin E. Haithcock, MD‡
Allen Cole Burks, MD†
*Division of Pulmonary and Critical Care Medicine, Louisiana State University Shreveport, Shreveport, LA
†Division of Pulmonary Disease and Critical Care Medicine
‡Division of Cardiothoracic Surgery
University of North Carolina-Chapel Hill
Chapel Hill, NC

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