Traumatic fistula between a lacerated middle meningeal artery and a diploic vein

Case report

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A traumatic fistula occurring between a lacerated middle meningeal artery and a diploic vein was treated conservatively, and was no longer demonstrable at follow-up examination about 1 1/2 years after the injury.

Key Words • arteriovenous fistula • middle meningeal artery • diploic vein • carotid angiography • head injury

Occurrence of meningeal artery fistulas as a complication of skull fractures has been previously reported in the literature. We are reporting a case in which a traumatic fistula found between a lacerated middle meningeal artery and a diploic vein was treated conservatively and was no longer visible at the latest follow-up examination about 1 1/2 years after the injury.

Case Report

A 65-year-old man was admitted to Niigata University Hospital on January 4, 1973, because of speech impairment of 2 days' duration following an automobile accident.

Examination. There was a contusion of the right frontal scalp, but no evidence of trauma other than to the head. He was awake but unable to talk freely or follow commands. The pupils were equal in size and reacted to light. There was no motor weakness in his limbs. No bruit was heard over the head. Lumbar puncture revealed an opening pressure of 225 mm H₂O and slightly bloody cerebrospinal fluid. An electroencephalogram showed left frontocentral delta activity. Skull films showed a left frontoparietal linear fracture with diastasis of the coronal suture and a right frontal linear fracture. A left percutaneous carotid arteriogram was obtained on the day of admission. There were no angiographic signs of an epidural hematoma. An accumulation of contrast medium was visualized in the early arterial phase adjacent to a branch of the anterior division of the middle meningeal artery at the site where a linear fracture crossed it. This contrast medium drained away in linear or band-like shape in the late venous phase (Fig. 1).

Course. The patient was treated conservatively without any operative procedures.
About 1 week after the injury, he was able to follow commands accurately and aphasia had improved. Before discharge, left carotid arteriography was performed twice, on January 9 and 21, with the same findings as previously (Fig. 2).

At the follow-up examination about 1½ years after the injury, the patient was free of symptoms. A left carotid arteriogram showed normal flow, with the fistula no longer visible (Fig. 3).

Discussion

Damage of the middle meningeal arteries associated with skull fractures includes extravasation of blood with formation of epidural hematoma, traumatic aneurysm and arteriovenous fistula. Rumbaugh, et al.,2 reported meningeal artery fistulas were not rare and nearly always associated with a fracture line. Most of those recognized involve the middle meningeal artery and its accompanying veins,
Traumatic meningeal artery-diploic vein fistula

Fig. 2. Left carotid angiograms. Left: Five days after the initial angiography. Almost the same picture as seen in Fig. 1 upper right. MMA and arrow heads indicate the middle meningeal artery. Arrows indicate the diploic veins. Right: Two weeks later. The fistula is still seen (arrow).

Fig. 3. Left carotid angiogram performed 1½ years after the third angiography. The fistula is no longer demonstrable. MMA and arrow heads indicate the middle meningeal artery.

and produce the so-called “railroad track” sign. It seems reasonable in this case to suppose that the venous part of the fistula must have been a diploic vein. Repeat arteriograms 2, 7, and 19 days after the trauma revealed the same pictures of band-like shape and no “railroad track” sign. However, fistulous communication between the meningeal artery and a diploic vein are not so common.1,5

The fistula may persist for a long period; however, spontaneous disappearance of the fistula was reported by Wilson and Cronic,5 and Jackson and du Boulay.1 The fistula in our case was no longer demonstrable at the latest follow-up examination about 1½ years after the injury, although the patient was treated conservatively without any operative procedures. The cause of closure of this fistula is not known, but it may have resulted from thrombosis to the vessels as Wilson and Cronic suggested. These vascular injuries of the meningeal arteries may be of little or no clinical significance, except for those with formation of an epidural hematoma. In this case, there were no angiographic signs of an epidural hematoma. It was considered that aphasia, slightly bloody cerebrospinal fluid, and left frontocentral delta activity in an electroencephalogram at the acute stage of the trauma were caused by contusion of the brain.

References


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