

Bronchial Artery
Embolisation in Patients
with Hemoptysis

Basic principle

- It is said that hemoptysis is caused by the formation of anomalous anastomosis (bronchial artery-pulmonary artery shunt) between the bronchial artery and the pulmonary artery, and if the bronchial artery is embolized, hemorrhage will cease. This is a fundamental concept of BAE.
- BAE was mostly performed as an emergency hemostatic procedure. Recently, it is often performed as an elective catheter treatment to prevent recurrence after massive hemoptysis, or control chronic repetitive hemoptysis.
- Although it is termed bronchial artery embolization, various systemic arteries other than the bronchial artery (non-bronchial arteries) also form a shunt with the pulmonary artery and cause hemoptysis. Therefore, it is common to embolize such non-bronchial arteries.

Indication

CIRSE (Cardiovascular and Interventional Radiological Society of Europe) Standards of Practice on Bronchial Artery Embolisation

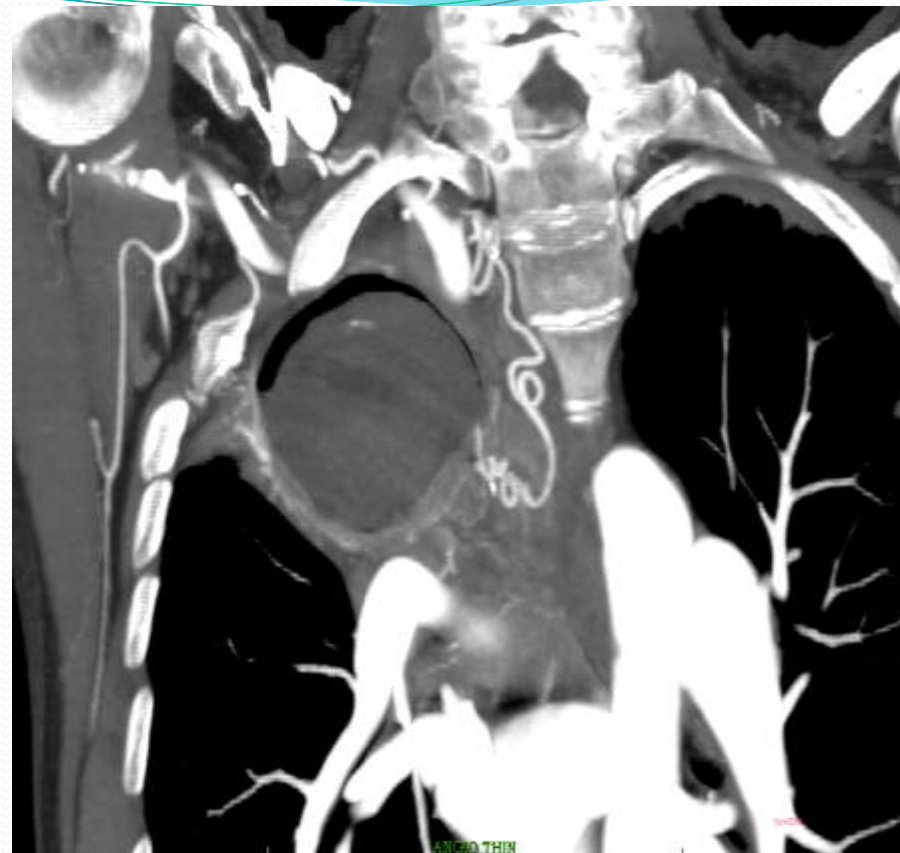
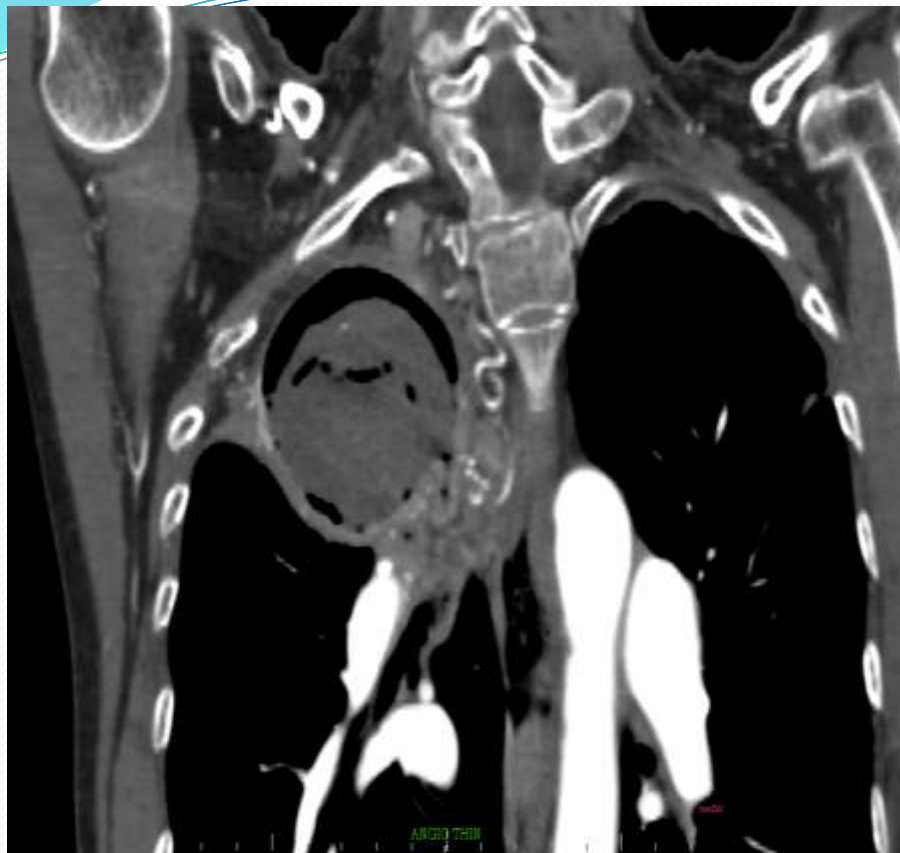
- Any haemoptysis causing significant airway compromise or respiratory distress
- Three or more episodes of haemoptysis with 100 ml blood or more within 1 week
- Chronic or slowly increasing bleeding episodes.
- As volume of blood expectoration is not reliable *significant hemoptysis* is considered on clinical grounds, including hematological compromise (a hemoglobin decrease of more than 1 g/dl) hemodynamic instability (defined as a systolic arterial pressure less than 90 mmHg).

