Clinical picture

Giant intracranial aneurysm of the right middle cerebral artery

A 40-year-old Tibetan monk attended the emergency department with a 3-week history of occipital headache and nausea. Further history was unremarkable, with no focal neurological deficit on examination. An urgent computed tomography (CT) of the head was performed. This revealed a 6 x 6 cm well-defined, hyper-dense lesion in the right fronto-temporal region (Figures 1 and 2). There was also significant mass effect on the lateral and third ventricle ipsilaterally. The contralateral temporal horn was slightly prominent, suggestive of mild chronic contralateral hydrocephalus. The lesion enhanced markedly with intravenous contrast and was initially thought to represent a large meningioma. Specialist neuro-radiological opinion was sought, and after further review, the mass was reported as a giant intracranial aneurysm arising from the right middle cerebral artery (MCA). This was confirmed on CT angiography, which demonstrated the aneurysm to arise from the M1 segment of the right MCA (Figure 3). Imaging features, including no obvious transependymal cerebrospinal fluid (CSF) flow on pre-contrast CT, suggested this to not be an acute phenomenon. The patient subsequently underwent endovascular embolization of the aneurysm under local anaesthetic. Due to significant jet flow into the aneurysm, elective embolization of the right internal carotid artery was undertaken. The patient initially made a good recovery, but 48-h post-embolization developed raised intracranial pressure and required an emergency right craniotomy for decompression. This was subsequently complicated by pulmonary sepsis, a complication from which he ultimately died.

Giant intracranial aneurysms are aneurysms with a maximum diameter of 25 mm or greater. They comprise 5% of all cerebral aneurysms, have a female preponderance, and typically present in the fifth to seventh decades of life. They can develop de novo at defective areas of the internal elastic lamina or evolve from smaller aneurysms under continued hemodynamic stress. Most aneurysms are of the saccular type. Presentation of unruptured aneurysms can be varied, with features including focal neurology (e.g. cranial nerve palsy, visual disturbance), impaired mental status, headache, nausea and vomiting, and seizures. CT or magnetic resonance (MR) angiography is commonly used to assess intraluminal flow, define the neck, and establish the relationship to adjacent vascular structures. Giant aneurysms appear on unenhanced CT as well-delineated, round or lobulated, slightly hyperattenuating extra-axial masses, often exhibiting significant mass effect. Concentric bands of peripheral intramural or luminal thrombus calcification are common, producing a heterogenous, laminated appearance—a feature unusually absent in our reported case. Signal intensity characteristics at MR imaging are variable, depending on blood velocity,
Management of giant intracranial aneurysms is difficult due to anatomical complexity, but endovascular treatment is generally associated with lower morbidity and mortality than surgery. Several endovascular approaches exist, including parent vessel occlusion, selective coiling (endosaccular, balloon-assisted and stent-assisted) and embolization, with morbidity and mortality reported in a recent 106-case series to be 7.5 and 2.8%, respectively. Surgical approaches include aneurysm clipping, aneurysm trapping, bypass, aneurysmectomy and aneurysmorrhaphy, with peri-operative morbidity and mortality reported in a recent six-case series to be 36 and 18%, respectively. Both endovascular and surgical approaches can achieve ‘excellent’ or ‘good’ clinical outcomes at over 1-year post-procedure, with modified Rankin Scale scores ≤2 achieved in the above case series’ to be 88 and 86%, respectively. Fusiform aneurysms are usually left untreated due to lack of a definable neck. Untreated, giant intracranial aneurysms have a 5-year mortality >80% due to a high risk of subarachnoid haemorrhage and progressive mass effect; treatment provides >70% of patients with a good outcome.

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References