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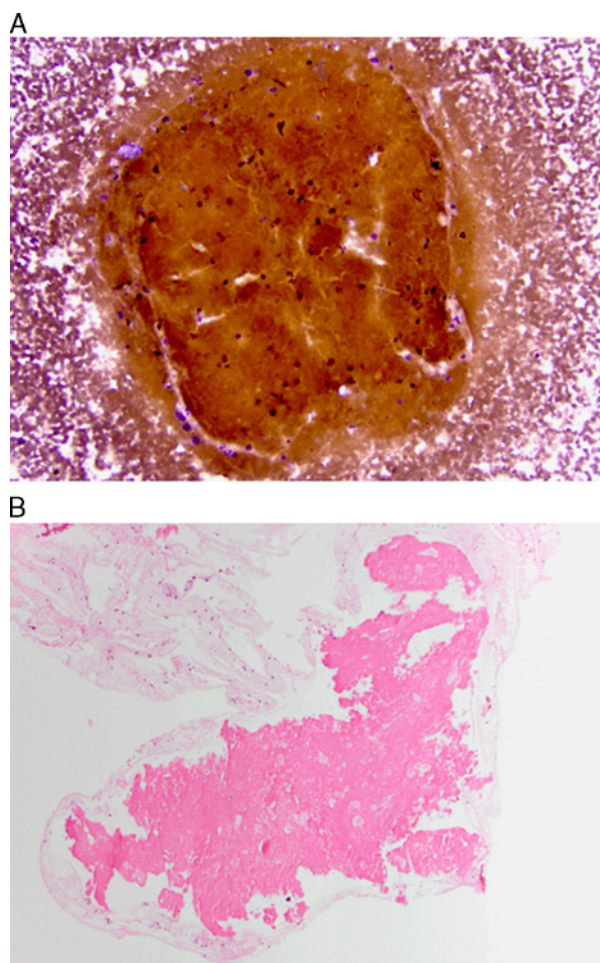


FIGURE 4. Pulmonary artery thrombus sampled by EBUS. Fragments of bland, unorganized thrombus were identified on the cytologic air-dried direct smear (A, Wright-Geimsa stain; original magnification, $\times 200$) and the subsequently prepared cell block (B, hematoxylin and eosin stain; original magnification, $\times 100$).

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Endobronchial Sealing With Glue for Malignant Hemoptysis

To the Editor:

Hemoptysis is a common occurrence in patients suffering from a lung cancer.

Bronchoscopic interventions bronchoscopy can be initiated for the initial management of moderate to massive hemoptysis, until more definitive radiologic or surgical therapies can be carried out.¹ Besides, the success rate of radiologic procedures such as bronchial artery embolization is not 100% and the majority of the patients are not good candidates for surgery. Under such circumstances bronchoscopic interventions can provide a viable option. We report a technique of endobronchial sealing with cyanoacrylate glue after the failure of a bronchial arterial embolization in a case of a malignant hemoptysis.

A 76-year-old woman presented with a moderate hemoptysis from a metastatic left lung adenocarcinoma that evolved over several months. This patient was receiving palliative care following failure of the first 2 lines of chemotherapy. The patient's functional capacities were altered to grade 3 on the Eastern Cooperative Oncology Group scale (ECOG). A computed tomography scan of the chest demonstrated a large (50 mm) left upper lobe mass surrounded by a crazy paving, suggesting alveolar flooding most likely from the blood.

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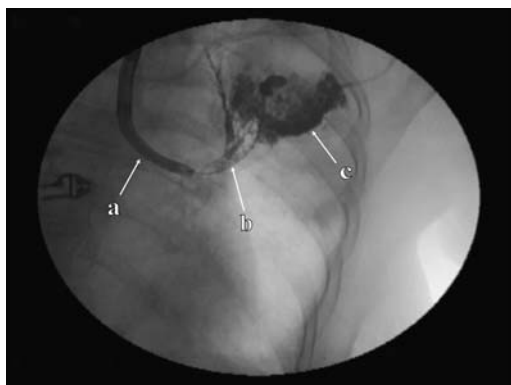


FIGURE 1. Chest x-ray showing: a, the flexible bronchoscope; b, the catheter; c, the radio opaque glue. *4+*

Hemoptysis persisted, despite 2 successful attempts at left bronchial arterial embolizations.