Procedure

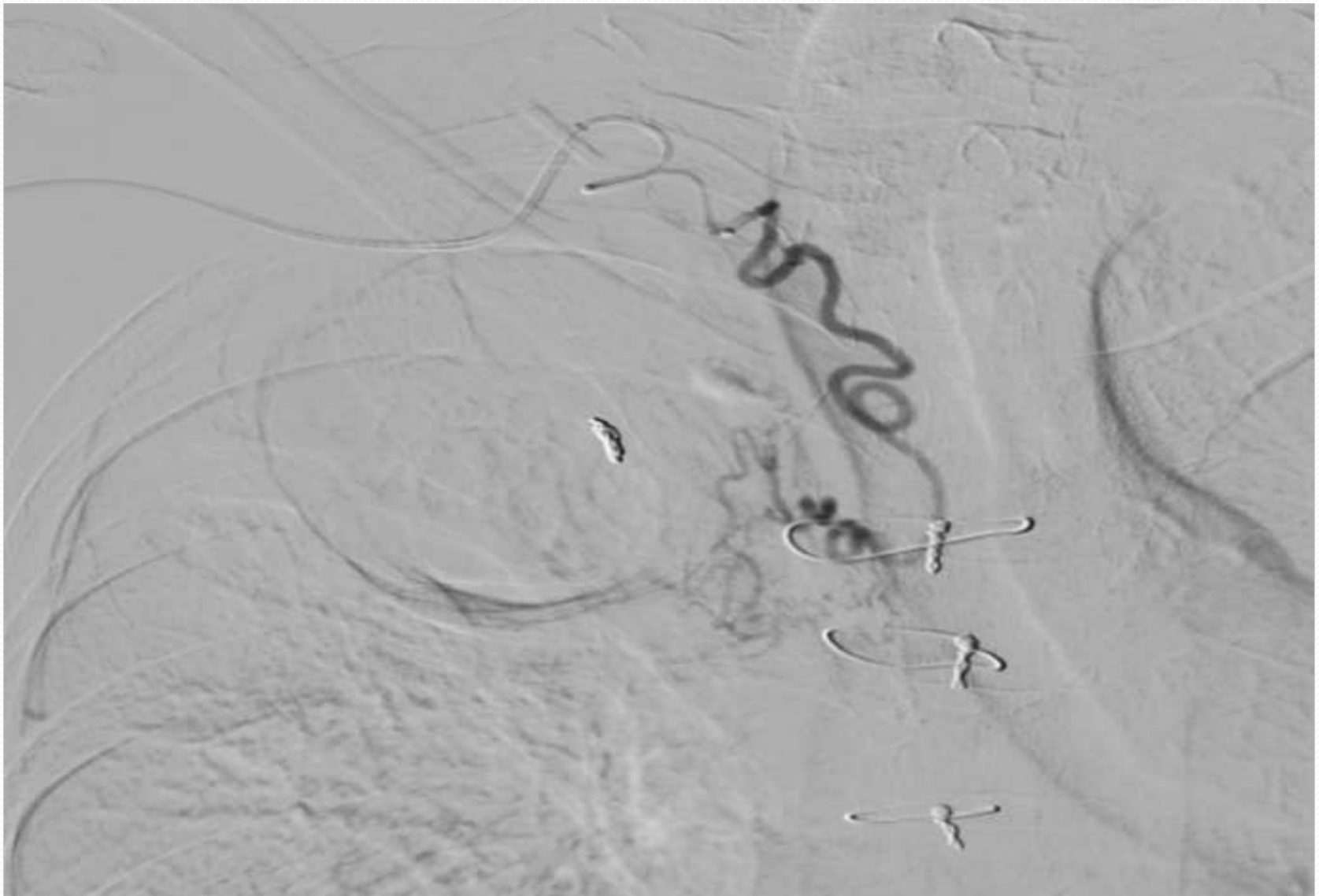
- Via transfemoral approach a 5F or 6F catheter into the descending thoracic aorta to catheterize the appropriate feeding artery selectively. A 2.7 F catheter was introduced in a coaxial manner and advanced as distally as possible in the target vessel where the embolization was performed. Therapeutic bronchial artery embolization was performed using 250-350 micron polyvinyl alcohol particles.
- Procedure was considered as technically successful in case of disappearance of the vascular blush following embolization.

