Pulmonary artery pseudoaneurysm embolisation to treat massive haemoptysis due to metastatic oropharyngeal squamous cell carcinoma

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DESCRIPTION

A 57-year-old woman with metastatic oral squamous cell carcinoma presented to the emergency department with massive haemoptysis. Her blood pressure was 96/69 mm Hg with a heart rate of 65 beats per minute. Laboratory tests showed a mild coagulopathy (INR 1.3) for which vitamin K and tranexemic acid were administered. CT angiography revealed a metastatic pulmonary cavity, with an adjacent 10 mm pseudoaneurysm arising from a posterior basal segmental branch of the left pulmonary artery ([figure 1](#)). No other pulmonary, bronchial or systemic arterial anomaly was identified. Under general anaesthesia, the left pulmonary artery was selectively catheterised using a steerable 0.035" guidewire (Storq, Cordis, Baar, Switzerland), a 7F hydrophilic sheath (Ansel, Cook Medical, Indiana, USA) and a 5F multipurpose catheter (Cook Medical, Bloomington, Indiana, USA). Pulmonary artery angiography was performed with arrested respiration and selective pulmonary artery catheterisation carried out with a 130 cm microcatheter

(Progreat, Terumo, Tokyo, Japan). The pulmonary artery proximal and distal to the pseudoaneurysm was embolised with one 7×300 mm and five 10×500 mm helix ev3 concerto detachable coils (Medtronic, Minneapolis, Minnesota, USA). The pseudoaneurysm was embolised with a single 7×10 mm complex helical-18 microcoil and nine 4×7 mm multiloop-18 microcoils (Boston Scientific, Marlborough, Massachusetts, USA) with satisfactory angiographic result and no filling of the pseudoaneurysm ([figure 2](#)). This is also called a sandwich technique.¹ The patient's haemoptysis resolved, and her vital signs stabilised following the procedure with a short postprocedural stay in intensive care. No further haemoptysis occurred over the next 2 weeks, although she died following a further episode on day 24 postprocedure. Interim investigations with MRI neck and Positron Emission Tomography (PET)-CT demonstrated locoregional recurrence of squamous cell carcinoma and uptake within the pulmonary cavity attributed to metastases. Serial chest radiographs revealed a pleural effusion thought to be infective, in view of an elevated white cell count, which resolved after treatment with piperacillin. No angiographic follow-up was performed. The cause of recurrent massive haemoptysis was not confirmed and a post-mortem was not performed.

Massive haemoptysis, defined as blood loss of 300–600 mL over 24 hours, is a distressing and life-threatening condition. The bronchial arteries are the most common source of haemorrhage, with pulmonary arteries second, accounting for 6%–11% of cases.^{2,3} Pulmonary artery pseudoaneurysms are associated with cavitating infections or malignancy, usually primary lung cancer, and rarely due to metastases.^{4,5} No difference in pseudoaneurysm morphology or response to treatment has been identified for different types of malignancy.

CT angiography is essential for accurate diagnosis, treatment planning and prognostication and should therefore be performed urgently. Treatment can be pharmacological, bronchoscopic, endovascular or surgical and is often guided by the volume of haemorrhage, the underlying cause, patient's performance status and laboratory results.⁶ Classification on catheter angiography can be used to further determine the endovascular treatment approach. Pseudoaneurysms which are visualised at non-selective (type A) or selective (type B) segmental pulmonary angiography are amenable to endovascular treatment via the pulmonary artery. In

Figure 1 Coronal CT pulmonary angiogram (maximum intensity projection reformat) showing a 10 mm wide necked pseudoaneurysm originating from the posterior basal segmental branch of the left lower lobe pulmonary artery.

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Figure 2 Fluoroscopic image demonstrating contrast at the top of the coil nest suggestive of complete occlusion of the posterior basal segmental pulmonary artery and the pseudoaneurysm with embolisation coils.

contrast, pseudoaneurysms which are only demonstrated with bronchial or other systemic arterial (eg, internal mammary) catheterisation (type C) usually arise from systemic to pulmonary arterial shunts and can be treated by bronchial or systemic arterial embolisation. When a pseudoaneurysm is evident on CT but not on catheter angiography (type D), empirical targeted embolisation based on CT findings may be considered.⁷

Where a massive haemoptysis pathway is in place, the patient may be transferred from the CT scanner to the interventional radiology suite to receive prompt endovascular treatment. Coagulopathy should be corrected in all cases and the airway managed to reduce the risk of aspiration. However we wish to emphasise that while the procedure is safe, the prognosis is still poor even when effective endpoint embolotherapy is carried out. Indeed, survival rates of 67% and 46% at 1 and 3 months have been reported in the literature, meaning physicians should be aware of this and the patient should be consented accordingly.⁸ Endovascular embolisation can be used in the emergency setting to allow

Patient's perspective

I was frightened prior to the procedure and my husband was tearful. We were hugely relieved when I awoke the following day.

Learning points

- ▶ Although massive haemoptysis arises from bronchial or other systemic arteries in most cases, treating physicians should be mindful of the possibility of pulmonary arterial haemorrhage, especially in the context of cavitating pulmonary lesions.
- ▶ Early CT angiography should be arranged to make the diagnosis, plan treatment and prognosticate.
- ▶ Pulmonary artery pseudoaneurysms can be treated by interventional radiologists using minimally invasive endovascular techniques.

a definitive management strategy to be implemented. Follow-up angiographic imaging should be considered to evaluate embolisation efficacy. The procedure does not preclude surgery should it become necessary, and can alleviate symptoms in the palliative setting.

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