Massive Hemoptysis due to Acquired Bronchial Artery - Pulmonary Artery Fistula (BA-PA) - Endovascular management.

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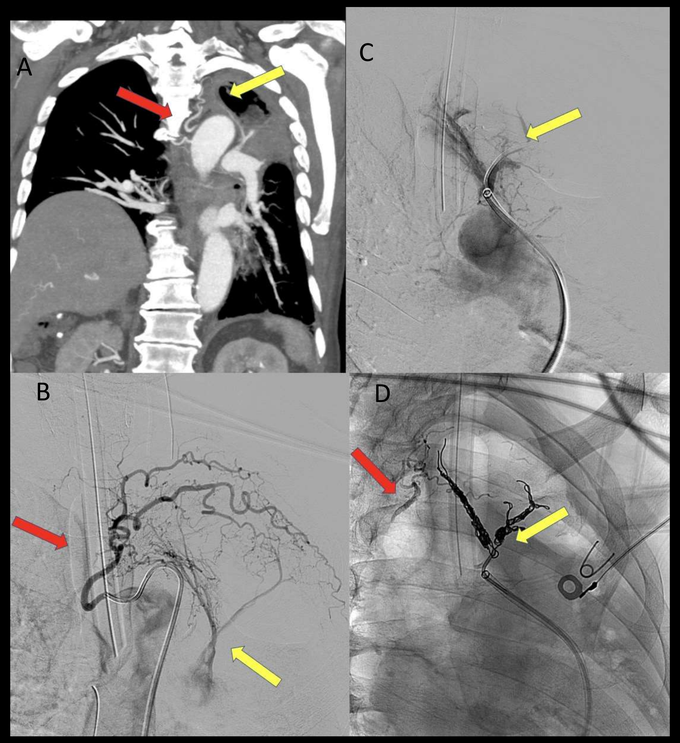
INTRODUCTION:

Bronchial artery embolization (BAE) is an established treatment for moderate to severe hemoptysis. N-butyl cyanoacrylate (NBCA) is used to achieve distal embolization and avoid recurrence from collateralization. Non-target embolization is a concern during BAE and a bronchopulmonary shunt increases the risk of non target embolization. Here we describe a case of acquired Bronchial artery - Pulmonary artery (BA - PA) fistula treated endovascularly.

CASE:

71-year-old male with treated tuberculosis and post treatment left upper lobe cavity (LUL) presented with cough. CT demonstrated multiple soft tissue nodules within the cavity suggesting Aspergilloma, which was confirmed on bronchoscopy. He presented with large volume hemoptysis within a week of initiation of anti-fungal therapy. Repeat CTA showed similar cavitation in the LUL with hypertrophied bronchial arteries along the superior aspect of the cavity. Prominent pulmonary artery branches were noted along the inferior aspect of the cavity. Interventional Radiology was consulted for Bronchial artery embolization.

Left supreme intercostal arteriogram (via a reverse Chung catheter) and left pulmonary arteriogram (via an angled catheter) was performed. Left supreme intercostal arteriogram demonstrated BA - PA fistula with reversed flow in the left upper lobe PA. The supreme intercostal artery was embolized using NBCA. Left upper lobe PA branches were embolized with coils. Final angiography showed cessation of flow around the left upper lobe cavity. Patient remained asymptomatic at 10 month follow up.



A – Coronal CTA demonstrating hypertrophied bronchial artery (red arrow) and branches of left upper lobe pulmonary artery (yellow arrow) around the left upper cavity.

B – Digital subtraction angiogram with Reverse Chung catheter in the left supreme intercostal artery demonstrating hypertrophied bronchial artery (red arrow) with filling of the left upper pulmonary artery (yellow arrow) likely through a fistula around the cavity.

C – Left upper lobe pulmonary arteriogram demonstrating abnormal left upper lobe pulmonary vasculature (yellow arrow).

D- Post embolization image demonstrating NBCA cast (red arrow) in the bronchial artery and coils in the left upper lobe pulmonary artery (yellow area). There was adequate cessation of flow.

DISCUSSION:

- Massive hemoptysis due to acquired BA-PA fistula is rare with only handful of reported cases in literature, bronchoscopic management is often unsuccessful.
- Acquired BA-PA fistulas occur in bronchiectasis, tuberculosis or other chronic infections and it is hypothesized that regional hypoxemia leads to abnormal neovascularization around the cavity.
- Factors limiting long term durability of BAE are incomplete embolization of target vessel, progression of underlying disease process and revascularization/formation of of collaterals.
- NBCA is a more durable embolic agent, achieving proximal and distal vessel occlusion with no recurrence found in a series of 319 BAEs (2).
- Risk of severe complications such as non-target embolization (anterior spinal artery or vertebral artery), shunting and tissue necrosis can occur with NBCA and requires high operator expertise.
- The concentration of NBCA can be decided based on the flow dynamics in the target vessel embolized – 1:2 or 1:3 ratio for larger vessels and 1:4 for smaller vessels.
- A cavitary lung process can erode into pulmonary artery branches causing pseudoaneurysms and increases risk of re-bleeding.
- Pulmonary artery branches were embolized with coils given reversal of flow. Systemic embolization of NBCA is a major concern, given reversal of flow, unless performed with a balloon occlusion catheter.

REFERENCES:

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