Case 1

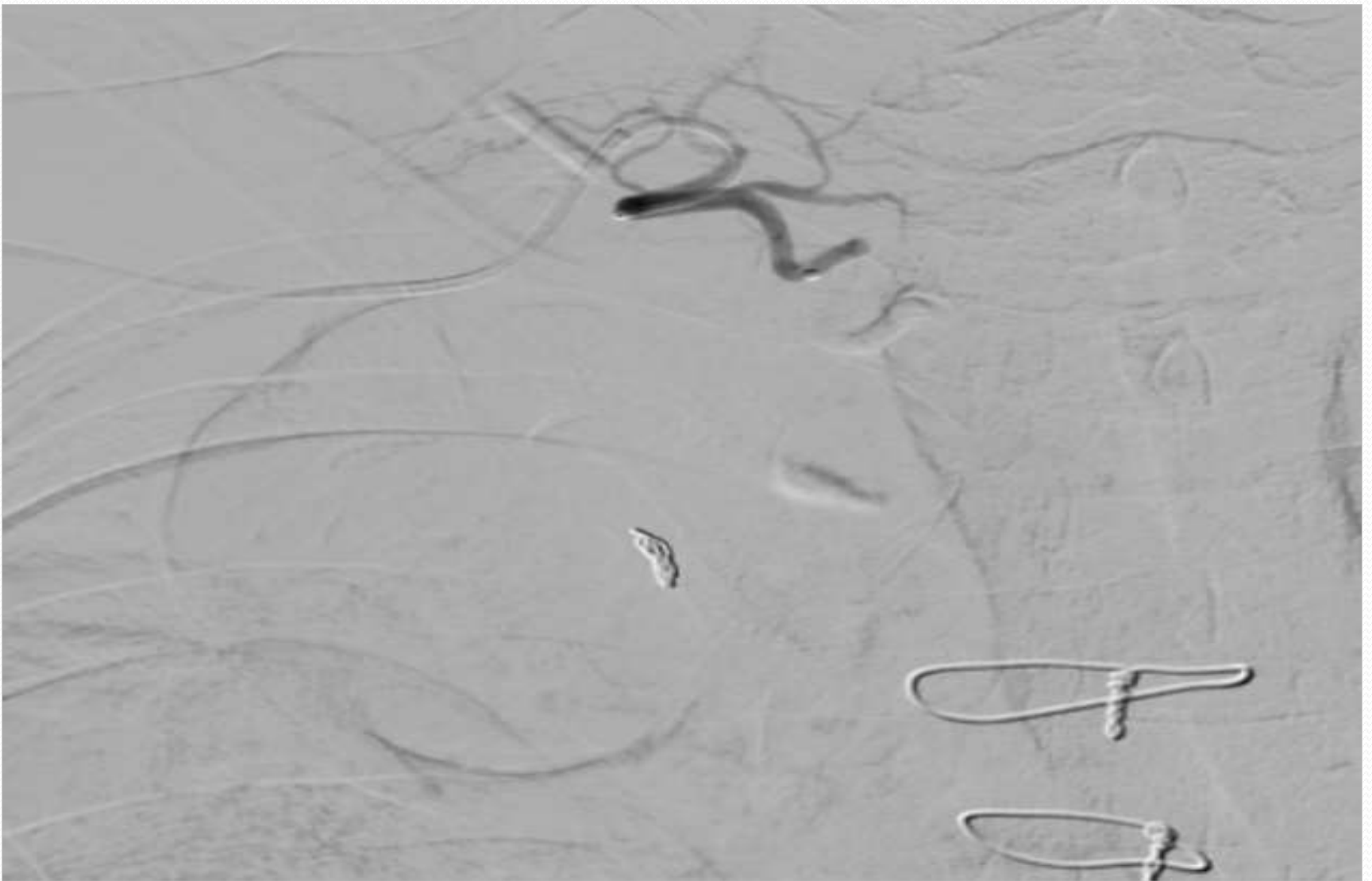
- 55y/f, k/c/o TB, presented with clinically significant hemoptysis



