

Acute pain abdomen after bronchial artery embolization

Sir,

Massive hemoptysis is a life-threatening emergency and is one of the worst nightmares for a pulmonary physician. Both benign and malignant conditions can result in massive hemoptysis. Bronchial artery embolization is commonly performed mostly as a bridging procedure to control the hemoptysis. The procedure is reasonably safe and effective in controlling hemoptysis due to varying causes. However, severe, life-threatening complications due to inadvertent embolization of nontarget vessels have been reported.

A 32-year-old gentleman, with a history of having been treated for pulmonary tuberculosis 15 years ago, presented with multiple episodes of hemoptysis for 2 weeks. This included three episodes of massive hemoptysis (150–200 ml) for 2 days before admission. He was hemodynamically stable and had bilateral infrascapular coarse crepitations. Other system examination was unremarkable. Blood investigations including coagulation parameters were normal except for anemia (hemoglobin – 9 g/dl). Chest radiograph showed cystic lucencies in both lower lobes suggestive of bronchiectasis which was confirmed on high-resolution computed tomography (CT).

Bronchial artery embolization was done in view of bilateral disease. The right bronchial artery and inferior common trunk were embolized using Gelfoam [Figure 1]. He was stable immediately after the procedure. About 12 h postprocedure, he started experiencing severe abdominal pain along with multiple episodes of vomiting. The abdomen was soft to palpation with no guarding or rigidity. Erect abdominal X-ray and abdominal ultrasound did not give any clues, except for a solitary left kidney. A surgical consult was sought, and a contrast CT abdomen

was advised and a diagnostic laparotomy was planned. A nephrology opinion was sought in view of the solitary kidney. Due to the emergent need for the CT scan, good hydration with N-acetyl cysteine with an informed risk of contrast-induced nephropathy was advised. After obtaining informed consent from the patient, contrast CT of the abdomen was done which revealed multiple microinfarcts in the kidney and the spleen [Figure 2]. He was treated symptomatically with analgesia and hydration. Mild renal dysfunction developed (baseline blood urea/serum creatinine – 23/0.8 mg/dL and after CT – 29/1.75 mg/dL) which was attributed to the infarcts and contrast nephropathy in the solitary kidney. It resolved with conservative management (blood urea/serum creatinine at discharge – 12/1.09 mg/dL). The patient was discharged after 7 days of monitoring in a stable state.

Majority of the patients with massive hemoptysis are poor surgical candidates either due to poor pulmonary reserve or due to bilateral disease which precludes surgery. Embolization of the bronchial arteries feeding the diseased lung has been done routinely to control bleeding in these patients and even as a bridge procedure before definitive surgery can be performed. The procedure is relatively safe with a few self-limiting side effects such as chest pain, dysphagia, and shoulder pain, described in up to 35% of cases.^[1]

Multiple agents are used for embolization including gel foam, polyvinyl alcohol (PVA) particles, N-butyl cyanoacrylate (NBCA), coils, and embospheres (trisacryl microspheres). Gel sponge is simple and inexpensive, but by the virtue of being absorbable, chances of recanalization of the embolized artery and recurrence of bleeding are very high.^[2] PVA particles are variable in size (150–1200 µm) and form aggregates and hence carry less chances of systemic

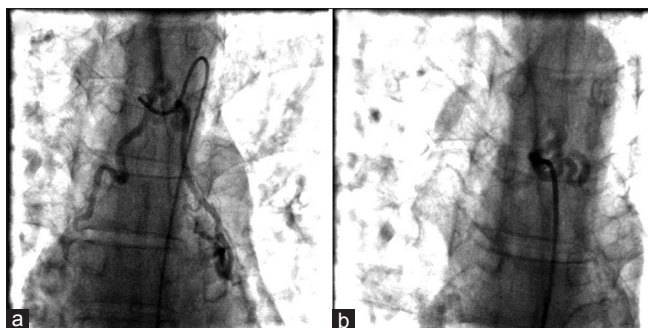


Figure 1: Angiography images (a) showing tortuous, dilated B/L bronchial arteries with abnormal blush. (b) Postembolization by Gelfoam image showing cessation of the flow just distal to the origin of the B/L bronchial arteries

embolization. Microspheres are more uniform in size compared to PVA and thus less prone for clumping within catheters. Nevertheless, they have better penetration and probably carry a higher risk of systemic embolization.^[3] Coils have fallen out of favor because they occlude more proximal vessels. Liquid agents such as NBCA are not used commonly due to high risk of tissue necrosis. However, this has been challenged and NBCA reported to be more durable and as safe as PVA.^[4] The optimum range of particle size is 350–500 μm because smaller particles can pass through the bronchopulmonary anastomoses, leading to systemic embolization, pulmonary infarcts, or occlude peripheral vessels causing necrosis of bronchial and esophageal wall.^[2]

The most dreaded of the systemic emboli include spinal cord ischemia in 0.6%–4.4%; transient ischemia or stroke in 0.6%–2%; and isolated cases of bronchial necrosis with bronchoesophageal fistula, myocardial infarction, and dissection of aorta.^[1] This has been attributed to inadvertent embolization of spinal arteries arising from bronchial or intercostobronchial arteries, reflux of embolic particles into the aorta, or their passage through bronchopulmonary shunts.

Splenic and renal infarcts have been rarely reported in literature and can present as an acute abdomen as in our patient. All the reported cases had spontaneous recovery with conservative management.^[3,5,6] Lack of knowledge regarding this possible rare complication may lead to improper investigations, misdiagnosis, and unwarranted laparotomies.

We did not use a microcatheter in our patient due to financial constraints. The possible cause of systemic embolization was a spillover of the gel foam into the aorta. Use of gelfoam led to complete recovery, the chances of which could have been lesser if PVA particles were used. Use of microcatheters helps in selective catheterization and positioning in the bronchial vessels and thus prevents spillover into systemic circulation and spinal

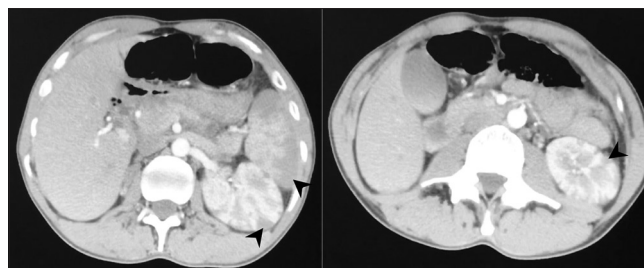


Figure 2: Computed tomography abdomen showing multiple nonenhancing areas in the cortical aspect of the left kidney and anterolateral aspect of the spleen suggestive of infarcts (arrowheads)

artery embolization. Careful scrutiny of the angiography for the presence of aberrant vessels and collaterals and thorough knowledge of vascular anatomy in experienced hands can minimize such inadvertent complications. Furthermore, as enumerated above, the material used for embolization also has a bearing on the likelihood of such complications.^[2,3] Hence, use of microcatheters for selective embolization and selection of the optimal size and agent for embolization, together with expertise, can prevent such extreme complications.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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