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LETTER TO THE EDITORS

Fat emboli responsible for ischemic stroke in reconstructive eye surgery

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Dear Sirs,

A 33-year-old woman underwent autologous fat injection in the left orbit during reconstructive eye surgery before replacement of an infected eye prosthesis. Past medical history was uneventful except for anophthalmia since age 6, responsible for several operations over the past decade. After removal of the infected prosthesis, a partial reconstruction of the orbit was performed. Eight 1-mL syringes, each containing 1 mL of autologous fat were injected, two into the margo orbitalis region, and the six others into the orbital cavity. No cardiac arrhythmia or drop of blood pressure was recorded during surgery or the postoperative period. Upon awakening, the patient presented a complete right hemiplegia.

Brain MRI revealed a large cerebral infarction in the left middle cerebral artery (MCA) territory (Fig. 1). Cervical and transcranial ultrasonography, transthoracic and transoesophageal echocardiography, 24 h-Holter ECG and the biological workup were all normal. In addition to cerebral ischemia, MRI showed the presence of T1-hyperintensive abnormalities, both in the left cavernous sinus and in several distal branches of the left MCA. These abnormalities disappeared on sequences with fat saturation, confirming their fatty nature and leading to the diagnosis of stroke due to fat emboli (Fig. 1).

Stroke after autologous fat injection in cosmetic surgery of the face has been exceptionally reported [1–4]. In these cases, fundoscopic examination was diagnostic, showing occlusions of distal branches of the retinal artery with fat emboli. To our knowledge, stroke complicating a reconstructive eye surgery has not been reported to date. In the present case, fundus could not be examined (anophtalmia) but MRI was the diagnostic tool, demonstrating the presence of fatty particles in cerebral arteries.

The mechanism by which extravascular injection of fat during reconstructive surgery of the face can provoke ischemic stroke remains speculative. It has been shown using conventional angiography that inactive anastomoses between external and internal carotid arteries may become functionally active if pressure in external carotid artery branches is increased [5]. Fatty particles could enter the external carotid artery system directly by intravasation before reaching the internal carotid artery retrogradely by reopening of the anastomoses cited above. Three preconditions are supposed to favor intravasation of fat, namely, the presence of well vascularized tissues, fragmentation of the parenchyma associated with vascular breaches (for example in the case of infected tissue), and local pressure increase [2]. Our patient fulfilled these preconditions since orbital structures are hypervascularized, the procedure was septic with tissues already fragmented by previous reconstructions, and repeated injections during the procedure certainly increased the intraorbital pressure. The amount of fat injected, the applied force during injections and the velocity of these injections seem also to be factors that raise the risk of fat emboli during facial reconstructive surgery [2, 4] and should be taken into careful account during any procedure. Our case dramatically illustrates the fact that fat injection in infected

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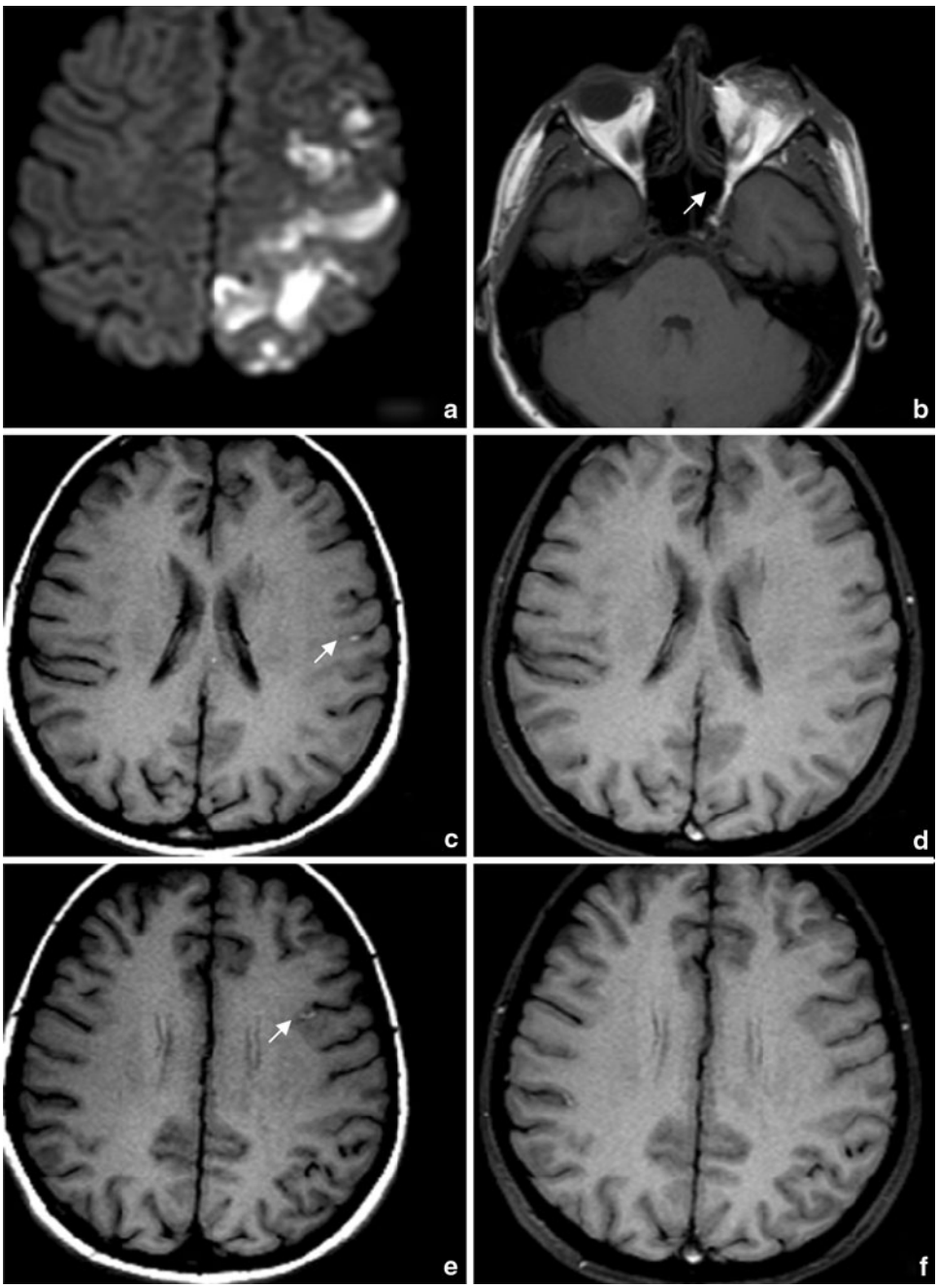

Fig. 1 **a** Diffusion weighted imaging showing brain infarction in the left middle cerebral artery territory. **b** T1 weighted imaging showing fat slipping into the left cavernous sinus (*arrow*). **c**, **e** T1 weighted imaging showing punctiform hypersignals in left middle cerebral artery branches (*arrows*). **d**, **f** T1 weighted imaging with saturation of fat, same images: disappearance of hypersignals

tissue should be avoided as long as possible. Although exceptional, ischemic stroke is a dreadful complication of orbital reconstruction of which neurologists and surgeons should be definitely aware.

Conflict of interest statement None.

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