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## Ossification of the posterior longitudinal ligament diagnosed by MR.

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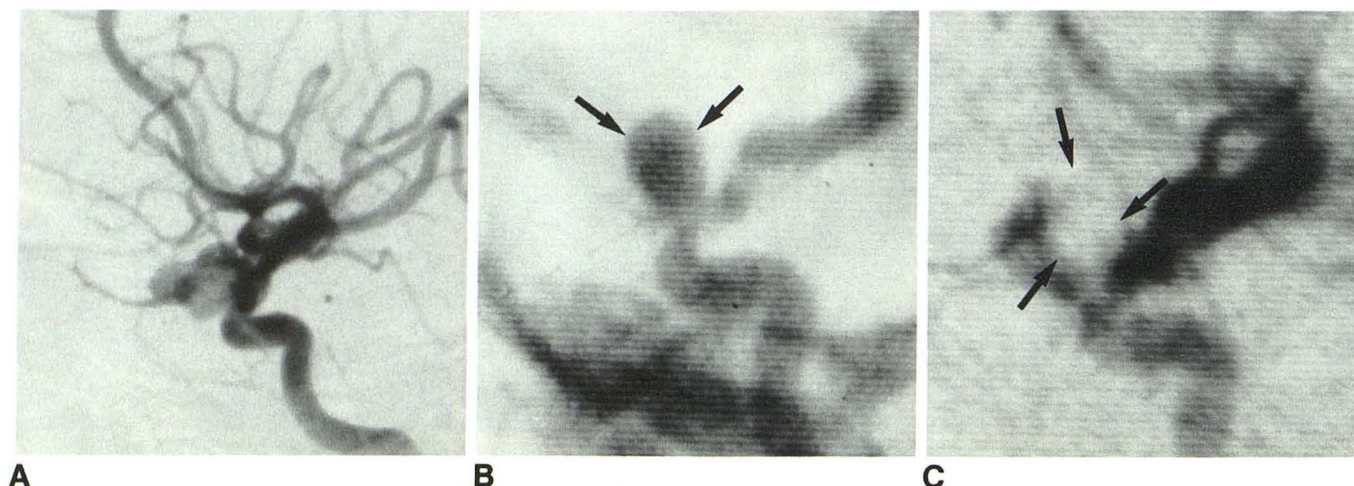


Fig. 1.—A, Lateral arteriogram shows lobulated pseudoaneurysm of cavernous portion of left internal carotid artery projecting anteriorly and inferiorly into sphenoid sinus.

B, Single selected frame from preembolization digital subtraction angiography was superimposed on real-time fluoroscopic image during embolization procedure. Balloon (arrows) was guided into pseudoaneurysm, inflated, and detached.

C, On postembolization digital subtraction angiogram, some filling of pseudoaneurysm remains anterior to balloon (arrows). Balloon was detached, occluding opening while preserving carotid flow.

digital subtraction angiography. Postembolization angiography showed greater than 50% of the aneurysm occupied by the balloon (Fig. 1C). A repeat arteriogram at 3 months showed no change in the size of the residual aneurysm. More importantly, thrombus was seen extending into the sphenoid sinus. The patient remained asymptomatic at the 6-month follow-up.

## Discussion

Intravascular balloon occlusion of the internal carotid artery has proved to be an effective technique in the treatment of internal carotid artery aneurysms [3–6]. The balloons can be introduced through a femoral-cerebral angiographic catheter system, one above the aneurysm and one below, effecting trapping and occlusion of carotid blood flow. The technique eliminates the need for an open operation, but a bypass from the superficial temporal artery to the middle cerebral artery still is needed in cases in which marginal cross-circulation is present. Direct obliteration of the aneurysm and preservation of carotid blood flow would be the ideal technique, but this combination rarely has been achieved. Because of the marginal cross-circulation in our case, we decided to obliterate the pseudoaneurysm rather than occlude the internal carotid artery by trapping the pseudoaneurysm. The preembolization digital subtraction angiographic image was used as a “road map” and was superimposed on the real-time fluoroscopic image, allowing visualization of the pseudoaneurysm. The balloon was inflated only to a point at which occlusion of the aneurysm was present, thereby eliminating any possibility of rupture.

The exact time at which embolization of a pseudoaneurysm can be performed safely is unknown; however, we would not recommend balloon occlusion of a newly formed pseudoaneurysm. Sufficient time should be allowed for the pseudoaneurysm to develop a thick wall. In addition, if the presenting clinical symptomatology is epistaxis, occlusion of the sphenoidal part of the aneurysm must be confirmed and any residual aneurysm observed by means of repeat arteriography. If this cannot be done, entrapment of the aneurysm is recommended, even if a bypass from the superficial temporal artery to the middle cerebral artery must be performed to prevent further epistaxis from the pseudoaneurysm.

