

# DISSECTING ANEURYSM OF THE INTRACRANIAL VERTEBRAL ARTERY

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## SUMMARY :

A case with a dissecting aneurysm of the intracranial vertebral artery is presented. The patient, mainly presenting with lower nerve palsies, was treated by proximal ligation of the right vertebral artery. Cumulation of experience and a better understanding of the therapeutic modality of this pathology is needed since only 37 surgically treated cases with dissecting aneurysm of the intracranial vertebral artery have been reported in the literature.

## KEY WORDS :

Dissecting aneurysm, Vertebral artery.

## INTRODUCTION

Dissecting aneurysms of the intracranial arteries are relatively rare. Those involving the arteries of the posterior circulation are even rarer. The clinical picture mostly reflects the findings of a stroke of the affected vessel. Subarachnoid hemorrhage is not a common presentation. The presented case showed clinical signs attributable to the mass effect of the dissecting aneurysm of the right vertebral artery. This observation was confirmed at surgery.

## CASE REPORT

This 36-year-old male patient had experienced severe headache for two months before admission. During the last fifteen days, swallowing problems and speech difficulty had disturbed the patient. Physical examination was normal. Neurological examination revealed a slightly lethargic patient with dysarthric speech, hoarseness and dysphagia. Cerebellar tests were moderately impaired. Routine laboratory and audiological tests were normal. CT (Fig. 1) disclosed a large lesion with pressure effect on the fourth ventricle. It was enhancing with a small central hypodense area. Vertebral angiography (Fig. 2A and 2B) showed a fusiform aneurysmal dilatation originating from the right vertebral artery. The vertebral artery showed narrowing at the proximal end of the aneurysm. Three different densities, especially evident on the lateral angiogram, were seen. The proximal portion of the aneurysm was the most dense. The medial segment was moderately dense and the distal part was faintly seen.

The patient was operated on March 12, 1990. Following a right suboccipital craniectomy, the cerebellopontine and cerebellomedullary cisterns were opened. Vertebral artery showed tubular enlargement

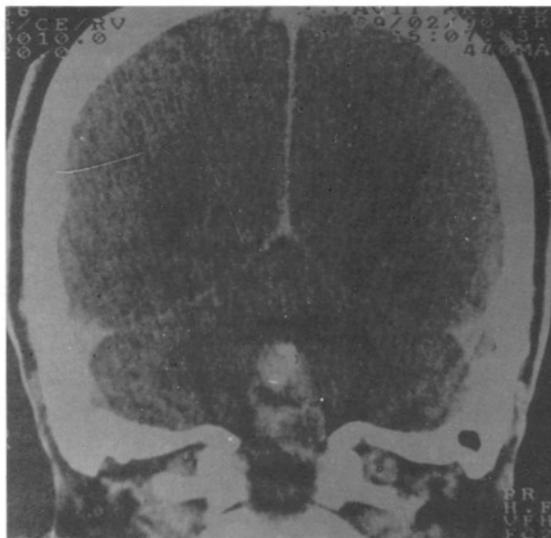


Fig. 1 : CT showing a large lesion in the mid-posterior fossa. There are three different areas of enhancement within the lesion. The upper part is hyperdense while the mid-portion has low density and the lower part is moderately enhancing.

and bluish discoloration was noted. Compression of the aneurysm, especially to the lower cranial nerves was obvious. The distal portion of the aneurysm was lying on the basilar artery, which made trapping practically impossible, so the vertebral artery was clipped distal to the origin of PICA. The patient was observed for fifteen minutes for possible respiratory and pulse changes. No changes occurred, and the postoperative period was uneventful. Some improvement in swallowing and speech were noted. Ten weeks postoperatively a control angiogram (Fig. 3) showed nonfilling of the right vertebral artery or the aneurysm. The patient was symptom free.

