

# Giant complex pulmonary arteriovenous malformation treated with coil embolisation under general anaesthesia with a history of contrast media allergy

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## DESCRIPTION

An early-adolescent male patient receiving dupilumab for atopic dermatitis consulted for chest discomfort. He had allergies to peanuts and tick bites, a history of childhood asthma and finger clubbing. On admission, his oxygen saturation was 90% at room air. Unenhanced chest CT showed idiopathic pneumomediastinum and an incidental pulmonary arteriovenous malformation (PAVM) in the middle lobe of the right lung. Genetic testing for hereditary haemorrhagic telangiectasia was negative; no physical findings or family history suggested this disease. Head and trunk contrast-enhanced CT using iomeprol was performed to evaluate the arteriovenous malformation (AVM). The patient's allergy to contrast media was noted during this examination. The PAVM in the middle lobe of the right lung—complex and 5.5 cm in length—was mainly supplied by the medial segmental artery of the lobe (A5). Its largest diameter was 9.8 mm. CT showed lesions in the right upper and lower lobes; PAVMs were suspected. No AVMs were noted in any other organs. The patient had no PAVM-related respiratory symptoms.

Given the risk of central nervous system complications and hypoxemia, we performed endovascular coil embolisation. A two-stage procedure was planned, as embolising a giant PAVM was too lengthy for a one-stage procedure. Moreover, a two-stage procedure supports fractionation of the radiation exposure. To prevent an allergic reaction to the contrast media in stage 1 of the embolisation, prednisolone was preadministered, general

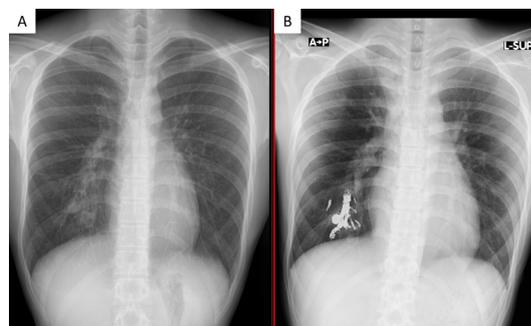
anaesthesia was selected, and the contrast medium was changed. Angiography using iohexal was initiated; no changes in vital signs were noted. Angiography of A5 showed numerous PAVMs. The target PAVM was embolised using 63 hydrogel detachable coils and an Amplatzer vascular plug ([figure 1](#)). The procedure lasted 6 hours 42 min.

Three months after the procedure, arterial blood gas testing showed an increase in partial pressure of arterial oxygen from 62.6 to 90.8 mm Hg. Stage 2, embolisation of the residual lesion, was planned to take place 6 months after the initial procedure.

Approximately 20% of all PAVMs are complex. Embolisation is technically difficult for such cases because it requires occlusion of multiple supply arteries.<sup>1</sup> Recently, embolisation of the sac, in addition to the pulmonary artery, has been suggested to reduce artery reopening.<sup>2</sup> We followed this approach in this case; therefore, more coils and time were required.

The patient's history of severe allergy to contrast media, multiple other allergies and asthma were considered risk factors. Despite premedication with steroids, allergic reactions to contrast media develop in 2.1% of patients with  $\geq 2$  risk factors, as seen in our patient.<sup>3</sup> We changed the contrast medium and performed the procedure under general anaesthesia to avoid a breakthrough reaction, enabling us to safely complete the embolisation.

Pneumonectomy was suggested as an alternative treatment. The patient and his family declined the surgery, and as CT imaging suggested multiple other PAVMs, embolisation was performed first. Surgery may be performed should clinical failure occur. Considering the invasiveness of surgery, we believe that



**Figure 1** Chest radiography shows (A) a dense mass in the right lower lung (before endovascular coil embolisation) and (B) the embolised pulmonary arteriovenous malformation. Sixty-three hydrogel detachable coils and an Amplatzer vascular plug were used to complete the first stage of treatment.

## Learning points

- ▶ A young patient with a history of allergy to contrast media underwent successful transvascular coil embolisation of a giant pulmonary arteriovenous malformation that had a complex geometry.
- ▶ Performing an embolisation under general anaesthesia enables systemic control in case of recurrent anaphylaxis and rest during lengthy procedures.
- ▶ Endovascular coil embolisation should be considered first for treating complex pulmonary arteriovenous malformations.



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embolisation should be the first treatment choice, even for complex PAVMs.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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#### REFERENCES

- 1 Sulaiman S, Vinayakumar D, Bastian C. Percutaneous closure of a giant pulmonary arteriovenous malformation using multiple devices. *J Cardiol Cases* 2017;16:62–5.
- 2 Shimohira M, Kiyosue H, Osuga K, *et al.* Location of embolization affects patency after coil embolization for pulmonary arteriovenous malformations: importance of time-resolved magnetic resonance angiography for diagnosis of patency. *Eur Radiol* 2021;31:5409–20.
- 3 Mervak BM, Davenport MS, Ellis JH, *et al.* Rates of breakthrough reactions in inpatients at high risk receiving premedication before contrast-enhanced CT. *AJR Am J Roentgenol* 2015;205:77–84.

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