THE UNRUPTURED EXTRADURAL INTRACAVERNOUS CAROTID ANEURYSM

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ABSTRACT

Extradural intracavernous aneurysm of the internal carotid artery was demonstrated in a 48-year old woman who presented with right exophthalmos and total opthalmoplegia. The aneurysm was an unruptured one. Coronal CT scan showed a target sign in the bulging right cavernous sinus. Reports concerning the CT findings of such aneurysm were rare.

INTRODUCTION

Aneurysms that arise from the intracavernous portion of the internal carotid artery may be asymptomatic or may cause dysfunction of the cranial nerves in the cavernous sinus (1,2). Its incidence varied from 5% to 11% (1,3). Bony erosion occurred in about 8% and wall calcification appeared in about one third of them. The internal carotid artery may be displaced or occluded by pressure from the aneurysm. Rupture of one of the these aneurysms into the cavernous sinus may cause a carotid-cavernous sinus fistula. Bilateral aneurysms in this location have been described (1,4).

CASE REPORT

A 48-year-old Thai woman was admitted to Prasat neurologic institute for investigation to find the cause of her right exophthalmos and total ophthalmoplegia which occurred three weeks ago. CNIII, IV, VI and V_1 palsy was noted at physical examination as well as the presence of mild optic disc swelling. Lumbar puncture showed normal findings. CT scan of the brain and orbits and cerebral angiography were performed and illustrated in figure 1-4. At operation an unruptured extradural intracavernous aneurysm of right internal carotid artery was noted and it was clipped successfully.

DISCUSSION

Linsky (4) considered an aneurysm to be intracavernous if it was shown by angiography to arise proximal to the ophthalmic artery. He also included aneurysms at or distal to the ophthalmic artery which found intraoperatively to arise completely within the cavernous sinus.

In published studies, the intracavernous carotid artery aneurysms accounted for 2.5% to 11.5% of all intracranial aneurysms (2,6-9), and were more frequent in female and in older patients, ie, the mean age of patients ranged from 49 to 64 years (10-12), and the female to male ratio ranged from 2:1 to 8:1. Intracavernous carotid artery aneurysms are not likely to rupture and cause subarachnoid hemorrhage. They tend to expand gradually, and symptoms, if they appear, may be caused by mass effect on cranial nerves.

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They can be classified as traumatic, mycotic or idiopathic. Although occasionally these aneurysms become very large, if they are located wholly within the cavernous sinus, their rupture rate is extremely low. If small intracavernous carotid artery aneurysms rupture, they usually result in a carotid-cavernous fistula (3,14,16,18). The incidence of ruptured aneurysms at the intracavernous portion of the internal carotid artery varies from 0-30% (2,13,14-17).

A previous classification (19,20) related the intracranial internal carotid artery to the anterior clinoid process and separated it into infraclinoid and supraclinoid segments. By inference the infraclinoid segment is extradural. This classification is purely descriptive purposes, but does not distinguish whether a particular aneurysm arises outside or inside the dura. Previous anatomical studies (21-23) have identified the origin of the ophthalmic artery as the point at which the ICA pierces the dura. The ophthalmic origin is intradural in 89% of dissection, lying at the level of penetration of the dura by the ICA in 83%, or within 1 mm distal to this point in 6.5%. In the remaining 11% the artery arises extradurally. Since the ophthalmic artery is clearly visible in most carotid angiograms, its origin serves as a practical landmark of the point at which the ICA becomes intradural. Thus any aneurysm arising from the ICA from a site more than 1 mm proximal to the origin of the ophthalmic artery can reasonably be viewed as extradural (19). Aneurysms arising from this part of the ICA may attain great size, but rarely rupture because their walls are supported by the dura (20).

Not long ago, intracavernous carotid artery aneurysms could be treated only by cervical carotid artery ligation with or without extracranial-intracranial bypass (5,24-26) or by direct surgical repair with cardiac stanstill (27). Acceptable results were obtained by treating cavernous sinus aneurysms with balloon occlusion of the internal carotid artery proximal to the aneurysm (9,28-30) or with balloon embolization of the aneurysm lumen and preservation of the ipsilateral ICA (30). Favorable outcome in patients treated with direct surgical approaches for clipping were also reported (31-35), aneurysmorrhaphy (32-36) or cavernous sinus trapping with saphenous-vein bypass grafting (36-38).

Homogeneously enhanced unilateral bulging of the cavernous sinus is seen in aneurysms of cavernous carotid-ophthalamic artery complex, C-C fistula, meningioma, schwannoma, metastasis (homogenous or perineural) and lymphoma. Angiography is suggested to rule out aneurysm or C-C fistula. A lesion with a homogeneously enhanced center lumen (patent) surrounding hypodense unenhanced area (thrombus) should arouse us to think of an aneurysm as in this presenting case.

