Angiographic Images of False Aneurysmal Sac Caused by Rupture of Median Meningeal Artery in the Course of Traumatic Extradural Hematomata

Report of 3 Cases

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In one year we have observed 3 cases of traumatic extradural hematoma of subacute development, with particular angiographic images: a pseudo-aneurysmal sac opposite a fracture line, and suspended from a large branch of the median meningeal artery. Also there were the classical angiographic signs of extradural hematoma, viz. on the anteroposterior angiogram, detachment of the corticomeningeal vessels from the internal lamina of the skull and, on the lateral angiogram, displacement of the vessels at the site of the hematoma. Our third observation demonstrates the value of selective angiography of the external carotid artery for the elucidation of such images.

The literature is not very communicative on the subject of these phenomena; Lindgren, 5 in his book on roentgenology, shows a single image resembling ours. Pouyanne et al., 6 in 1959, published the first French observation, but this aneurysmal hematoma had developed on the internal surface of the dura mater and was associated with a subdural and intracerebral hematoma. Vaughan 7 in 1959 published the observation of a woman, aged 70 years, who presented the angiographic image of rupture of the median meningeal artery, with the contrast medium spreading in a large, irregular pool. Billet 1 has described the same finding in a case of acute extradural hematoma. Huber 4 has described a similar image observed during the angiographic study of a case of acute extradural hematoma, performed between the 6th and the 32nd hour after the trauma: the epidural extravasation of blood revealed itself by a round or drop-shaped opaque spot along the route of the artery; its dimensions were not correlated with the volume of the hematoma.

Case Reports

Case 1. R. C., aged 34 years, had an accident late in April 1962: right frontotempro-orbital shock was followed by obnubilation with retrograde amnesia. During the next few days, there was return of consciousness, with left hemiparesis, which regressed, and right exophthalmia.

On May 22, 1962, neurological findings were normal, with the exception of a stiff neck. Electroencephalography revealed a right temporal lesion, and roentgenograms showed a right frontotemporal fracture. Arteriography (Figs. 1 and 2) revealed a displacement of the vessels indicating the presence of a mass in the right temporal region, a clear arrest of the filling of the median meningeal artery in the first arterial stage, and an opaque spot, the size of a cherry stone, visible in the anteroposterior and lateral projections in the capillary stage. Finally, in the capillary stage in the anteroposterior projection the detachment of the cerebral and meningeal vessels from the wall could be clearly seen. The diagnosis made was: extradural hematoma with false aneurysmal sac in the territory of the median meningeal artery.

At operation, an extradural hematoma was evacuated which occupied the tip of the temporal fossa. Close under the line of the fracture was a tear of the middle meningeal artery which opened into the blood pouch. The latter constituted the false aneurysmal sac adhering to the dura mater. This false sac was resected, a clip being placed on the median meningeal artery. There was no subdural hematoma.

The postoperative course was uneventful. Rapid recovery ensued.

Histological examination showed that the aneurysmal sac was in fact the outer coat of a hematoma. Accordingly, the case was one of organized pseudo-aneurysmal hematoma and not of true, saccular, congenital hematoma, because no arterial wall was found.
Case 2. Mr. O. N., aged 63 years, on April 25, 1961, presented a cranial trauma with brief loss of consciousness. The radiograms revealed a right temporal fracture. Ten days later, only stiffness of the neck persisted, without any sign of focalization, but electroencephalography showed a right temporoparietal lesion with depression of the electrogenesis on the right side. In spite of the normal clinical findings and the normal F.O., this electroencephalogram and the slowing of the pulse to 48 justified right carotid arteriography. The arteriogram revealed an opaque spot near the median meningeal artery precisely where this artery crossed the line of fracture (Fig. 8).

Otherwise, the arteries and veins showed no displacement on the lateral arteriogram. On the anteroposterior arteriogram, in the capillary phase, there was a clear spot between the internal lamina of the skull and the corticomeningeal vessels. This clear spot indicated the site of the extradural hematoma (Fig. 4).

Two cases similar to ours, aneurysmal hematoma originating from the median meningeal artery, with extradural hematoma, have been reported, one by Hirsch et al., and the other by Dilenge. Our cases are reported below.

Figs. 1 and 2. Case 1. (Above) Lateral projection, arterial stage. Arteriography via the common carotid artery. Note lifting of the sylvian axis and sudden interruption of a meningeal branch of the external carotid artery slightly above the quadrilateral lamina. (Below) Lateral projection, capillary stage. At the site of the interruption of the meningeal branch of the external carotid artery, an opaque spot becomes visible.

Fig. 3. Case 2. Lateral projection, arterial stage. Note the pseudo-aneurysm and the meningeal branch of the external carotid artery.

Fig. 4. Case 2. Anteroposterior projection, capillary stage. The spot of the pseudo-aneurysmal hematoma is visible, but one can distinguish also a clear band between the internal table of the bone and the corticomeningeal vessels; this image indicates the presence of the extradural hematoma.