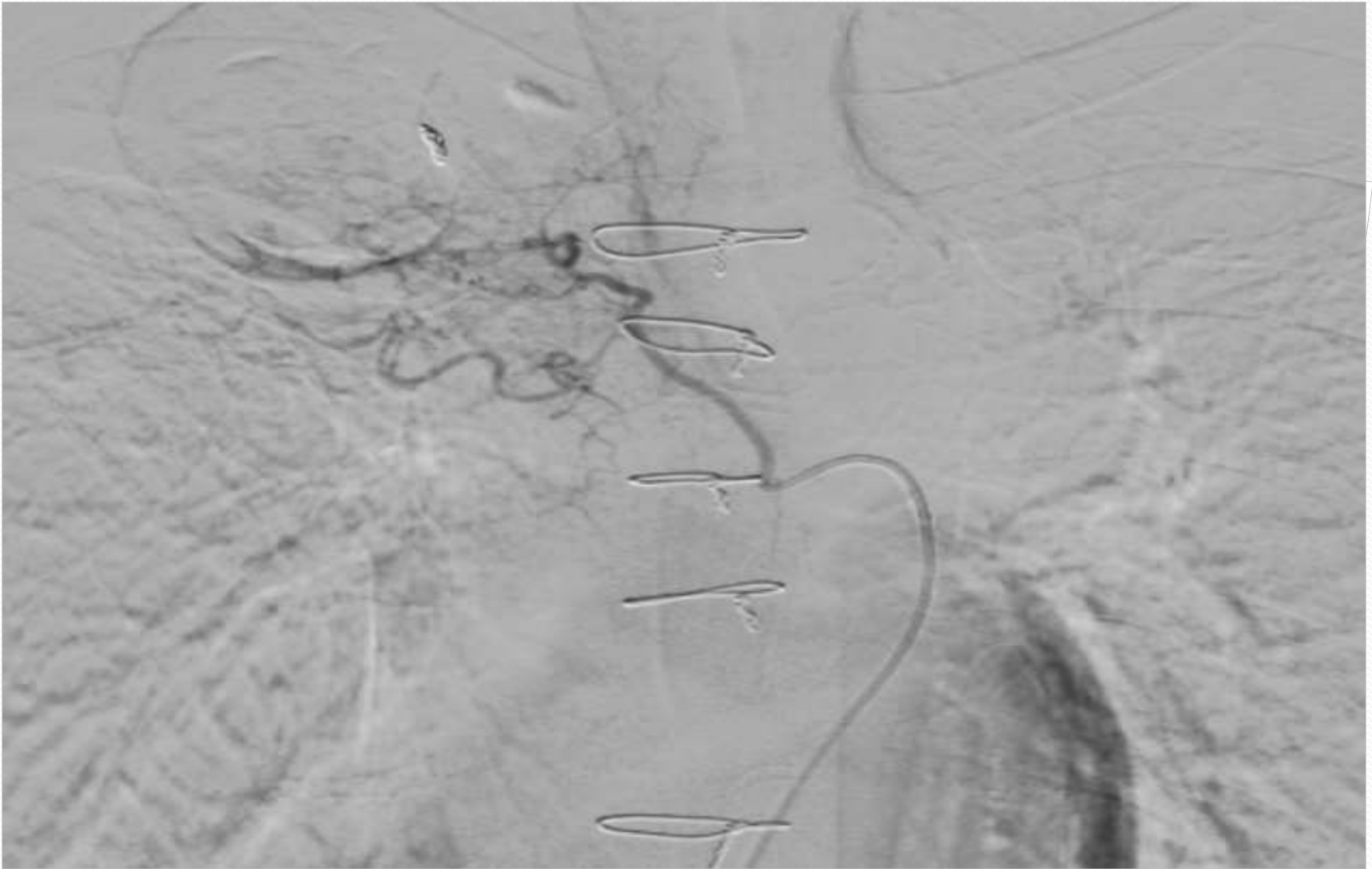
Coronal MIP reconstruction CT images showing large cavitary lesion In right upper lobe with abnormal tortuous vascular branches arising from right subclavian artery supplying it.



Vessel is super-selectively cannulated and embolized with PVA particle.