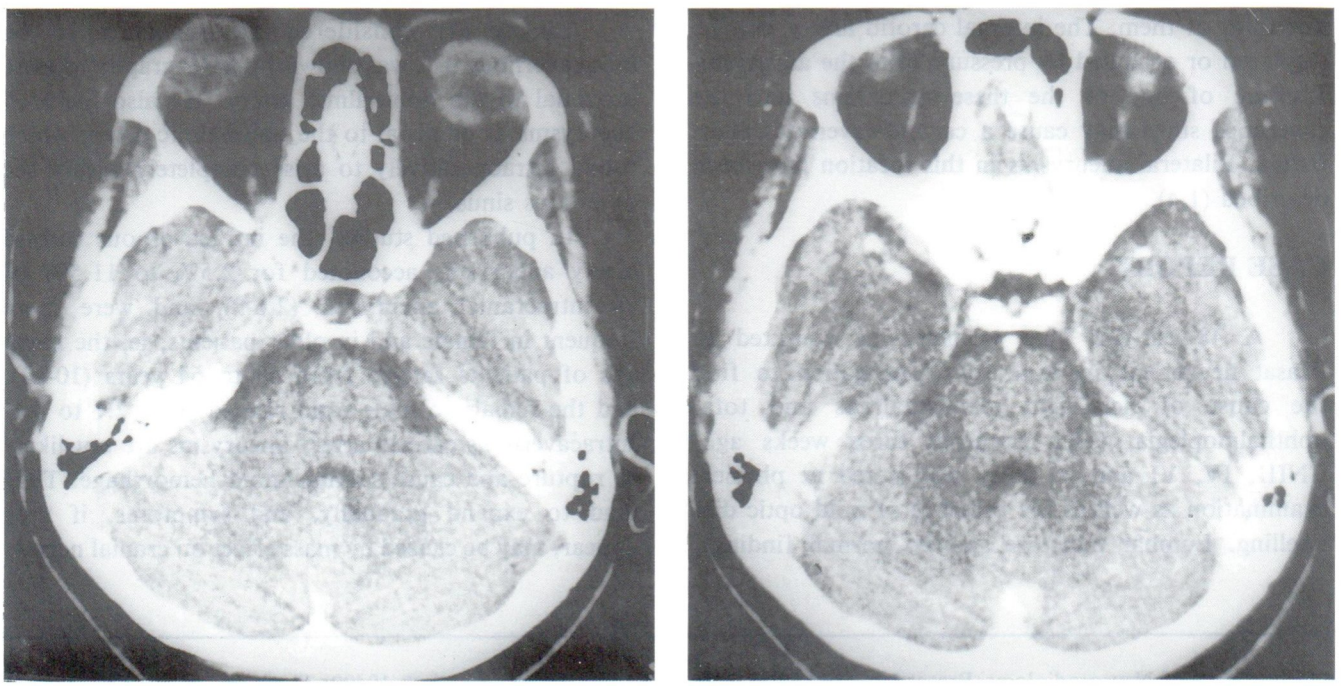

Fig. 1 Pre and post contrast axial CT scan of the brain revealed exophthalmos without bulging of the cavernous sinuses.

