

REVIEW OF CAROTID ANGIOGRAMS IN EVALUATION OF INTRA CRANIAL LESIONS PRIOR TO THE ADVENT OF COMPUTERIZED TOMOGRAPHY (CT) SCAN IN GHANA (1982 - 92)

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INTRODUCTION

Cerebral arteriography was first introduced in Spain by Egaz Moniz in 1927. In Ghana, carotid angiograms performed at the Korle-Bu Teaching Hospital between the mid sixties and the late seventies were done by non-radiologists: Professor Ben Edoe and Dr. J.O.M. Mustapha; a neurophysician and neurosurgeon respectively.

Cerebral angiography has been used for evaluation of intracranial mass lesions, patients with vascular abnormalities, transient ischaemic attacks, cerebrovascular accidents and for investigation of head injuries¹. The aim of the study is to review all the carotid angiograms of the last 10 years prior to the advent of CT scan in Ghana and also to form the basis for future research.

Key Words: Carotid Angiogram, Computerized Tomography (CT), Intracerebral Lesions, Magnetic Resonance Imaging (MRI).

MATERIALS AND METHOD

We reviewed 1229 carotid angiograms performed by the authors at the 37 Military Hospital between 1982

- 1986 and at Korle-Bu Teaching Hospital between 1986 - 1992. Six hundred and seventy-eight (55.18%) left carotid and 551 (44.82%) right carotid angiograms were performed.

The carotid angiograms were done under local anaesthesia with 2% Xylocaine and sedation with 10mg intravenous Valium. However, general anaesthesia was usually administered in infants and children under 7 years. Direct puncture of the common carotid artery with 18 gauge thin walled arterial needle was routinely used with guide wire to fix the needle firmly in the artery. Contrast media used were: 60% meglumine iohalamate (Conray 280) and later non-ionic Iopamidol (Omnipaque 240). 7 - 10mls of contrast was injected by hand.

Serial arterio-posterior and lateral radiographs were obtained with occasional additional oblique views. Following the removal of the arterial needle, the carotid puncture site was compressed for about 4 - 6 minutes. Unsuccessful examinations were not included in the study.

RESULTS

Age and sex distributions of patients on whom the

carotid angiograms were performed are shown in Tables I and II respectively. The youngest patient in the survey was 5 years and the oldest was 73 years. There were 775 males and 454 females. Out of the 1229 patients, there were 848 (69%) abnormal angiographic findings and 381 (31%) were normal.

Table III shows the angiographic diagnosis of the 848 patients.

Intracranial vascular lesions were 429 (50.6%) and intracranial tumours were 274 (32.3%). Infective lesions formed 77 (9.1%) and miscellaneous, which included hydrocephalus and arachnoid cysts were 68 (8.0%).

Table II: Carotid Angiograms — Sex Distribution of Patients

Year	Male (%)	Female (%)	Total (%)
1982	43	25	68
1983	51	27	78
1984	59	33	92
1985	64	39	103
1986	80	40	120
1987	76	49	125
1988	80	48	128
1989	84	49	138
1990	89	46	135
1991	72	52	124
1992	77	46	123
Total	775	454	1229

Table I: Carotid Angiograms — Age Distribution of Patients

Ages	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1-9	2	2	4	3	5	2	4	3	6	9	7
10-19	8	5	7	8	9	7	9	11	15	9	11
20-29	11	13	13	15	22	19	21	20	21	23	16
30-39	11	14	17	20	26	27	25	29	28	25	23
40-49	14	17	16	19	23	29	28	24	23	21	24
50-59	11	18	23	26	30	29	31	36	28	29	25
60-69	8	7	10	9	7	10	9	8	12	7	12
70-79	3	2	2	3	1	2	1	2	2	1	5
Total	68	78	92	103	120	125	128	133	135	124	123

Table III: Angiographic Diagnosis of 848 Patients

Vascular Lesions 429 (50.6%)	No.	%
Intracerebral - Thromboembolic occlusive/haemorrhagic lesions	170	20.0%
Subdural/Epidural Haematoma	142	16.7%
Aneurysms	58	6.9%
A.V. Malformation	29	3.4%
Stenosis of Internal Carotid Artery (ICA)	23	2.8%
Pseudo occlusion of ICA	7	0.8%
Tumours 274 (32.3%)		
Glioma	98	11.6%
Meningioma	65	7.7%
Pituitary	53	6.3%
Parasellar	47	5.6%
Angioma	10	1.1%
Infective 77 (9.1%)		
Pyogenic abscess	51	6.0%
Tuberculous abscess	26	3.1%
Miscellaneous 68 (8.0%)		
Hydrocephalus	59	7.0%
Arachnoid cysts	8	1.0%

Some complications encountered during and after the study are indicated in Table IV.

