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NEUROLOGICAL PICTURE

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A case of brain embolism during catheter embolisation of head arteriovenous malformation. What is the mechanism of stroke?

A 52-year-old man presented with facial swelling owing to progression of arteriovenous malformation (AVM). Angiography under endotracheal anaesthesia showed the right internal maxillary, right ascending pharyngeal and right superficial temporal arteries feeding an AVM (fig 1A). Clear connections to the intracranial circulation were not found. Vessels were embolised using N-butyl-2-cyanoacrylate and iodinated oily x ray contrast medium comprising 40% iodine in poppy seed oil (Lipiodol; Terumo, Tokyo, Japan; fig 1B).

After AVM embolisation, disturbance of consciousness and left hemiparesis were present. Diffusion-weighted magnetic resonance imaging showed multiple hyperintense lesions of the right middle cerebral artery, right posterior cerebral artery and right posterior inferior cerebellar artery territories (fig 2A). Computed tomography showed low-density lesions with high-density spots (fig 2B). We confirmed a patent foramen ovale (PFO) using transcranial Doppler and transoesophageal echocardiography with saline contrast. No lesions contributing to cerebral embolism were present in the carotid artery or the aortic arch. We finally considered that paradoxical brain embolism occurred because of embolic material passing through the PFO.

Cerebral complications during catheter embolisation have rarely been described in detail.^{1,2} Firstly, embolic material would have had to pass from the artery to the vein through the cerebral AVM during catheter embolisation. Pulmonary embolism as a complication of transcatheter arterial embolisation has indeed been documented.³ Secondly, mechanical ventilation may have contributed to an elevation of right atrial pressure. Increasing pressure in the right atrium would generate conditions such as a Valsalva manoeuvre. Therefore,

embolic material could have passed from the right to the left atrium through the PFO, resulting in multiple brain infarctions.

Y Iguchi, K Kimura

Department of Stroke Medicine, Kawasaki Medical School, Kurashiki-City, Japan

Correspondence to: Y Iguchi, Department of Stroke Medicine, Kawasaki Medical School, 577 Matsushima, Kurashiki-city, Okayama 701-0192, Japan; yigu@med.kawasaki-m.ac.jp

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Figure 1 (A) Right external carotid arteriography shows the right internal maxillary, right ascending pharyngeal and right superficial temporal arteries feeding vessels to a cerebral arteriovenous malformation (AVM). (B) Common carotid arteriography shows branches of the external carotid artery feeding vessels to the AVM.

Figure 2 (A) Diffusion-weighted magnetic resonance imaging shows multiple hyperintense lesions in the right occipital and temporal lobes and right caudate nucleus. (B) Computed tomography shows a hypodense lesion in the right occipital lobe. Multiple hyperdense lesions are present in bilateral occipital lobes, showing evidence of embolic material.