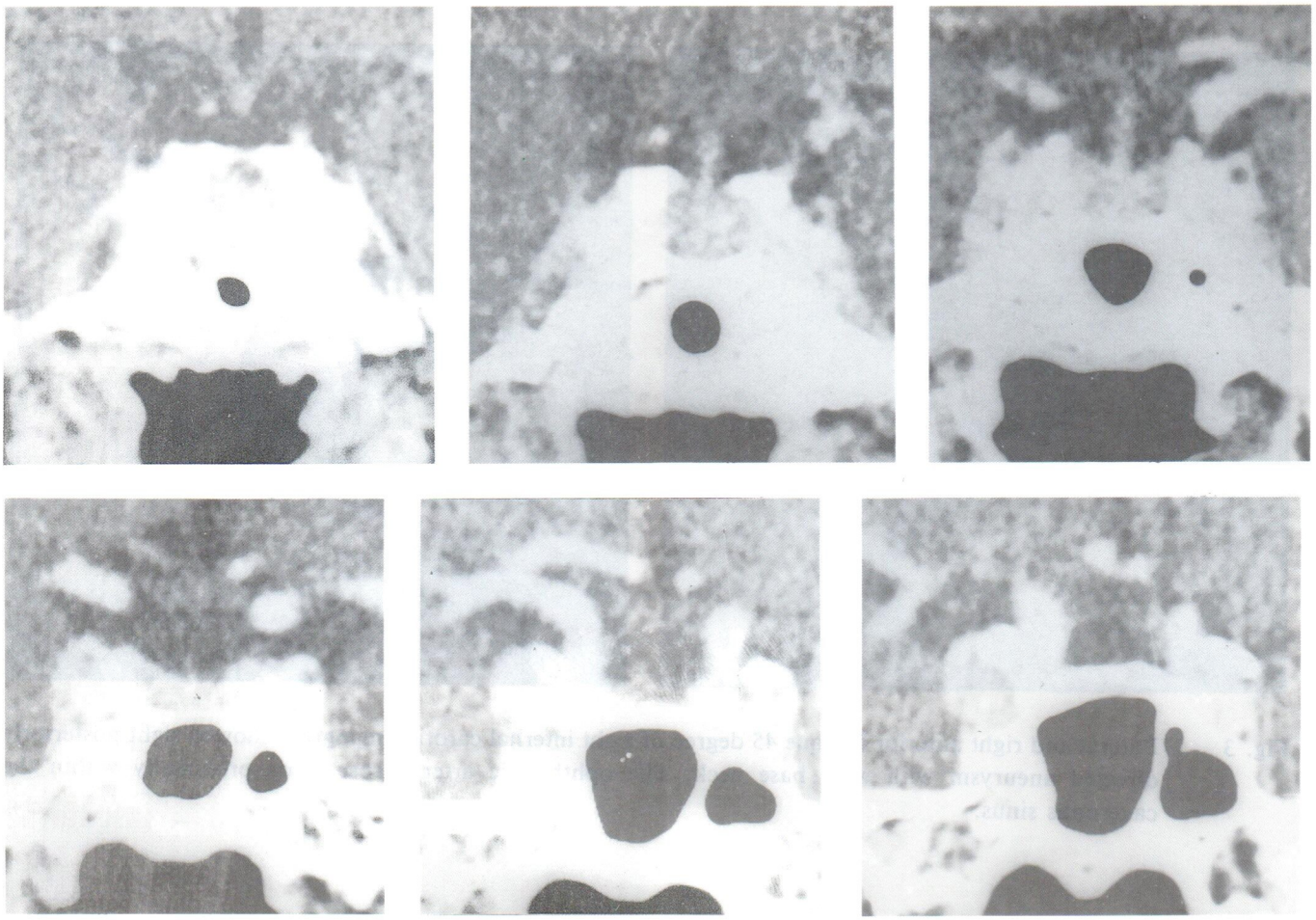

Fig. 2a An outpouching of the right cavernous sinus was noted at coronal enhanced CT scan.

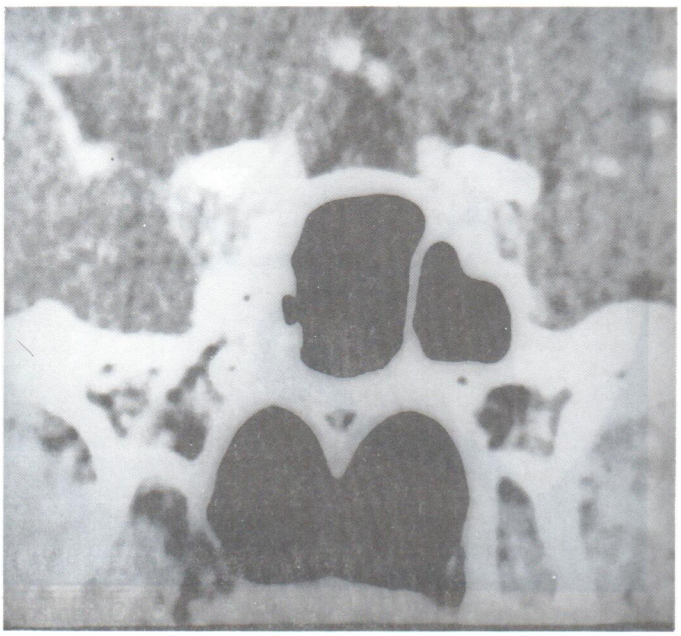

Fig. 2b. A target was seen in the bulging right cavernous sinus. There was no bony erosion or wall calcification