Stasis of blood flow on post embolization images



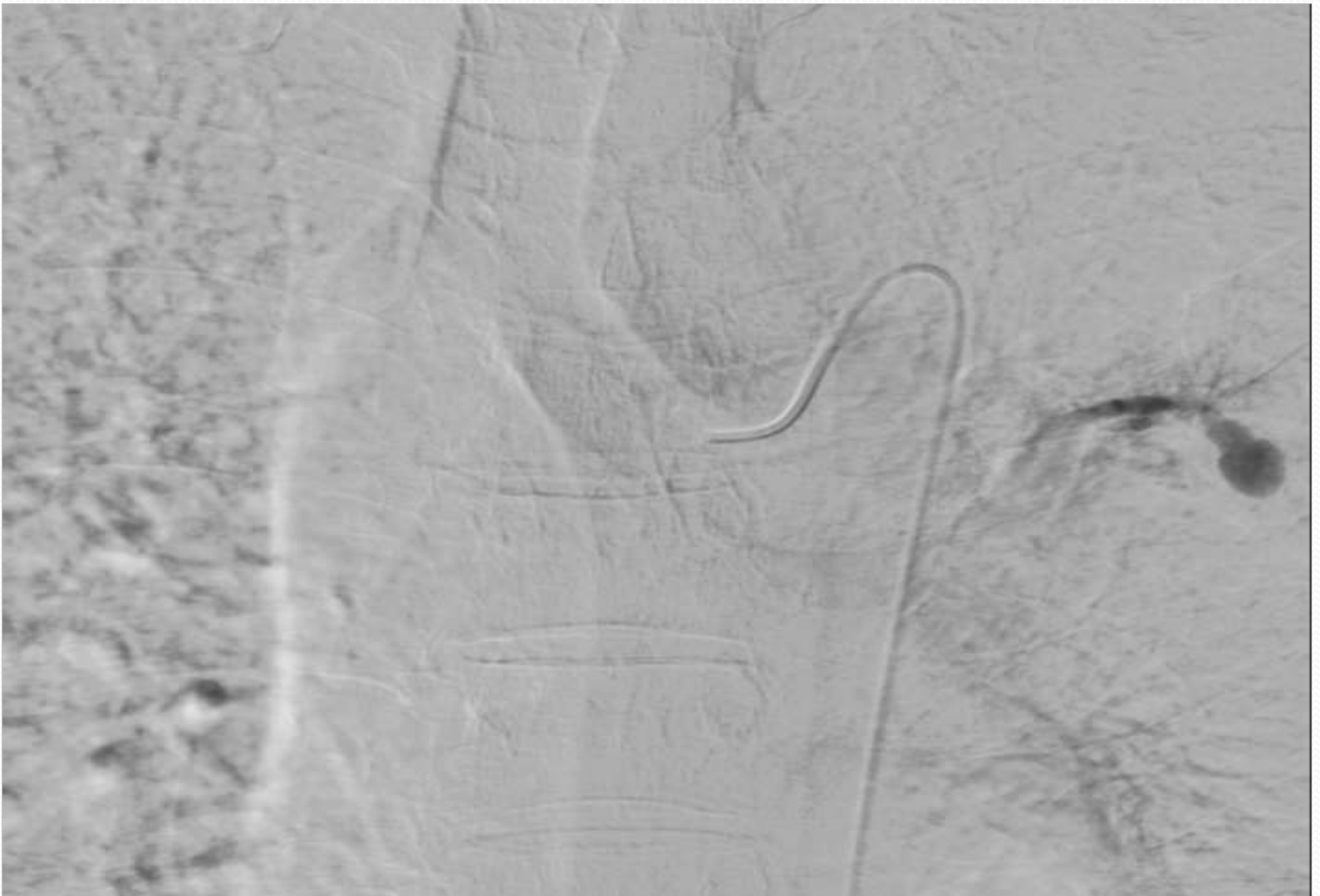
Angiography also revealed feeders from right intercostal arteries which are also embolized.

Case 2

- 49y/M, k/c/o TB, past history of hemoptysis (which was embolized previously 4 month back), again presented with recurrence of clinically significant hemoptysis.

