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Case Report

Brain arteriovenous malformations:Report of a case

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Abstract

Brain Arteriovenous Malformation (BAVM) is a form of congenital vascular malformation that are present at birth, and may be evident clinically, and usually will grow commensurately with the child. We report an adult ,a 40-year-old woman with brain arteriovenous malformation presenting with headache and epileptic seizures. CT scan demonstrated a Serpinginous enhanced brain lesion and angiography further supported the diagnosis with presence of tortuous, dilated and arterio-venous communicating cerebral vessels. These findings were later confirmed at surgery and supported with histology.

Key words: Arteriovenous,malformation,omputerisedTomography,Angiography

Introduction

Human brain arteriovenous malformations (BAVMs) are presumed to be congenital lesions that result from abnormal vascular formation during embryogenesis [1, 2]. The prevalence of BAVMs is often quoted to be 0.06 to 0.14% in several studies[3, 4] with an incidence 1 in 100,000 population [5]. 80% of BAVMs occur by the end of 4th decade while 20% occur before the age of 20 years[6]. The congenital abnormality consists of a nidus of abnormal dilated tortuous arteries and veins with a racemose tangle of closely packed pathologic vessels resulting in shunting of blood from arterial to venous side without intermediary capillary bed [6].

The purpose of this write up is to present a case of BAVMs diagnosed by Computed tomographic scan (CT) and angiography and to emphasize the path gnomonic CT and angiographic findings in BAVMs.

Case Report.

Mrs. M.O was a 40 year old legal practitioner who presented at Neuro Surgery out patient clinic of the University College Hospital (UCH), Ibadan who presented with a two year history of persistent severe headache, dizziness and occasional vomiting,and a one month history of seizure attacks. There was no history of head injury and she was not a known diabetic or hypertensive. On examination, she was well oriented in time and place. She was not pale, anicteric, and there was no fever. Pulse Rate was 70/min, Blood Pressure was 90/60mmHg. No abnormality was detected on the examination of the chest, cardiovascular system, central nervous system, eyes and ear/nose/throat.

A diagnosis of Persistent Headache was made. with possibility of an intracranial space occupying lesion as a cause

A skull radiograph showed no abnormality. Cranial CT (fig 1) scan showed a curvilinear serpiginous enhancing lesion in the right parietal region extending high up in the vertex and close to the falx . Four- vessel angiography, frontal and lateral projections (figs 2 and 3) showed tortuousity and aggregation of the terminal branches of both right and left anterior cerebral arteries with reflux of contrast to the contra lateral side. The left anterior cerebral artery was also dilated in its entire length. There was early filling of the venous circulation in the right parietal region in the arterial phase. The

right posterior cerebral artery also appeared to be involved through its terminal branches in the occiput as it also showed increased tortuousity, dilated vessels and early filling of the venous circulation mentioned earlier.

The left posterior cerebral artery was only faintlyoutlined due to poor filling. Based on CT scan and Angiography findings, a radiological diagnosis of right parietal arteriovenous malformation (AVM) was made.

Further treatment continued in a Canadian Hospital on the patients choice. The AVM was resected Surgery confirmed the AVM and histological evidence further confirmed the radiological impressions. The patient fully recovered and returned back to Nigeria and is on follow up in the neurosurgical out patient clinic at University College Hospital Ibadan with complete absence of presenting symptoms.

Fig. 2: Right internal carotid artery angiogram (Frontal Projection) showing tortuosity and aggregation of the right cerebral anterior arteries with early filling in the arterial phase of the venous circulation (arrow).

Fig 1:Contrast enhanced axial brain CT showing curvilinear serpinginous enhancing lesion in the right parietal region

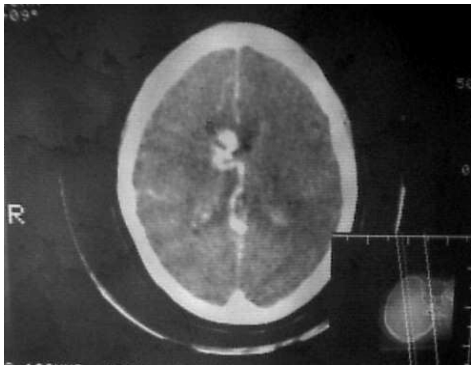

Fig.3 Right internal carotid artery angiogram (Lateral Projection) showing increase tortuorsity, dilatation and early filling of the venous rculation of the right posterior cerebral artery

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Discussion

Brain arteriovenous malformations (BAVMs) are considered to be congenital disorders; however, their familial occurrence has so far been described in only 19 families in the literature [7.] The natural course in patients with diagnosed BAVMs is dynamic rather than static, quiescent lesions [8, 9, 10 11, 12]. Several case series reporting interval angiography have suggested that BAVMs size can change with time [13,14,15,16]. Further more, a number of recurrent BAVMs have been reported after complete micro surgical resection [17] and radio surgery [18]. Mechanisms of growth and recurrence in BAVMs have been speculated to involve active angiogenesis or vascular remodeling triggered by abnormal balance of angiogenic factors or abnormal hemodynamics [19.]Cerebral bleeding is a small risk and reported as 3 to 4% annually.with a mortality of 1%[5.]

The treatment is surgical or radiotherapeutic intervention [5.] During the 1980s embolization of BAVMs became an alternative therapy, alone or in combination with stereotactic radiation or surgery [5.]

Safe resection of BAVMs in functional area requires four-vessel cerebral angiography with stereoscopic views to clearly demonstrate the BAVMs core or nidus, its feeding arteries and its draining veins [20.] Feeding arteries approaching the BAVM core must be identified,

since shunting arterioles are preferentially crowded in this area [20] Angiography must also locate hemodynamic compartments [18] which is a difficult task. On angiogram, BAVMs are demonstrated as tangles of tortuous vessels with evidence of shunting seen as early venous filling [18, 20], which were present in this patient . The nidus is an area of abnormal vessels where the vascular structures are beyond the capability of current imaging resolution [8, 9]. An anterior-venous fistula can exist along or with an BAVMs nidus 18,20. An AV fistula is defined as a direct communication between artery and vein without an intervening nidus net work; it is seen at angiography or fluoroscopy or is considered to be present when a micro catheter (2.2fr= 0.7mmis) is able to pass through the nidus into the draining vein [4]
Computed tomographic scan (CT scan) and MR images assist in determining the size and location of BAVMs and also in relating the BAVMs to functionally important gyri, deep gray matter and projection association and commissural fibres [20]. These non-invasive studies can be repeated to detect bleeding, cerebral edema and the residual BAVM post treatment [20]. MR imaging is especially valuable in identifying fast blood flow in BAVMs, which can indicate an area of vigorous bleeding [5.] Intra operatively ultrasound can identify the size and location of a BAVM core in relation to the exposed cortex [3,4,13.] Hematomas around core or a thrombosed portion of BAVMs can also be recognized by intra-operative ultrasound [20.]
A side from the low risk of bleeding that may be fatal BAVMs are begin lesions that may be the cause of deterioration in quality of life but when diagnosed treatment may be very rewarding.

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