Table IV: Complications of Carotid Angiograms

Allergic reactions to contrast medium	35
Hemiparesis	13
Hemiplegia	8
Death	1

We recorded 16.7% subdural/epidural haematoma; this was mostly associated with motor vehicle accidents and other forms of head trauma. Intracerebral aneurysms (ICA) were found in 58 patients (6.9%) located at the trifurcation of the middle cerebral artery, anterior and posterior communicating arteries. Arteriovenous malformations (AVM) were 29 (3.4%). Most of the AVM's were supratentorial, and majority were located in the fronto-central parietal distribution of the middle cerebral artery. Our youngest patient in the study, a 5 year old boy, had AVM. Stenosis of the cervical portion of internal carotid artery was seen in 23 patients (2.8%). This may be due to arterio-sclerosis or fibro-muscular dysplasia.

Failure of filling of the intra cranial division of the ICA occurred in 7 patients (0.8%): three of these had repeat examinations with pathological circulation. The remaining four were finally diagnosed as pseudo occlusion of the ICA due to raised intra cranial pressure.

DISCUSSION

Conventional cerebral angiography has been used to establish intra cranial abnormalities for many years and is still considered the standard method in vascular lesions¹.

In our study, vascular lesions accounted for the highest percentage (50.6%) of abnormalities; the commonest (20.6%) vascular lesion being intracerebral

thromboembolic occlusive/haemorrhagic lesions resulting in cerebro vascular accidents.

Angiography had been the most reliable procedure for investigating patients with head injuries with subdural/epidural haematoma prior to CT scan. Approximately 25% of individuals presenting with signs and symptoms of cerebrovascular disease will have demonstrable extra cranial carotid disease^{2,3}.

The commonest intra cranial tumour in our study was Glioma 98 (11.6%). We did not attempt to classify them pathologically for the sake of simplicity. Meningioma constituted 65 (7.7%). They were common in the middle aged women. The commonest sites were the parasagittal, falx and sphenoid ridge. Pituitary and parasellar tumours accounted for 11.9%. These included pituitary adenomas, cranio-pharyngioma, meningiomas, dermoid cyst, optic nerve and chiasma glioma.

Infective lesions were found in 77 (9.1%). Epidural empyema may result from infection in the frontal sinus or frontal bone infection (osteomyelitis). Subdural empyema may on the other hand result from penetration of the dura by frontal sinusitis, septic thrombo-phlebitis involving emissary veins allowing organisms to enter the dural space and infection of the subdural effusion. Most of the abnormalities were confidently diagnosed by radiology and confirmed at surgery. However, in some cases an abnormality was diagnosed but it was felt impossible to conclusively define the abnormality for example to distinguish between pyogenic or tuberculous empyema.

Unsuccessful arterial puncture was usually due to deep seated, non-palpable artery in the obese patient with a short, thick neck and also from arterial spasm and haematoma following attempts at arterial puncture.

Cerebral angiography is not without morbidity or

mortality⁴. In our study, 35 patients developed allergic reaction to the contrast media especially when we were using the ionic contrast media. Neurological complications are not uncommon in carotid angiogram. Takahashi and Dawanami⁵ reported only 7 neurological complications in their series of 422 examinations. In our 1229 examinations we recorded 13 patients with transient hemiparesis and 7 patients with hemiplegia immediately following the examination. They all made complete recovery within days, except one 65 year old man. There was however, one recorded death occurring within a few hours of the examination from pseudoocclusion of the internal carotid artery due to raised intracranial pressure. Post mortem showed intracranial haemorrhage.

Increasing availability and technical advances of CT scan and MRI have caused a decline in the use of diagnostic angiography and a shift of emphasis towards interventional angiography. Nonetheless, angiography has retained its position as the principal diagnostic examination for conditions caused by vascular disease or in which vascular conditions may dictate management⁶. Presently at the Korle-Bu Teaching Hospital, with the advent of CT scan, the number of carotid angiograms performed has drastically reduced to one or two per month instead of the average 10 per month. (Table 1).

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