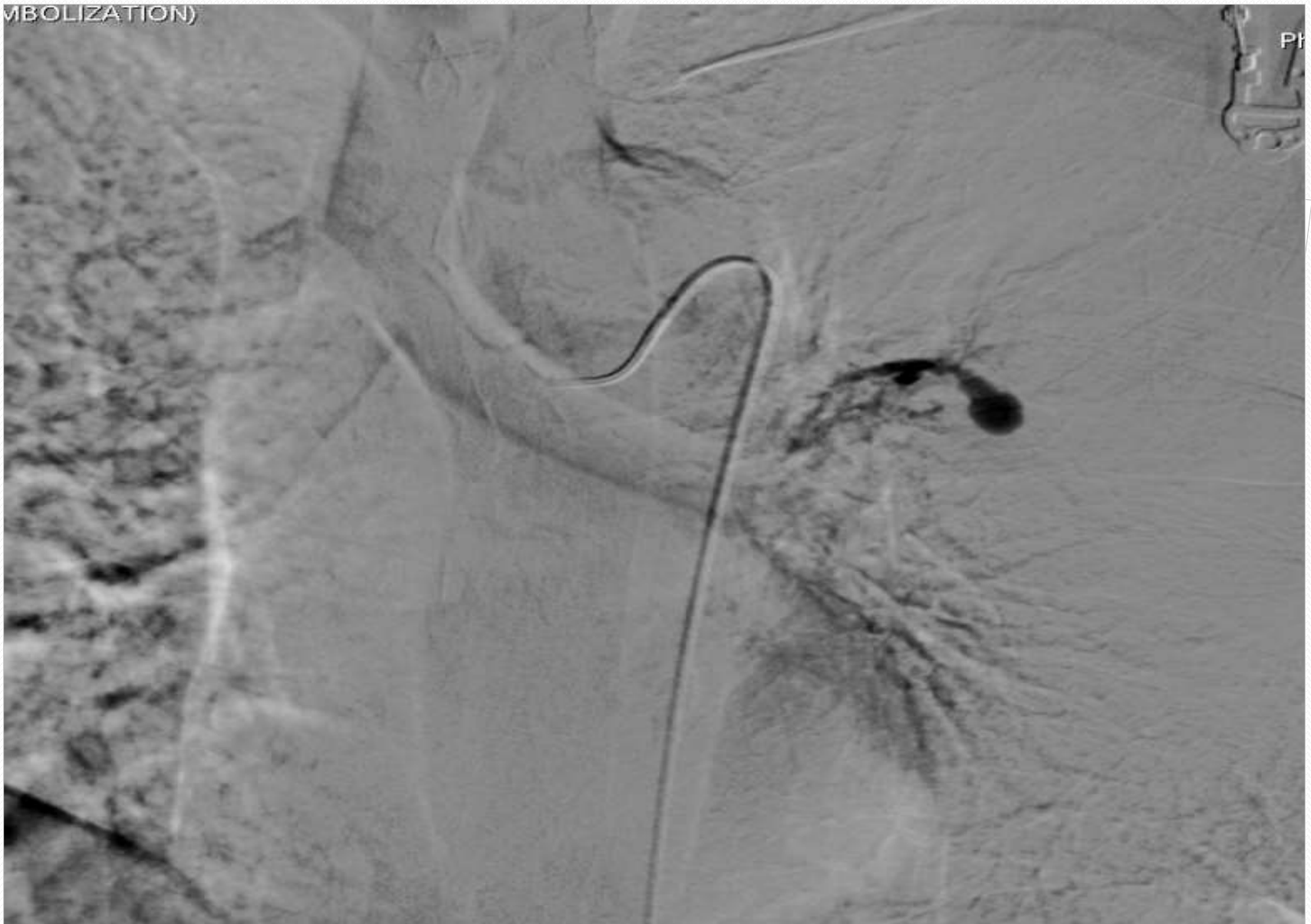


Coronal MIP recon CT images showing cavitary lesion in left upper lobe. No definite abnormal hypertrophied vessel supplying the lesion is noted.