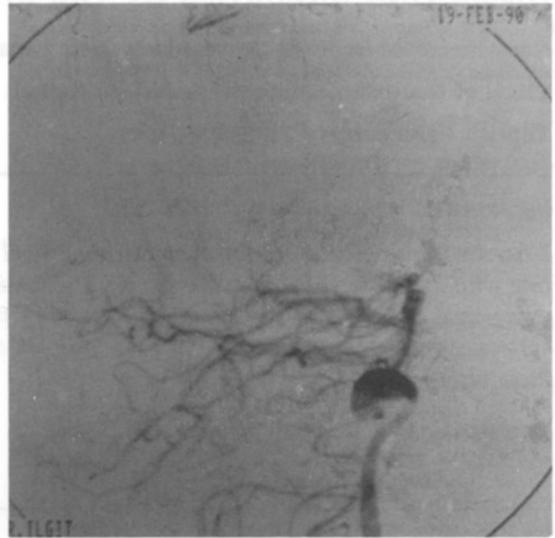
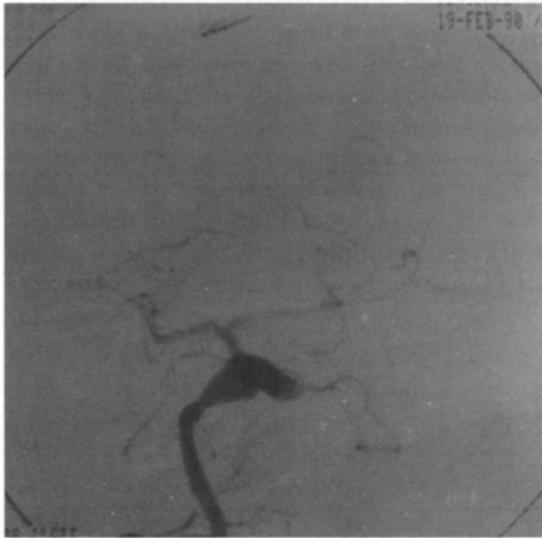


Fig. 2A and 2B-A-P and lateral angiograms showing a dissecting aneurysm of the right vertebral artery. Tubular enlargement and proximal narrowing of the right vertebral artery are better viewed on A-P picture. Lateral angiogram discloses three different densities in the aneurysm. The most proximal segment is highly dense, the mid-portion is moderately dense and the distal part is faint.

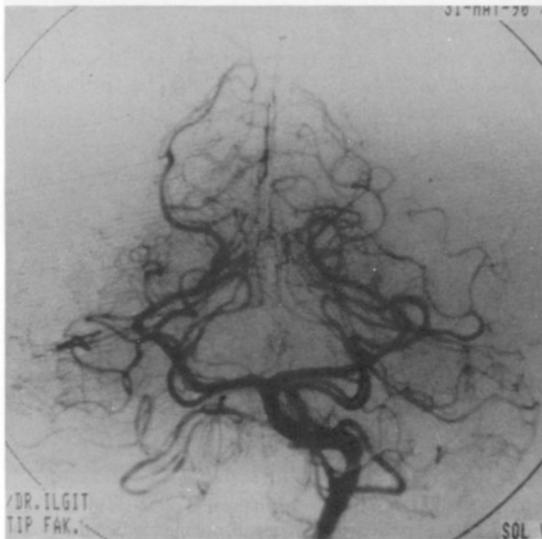


Fig. 3: Control vertebral angiogram ten weeks postoperatively shows non-filling of the right vertebral artery and the aneurysm whereas the left vertebral artery and the rest of the posterior circulation are filling perfectly.

## DISCUSSION

Dissecting aneurysms are generally considered (25) to be of two pathological types: a) dissections between the internal elastica and media, b) dissections within the media or adventitia. Clinical symptoms may be defined on this pathological basis. Most patients in group (a) present with strokes and a high incidence of headache. Cases in the second group, far less in frequency, manifest themselves by subarachnoid hemorrhage (1,6,7,13,17,20,25).

We would like to add symptoms related to compression because the large volume of the aneurysm of our patient, revealed on CT, had compressed the lower cranial nerves. This was confirmed at surgery.