The patient was clearly not a candidate for a surgical resection of the lesion. Bronchoscopy localized the bleeding from the apical segment of the left upper lobe (LB1). Standard local hemostatic agents (cold saline and epinephrine) failed to alleviate the bleeding. Our last option was to occlude the apical segment of the left upper lobe. Unfortunately, placement of an endobronchial silicone spigot (EWS; Novatech, La Ciotat, France) failed due to technical issue along with active bleeding.

We decided to occlude the bleeding segment using a bio-reactive cyanoacrylate glue. A polyethylene catheter, 2 mm in diameter, was passed through the working channel of the bronchoscope and positioned into the LB1 segment. Two milliliters of cyanoacrylate-based glue (Glubran 2; Aspide Medical, La Talaudière, France) mixed 50-50 percent with iodinated contrast was prepared to use for fluoroscopic guidance. Before the injection, the bronchoscope was withdrawn 3 to 4 cm proximally from the tip of the catheter to protect the bronchoscope from the glue. The

catheter position was controlled under the fluoroscopic guidance. Thereafter, the solution was injected through the catheter, followed by a quick washing with saline to flush the glue into the target area. The injection was performed in all sub-segmental bronchi of LB1 using fluoroscopic guidance. A cessation of bleeding was achieved instantaneously (Fig. 1; Video, Supplemental Digital Content 1, <http://links.lww.com/LBR/A113>, which demonstrates the procedure under fluoroscopy).

A follow-up computed tomography scan was performed at 48 hours, which demonstrated the tumor surrounded by the glue (Fig. 2). There was no recurrence of bleeding during the remainder of her hospitalization. We did not notice any complication related to the instillation of the glue.

In lung cancer patients, hemoptysis occurs in 20% of subjects at some time during their clinical course, with massive episodes developing as the terminal event in 3%.² In our case, the patient presented with a large vascular lung tumor that was progressing despite

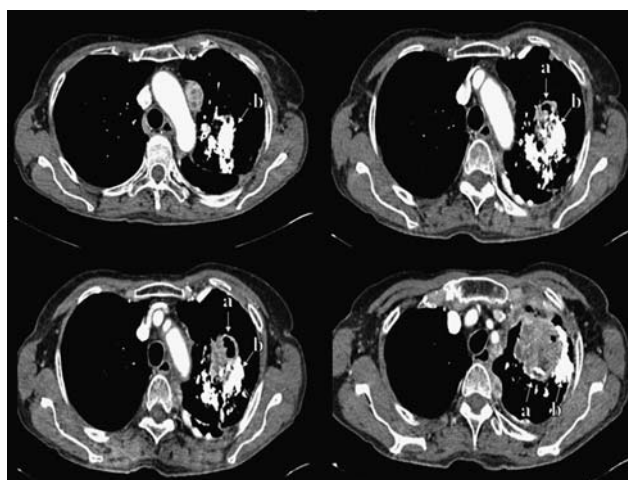


FIGURE 2. CT scan slides demonstrating the glue (b) which obstructs the apical segment of the left upper lobe and surrounds the tumor (a).

chemotherapy. Bronchial arteriography demonstrated a very important malignant neovascularization inside and around the tumor. Two left bronchial arterial embolizations were attempted yet failed.

Several bronchoscopic therapeutic techniques for the management of moderate to severe hemoptysis have been described in the literature; strategies depend upon the individual situation. In our case, instillation of standard hemostatic agents (cold saline and epinephrine) failed, which was not surprising. Indeed, the size of the tumor and the degree of its vascularization made these techniques inefficient.

In this context, the only measure to palliate the bleeding was to occlude the segmental bronchus leading to the source of bleeding. In our experience, placement of silicone spigot is an efficient immediate, temporary strategy to occlude bronchus,

until a more definitive measure can be carried out.^{3,4} However, in this particular patient an attempt to place a spigot failed due to difficult anatomic location. Subsequently, we decided to seal the bronchus with the cyanoacrylate glue; a tool that can be considered as a definitive treatment. This glue is a biological liquid glue, which hardens when in contact with water.^{5,6} This technique is a simple procedure and a good alternative in case the conventional therapies fail.

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