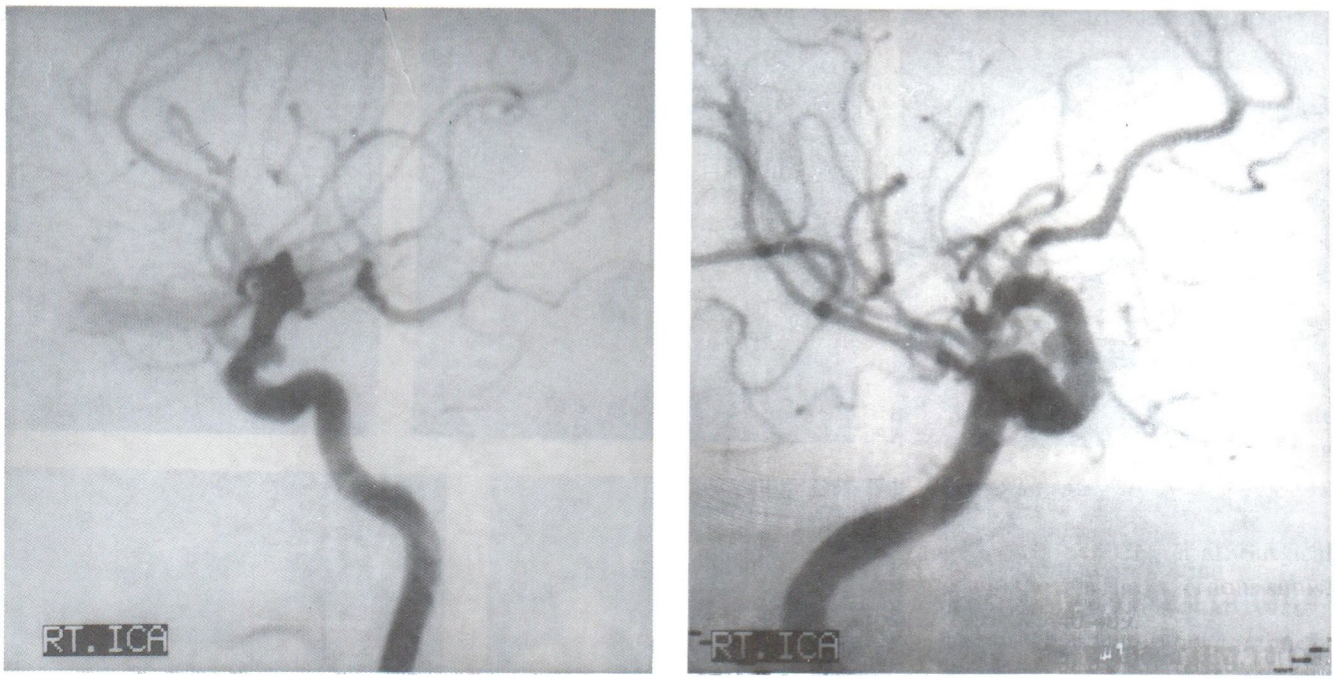

Fig. 3 Lateral and right anterior oblique 45 degree of right internal carotid angiogram showed right posteriorly directed aneurysm with wide base neck. The ophthalmic artery arose more proximally within the cavernous sinus.

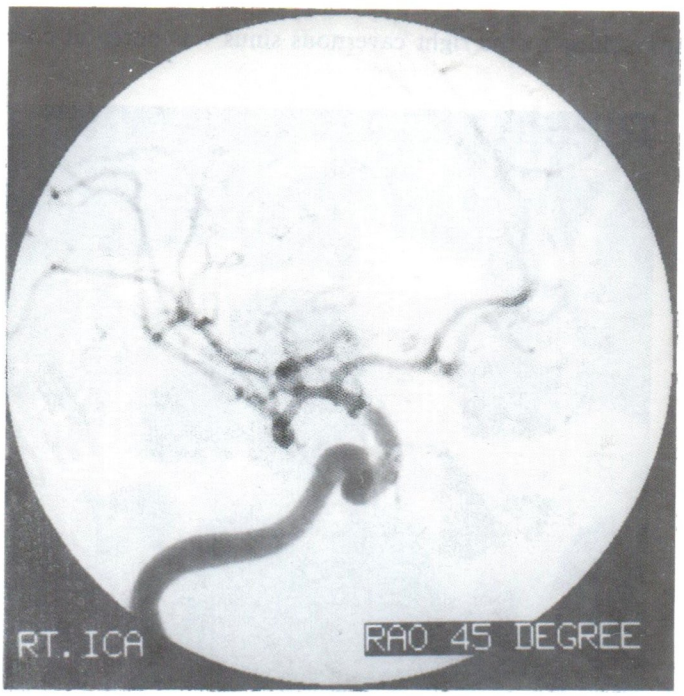

Fig. 4 Ten days-post operative cerebral angiogram showed no narrowing or irregularity of the parent vessel.

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