Naturally, angiography is the most reliable technique for diagnosis of a dissecting aneurysm preoperatively. Double lumen as evidenced by different densities of contrast material (13) is considered to be the most determining sign. Other angiography findings include arterial narrowing, proximal and distal to the aneurysm, a narrow tapered lumen (string sign), retention of the contrast medium in the late angiography phase (3).

We observed double lumen appearance and proximal narrowing of the artery, whereas the distal part was superimposed by the large aneurysm.

Our review of cases reported in the literature revealed that only in a minority of cases information with regard to CT was available. Generally CT was either normal or showed findings indicating SAH (6,18). In only one case (5) an enhancing mass was reported. Another point of interest is that CT shows three different enhancing areas within the aneurysm which correlates well with the finding of different areas of enhancement on angiography. This sign known as "double lumen" is considered pathognomonic for dissecting aneurysms(4).

MR demonstration of vertebral artery dissection has also been reported(15) on conventional spin-echo and on gradient refocused flow sequences. T1 and T2-weighted sequences showed a patent but narrowed vertebral artery and increased intensity

material in the region of dissection. Similar findings were noted in carotid dissection (9).

Intracranial dissecting aneurysms are rare (2,12,13,16,24). Those involving the posterior circulation are even more sparse. Including the first surgical case reported by Yonas (25) in 1977, we collected 48 cases from the English literature with dissecting aneurysms of the posterior circulation (5,6,10,14,17,18,20,23,25) (Table 1). Of those 48 patients 37 (7.08%) had undergone surgical intervention, 7 (14.58%) had been treated conservatively and four (8.33%) had died prior to surgery. One of the fatal cases could not even had the chance to be investigated, and diagnosis was based on postmortem findings (6).

Proximal ligation of the vertebral artery, clipping distal to the origin of PICA, was by far the preferred surgical procedure. 28 cases were treated by this method comprising 75% of surgical cases. Wrapping was added in one case and in another trapping, in addition to proximal ligation, was accomplished in a second operation. Wrapping was performed in five and trapping in four patients. In one patient (5) partial thrombectomy, aneurysmectomy and proximal ligation were accomplished simultaneously. Only two (5.4%) of the 37 surgical cases died (5, 25). Both deaths were attributable to non-neurological causes.

Since the great majority of cases have been reported in the last decade, it may be predicted that such cases will be diagnosed in increasing frequency. So a consensus should be reached regarding the therapy of this pathology. Two fatal cases in the surgical group died of non-neurological causes. This result, along with papers reporting fatalities of conservatively treated patients (13,16,22), and those who died awaiting surgery, led us to favour surgery even though spontaneous resolution of the aneurysm has been noted (6,8).

Proximal ligation of the vertebral artery, clipping distal to the origin of PICA, is the preferred surgical technique provided that adequate collateral circulation from the opposite vertebral artery is demonstrated preoperatively. Reconstructive vascular surgery is suggested for those patients suffering from ischemia.

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**Table 1 : Summary of the 48 cases with dissecting aneurysm of the vertebral artery.**

	Total	Surgical treatment	Conservative treatment	Deaths before surgery	Surgical procedure
Yonas (25) 1977	1	1	—	—	PLV
Waga (20) 1978	1	1	—	—	PLV
Senter (17) 1982	1	1	—	—	PLV&W
Miyazaki (14) 1984	1	1	—	—	PLV
Berger (5) 1984	3	2	1	—	1T, 1PVL, PA, Th
Shimoji (18) 1984	7	4	2	1	3 PLV, 1T
Friedman (6) 1984	11	9	1	1	9 PLV, 1T added in a second operation
Ito (10) 1988	1	1	—	—	PLV
Yamamura (23) 1990	22	17	3	2	10 PLV, 5W, 2T
	48	37	7	4	

PLV : Proximal ligation of vertebral artery, W : Wrapping, T : Trapping.  
PA : Partial aneurysmectomy, Th : Thrombectomy.

Generally, no causative factor is demonstrated in dissecting aneurysms; the associated pathologies are congenital medial defects (22), fibromuscular dysplasia (11), cystic medial degeneration (21), syphilis (19) and arteriosclerosis (14).

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