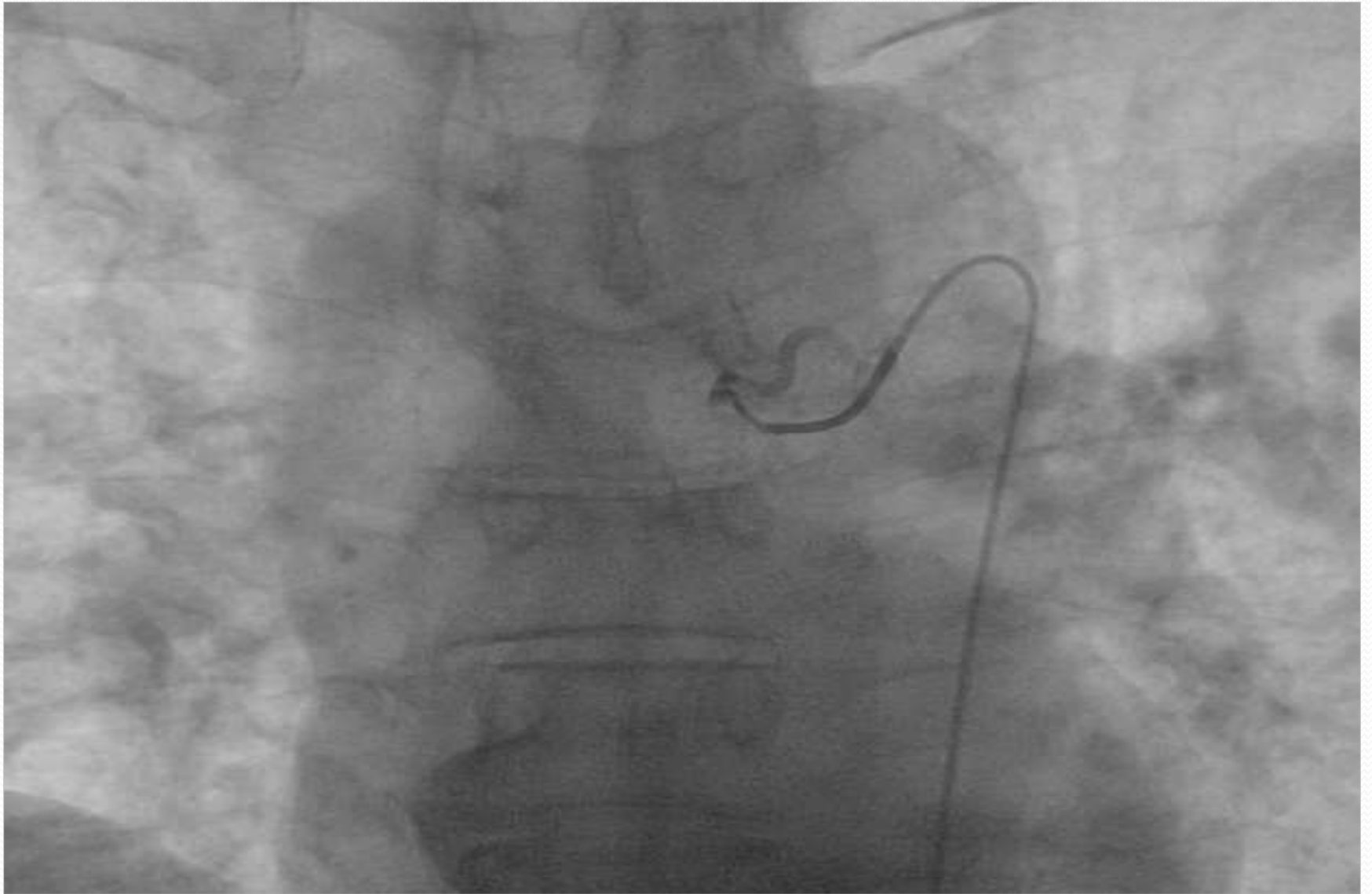
Angiography was done revealing hypertrophic left bronchial artery with pseudoaneurysm formation

EMBOLIZATION)



PH

Vessel is super-selectively cannulated and embolized with PVA particle.



Stasis of blood flow on post embolization images.

complications


- The most common complications of BAE are transient chest pain and dysphagia.
- The major complications include transverse myelitis, bronchial infarction, esophago-bronchial fistula, ischaemic colitis, transient cortical blindness and stroke.
- The dreaded one is spinal complication is spinal artery arising from bronchial is embolized inadvertently..
- If a spinal artery arises from a bronchial artery, we will only embolize the bronchial artery if we can achieve a stable distal position well beyond the spinal artery origin.

In pre operative cases

- As for pre operative embolization studies reveals less blood loss w.r.t. with out pre-operative embolization (for lobectomy 1344cc).
- Our preoperative indication cases reveals blood loss of approximately 600 cc and 800 cc.

Recurrence

- *Early-* may be due to **incomplete embolization** due to non-bronchial systemic arteries that are missed,
- *Late-* **recanalization** of the embolized vessel, **neovascularization** or **progression of the underlying disease** may be the reasons in the late period,
- Lung cancer, tuberculosis, aspergillosis and idiopathic bronchiectasis are associated with a high risk of bleeding recurrence.
- In these cases, BAE should be considered as a temporary and adjuvant therapy to surgery or as a specific medical therapy

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- The success rate of BAE in the early period is high, whereas it has a relatively lower success rate in the long-term .