False cerebral aneurysm associated with metastatic carcinoma of the brain

Case report

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In a patient with metastatic carcinoma of the left frontal lobe, carotid angiography revealed a false cerebral aneurysm arising from the middle cerebral vessels. At craniotomy the aneurysm was found to be surrounded by tumor and cortex. Since the clinical history excluded trauma, it was inferred that the histologically-proven invasion of the aneurysm wall by malignant cells was responsible for the formation of a false cerebral aneurysm.

KEY WORDS • false aneurysm • metastatic cerebral tumor

There have been several reports of false aneurysm of the middle meningeal artery and cerebrum, all of traumatic origin. To our knowledge no case of false cerebral aneurysm associated with metastatic carcinoma of the brain, and without history of trauma, has been published. We are presenting such a case.

Case Report

This 66-year-old man was seen for the first time on August 8, 1971, because of progressive confusion, disorientation, and slowness of mental function of 4 months' duration, and headache, apathy, poor balance, and mental confusion for 2 weeks. No history of head injury was obtained.

Examination. The systemic examination was unremarkable. There was loss of both remote and recent memory, inability to perform simple calculations, loss of attention span, and disorientation as to time and place. There was no papilledema, deficits of speech, cranial nerves, or motor or sensory systems. Very mild truncal ataxia was noted during ambulation. Laboratory tests showed: hemoglobin 14.6 gm/100 ml, hematocrit 44%, white blood cell count 7000/cu mm, normal electrolytes, protein 7.2 gm/100 ml, albumin 4.36 gm/100 ml, bilirubin 0.43 mg/100 ml, alkaline phosphatase 65 units/100 ml, lactate dehydrogenase (LDH) 122 units/100 ml, serum glutamic oxaloacetic transaminase (SGOT) 43 units/100 ml, blood urea nitrogen (BUN) 15 mg/100 ml. Chest and skull x-rays were normal. Brain scan disclosed a large area of abnormal uptake in the left frontal area. The left carotid angiogram (Fig. 1) showed a rounded shift of the anterior cerebral artery to the right, with an aneurysm apparently arising from a cortical branch of the middle cerebral group. Both the meniscus formation and the dissociated angiographic appearance of the distal and proximal segment to the aneurysm were interpreted as results of extremely slow circulation through the false aneurysm.
False cerebral aneurysm with metastatic carcinoma

Operation. On September 7, 1971, a frontal temporal flap was reflected. When the dura was opened, the aneurysm, which was embedded in both the cortex and the tumor, ruptured; the bleeding was easily controlled by clipping the feeding artery. The aneurysm was excised and a subtotal removal of a large tumor was performed without difficulty.

Histological Examination. The tumor cells were arranged in cords and sheets with large areas of necrosis supported by delicate fibrovascular stroma. The surrounding cerebral tissue sections were invaded by tumor cells that appeared pleomorphic, with numerous mitotic figures, scanty cytoplasm, and large hyperchromatic nuclei suggesting metastatic carcinoma of the brain possibly of pulmonary origin. Sections through a fragment of the aneurysm wall (Fig. 2) showed definite invasion by sheets and cords of malignant cells.

Postoperative Course. Recovery was uneventful. The patient was discharged on September 17, 1971; on examination 3 weeks later he appeared alert and oriented, and showed no speech difficulties or focal neurological deficits. He died 3 months later because of recurrent metastatic carcinoma of the brain.

Fig. 1. Left carotid angiograms. Upper Left: Anteroposterior view showing a shift of the anterior cerebral artery to the right side. Arrow indicates the aneurysm. Upper Right: Lateral view, showing the aneurysm (black arrow) arising from a cortical branch of the middle cerebral group (white arrow). Lower Left: Brow-up projection; intermediate phase, approximately 2½ seconds later. The aneurysm (black arrow) can still be seen (delayed filling). Note the meniscus formation due to deposition of the contrast material in the fundus of the aneurysm and separated from the blood, which has a lighter specific gravity. The distal arterial vessel of the aneurysm is still visible (white arrow) but the proximal feeding segment is no longer seen because the contrast material has emptied into the sac (dissociated angiography appearance of the arterial segments distal and proximal to the aneurysm).
microscopic tumor invasion. The latter mechanism would include clot formation, inner cavitation and communication with the arterial lumen in a manner comparable to the formation of a false aneurysm due to trauma. A combination of these mechanisms is also possible.

**Discussion**

We are aware that a false aneurysm can be identified by histological means, and that, unfortunately, we do not have such documentation. We base our assumption on the angiographic appearance.

The absence of trauma and presence of sheets of malignant cells invading the vessel wall suggest that this false aneurysm developed because of the metastatic tumor. Analogous cases of invasion of cerebral vessel walls by gliomas, lipomas of the corpus callosum, and glioblastomas have been reported. It can be postulated that a false aneurysm forms when a weakened arterial wall allows progressive local dilatation, or when a vessel wall ruptures because of

**References**


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