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## Ossification of the Posterior Longitudinal Ligament Diagnosed by MR

Ossification of the posterior longitudinal ligament (OPLL) is an uncommon, though not rare, disease of unknown etiology that occurs in approximately 0.2% of Caucasians [1]. The condition is much more common among Japanese, in whom the prevalence is about 2.0% [2]. Resnick et al. [3] found an association between diffuse idiopathic skeletal hyperostosis (DISH) and OPLL; OPLL occurred in 50% of patients with DISH. The significance of OPLL lies in the possibility of spinal cord compression by the ossified/calcified and hypertrophied



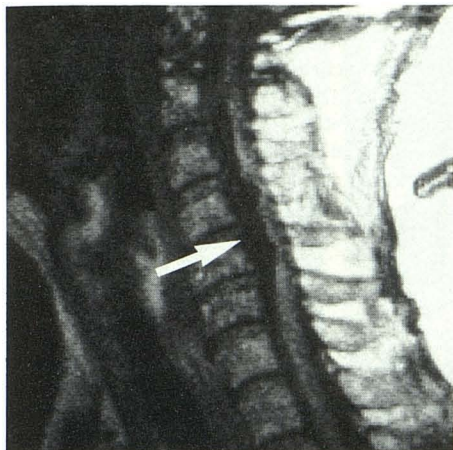


Fig. 1.—Sagittal MR image TE 32, TR 500 of cervical region shows lesion of low signal extending from C2 through C5 (arrow).



Fig. 2.—Sagittal MR image TE 120, TR 3000 again shows very low signal extending from C2 through C5 on this pulse sequence (arrow).

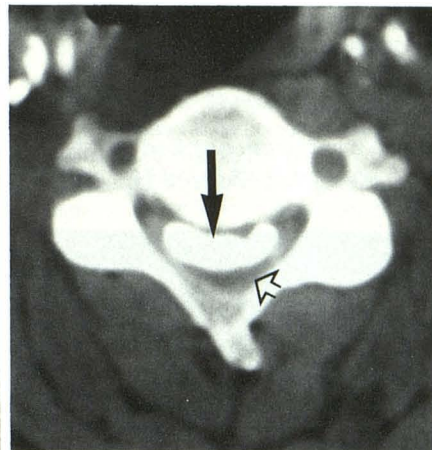


Fig. 3.—Axial CT scan with intrathecal contrast at same level shows extensive ossification (solid arrow) and a severely compressed spinal cord (open arrow) with narrowing of subarachnoid space.

posterior longitudinal ligament. In almost 19% of patients with OPLL registered in Japan, the upper extremities were disabled so severely that the patients were dependent on others to conduct activities of daily living and 10% were unable to walk [1]. The radiographic, tomographic, and CT appearances of OPLL are well described in the literature [4–6]. The MR appearance of OPLL has not been reported previously. We describe a case of OPLL diagnosed by MR.

### Case Report

A 70-year-old white man with DISH had a 4-month history of lower extremity weakness and paresthesias below the waist. Physical examination revealed quadriparesis; decreased vibratory sensation and proprioception in the hands and feet; decreased pin-prick sensation, with a level of approximately C6; 4+ quadriceps reflexes; and upgoing toes bilaterally. Cervical myelopathy was diagnosed, and an MR examination was done. Imaging was performed with a 0.6-T superconductive magnet using spin-echo techniques. The MR examination (Figs. 1 and 2) showed anterior compression of the cervical cord at C2–C5 by an area of very low signal on relatively T1- and T2-weighted sagittal images. The diagnosis of OPLL was made. Radiographs of the cervical spine and CT of the cervical spine with intrathecal contrast (Fig. 3) were confirmatory. Decompressive laminectomy was performed, and OPLL was proven pathologically.

### Discussion

The differential diagnosis for structures that are low signal intensity on both T1- and T2-weighted images is rather limited: (1) low proton density, such as areas of calcification; (2) flowing blood or CSF; (3) occasionally, paramagnetic substances, as seen in the liver in hemochromatosis. In this case the differential includes OPLL, a calcified meningioma, and arteriovenous malformation. A meningioma spanning five vertebral levels would be unlikely. Arteriovenous malformations are usually posterior and rarely produce this degree of cord compression. For these reasons, the MR in this case is most consistent with OPLL.

MR is the procedure of choice in evaluating cervical myelopathy at

our institution. If a lesion of low signal intensity on both T1- and T2-weighted images is identified anterior to the thecal sac, especially in a patient with a history of DISH, OPLL should be considered. Additionally, MR is invaluable in evaluating the degree of cord compression.

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### MR Imaging of Incisional Spinal Cord Injury

Conventional myelography and metrizamide-CT myelography have been used to delineate spinal injury [1–3]. At best, these techniques reveal the outline of the cord and the presence of cord compression. The correlation between the spinal injury seen on CT and clinical neurologic damage is rather poor [4]. MR is an excellent technique for visualizing the spinal cord and cord pathology [5, 6].

We report a case in which MR was used to study a stab wound through the spinal cord. The findings of the initial cord injury and