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Ligamentum flavum hematomas of the cervical and thoracic spine

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ABSTRACT

Objective: To report extremely rare cases of ligamentum flavum hematomas in the cervical and thoracic spine. Only six cases of thoracic ligamentum flavum hematomas and three cases of cervical ligamentum flavum hematomas have been reported so far.
Methods: Two patients presented with tetraparesis and one patient presented with radicular pain and paresthesias in the T3 dermatome. MRI was performed in two patients, which showed a posterior intraspinal mass, continuous with the ligamentum flavum. The mass was moderately hypointense on T2-weighted images and hyperintense on T1-weighted images with no contrast enhancement. The third patient underwent cervical myelography because of a cardiac pacemaker. The myelography showed an intraspinal posterior mass with compression of the dural sac at C3/C4.
Results: All patients underwent a hemilaminectomy to resect the ligamentum flavum hematoma and recovered completely afterwords, and did not experience a recurrence during follow-up of at least 2 years.
Conclusion: This case series shows rare cases of ligamentum flavum hematomas in the cervical and thoracic spine. Surgery achieved complete recovery of the preoperative symptoms in all patients within days.

1. Introduction

Delayed onset of neurological symptoms in the lower extremities is associated most frequently with degenerative disk disorders [2,6,7,11]. Bleeding in the epidural and subdural spaces or within a spinal tumor are other well-known causes [10]. Progressive myelopathy due to hemorrhage into the ligamentum flavum of the thoracic or cervical spine, however, has received only very little attention [3,16,17,21,22]. Available data on diagnosis and treatment is scarce and long-term prognosis after surgery has been unclear. Here, we report our experiences in a series of 3 patients seen within a period of 10 years.

2. Patients

Three patients presented with delayed onset of neurological symptoms due to acute hemorrhage into the ligamentum flavum. One patient was female (age, 56 years), and the other two were male (age, 54 and 59 years). Two hematomas were localized in the cervical spine at level C3/C4; the hematoma in the third patient was localized in the thoracic spine at level T3/T4. All patients were referred for emergency treatment when symptoms deteriorated.

3. Results

Both patients with a cervical ligamentum flavum hematoma presented with tetraparesis; the patient with the thoracic ligamentum flavum hematoma had radicular pain and paresthesias in the T3 dermatome. One patient with cervical ligamentum flavum hematoma was on anticoagulant therapy.

MRI was performed in two patients, which showed a posterior intraspinal mass, continuous with the ligamentum flavum. The mass was moderately hypointense on T2-weighted images and hyperintense on T1-weighted images (see Fig. 1a–c) with no contrast enhancement. The third patient underwent cervical myelography because of a cardiac pacemaker. The myelography showed an intraspinal posterior mass with compression of the dural sac at C3/C4.

All patients underwent a hemilaminectomy at the levels of the lesion with complete removal of the hematomas within the ligamentum flavum. After opening the flavum at the site of the cyst, the hematoma was evacuated which was partially organized. In

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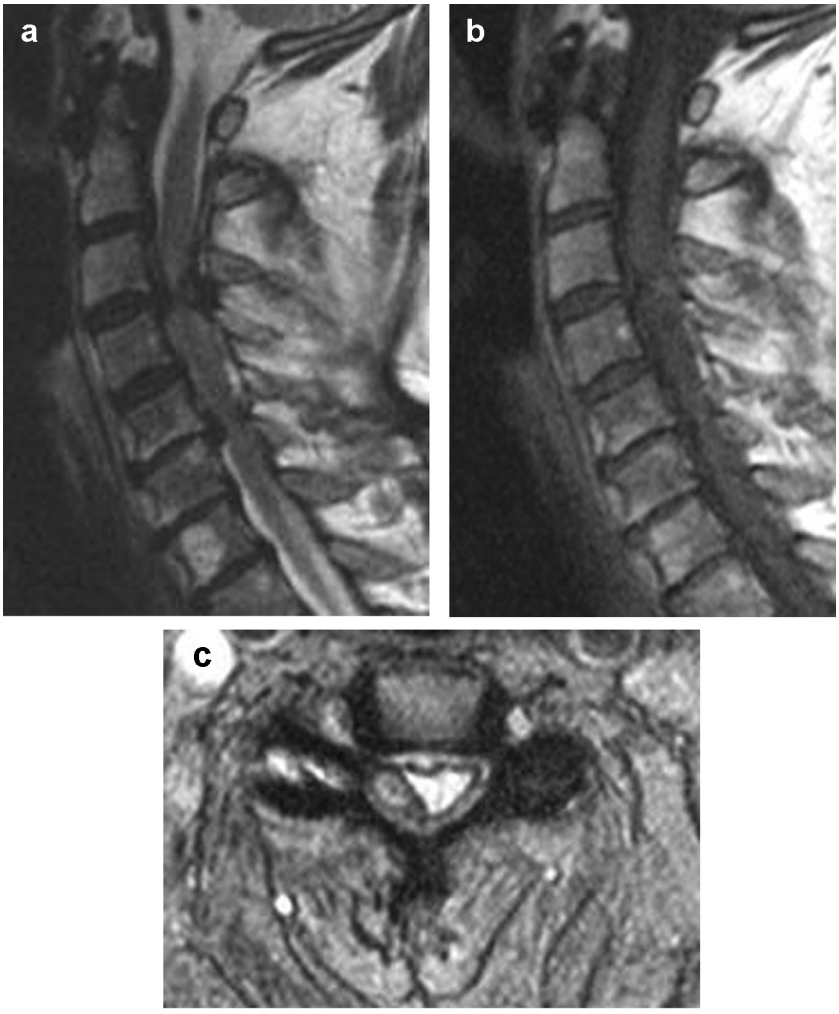

Fig. 1. (a) Ligamentum flavum hematoma at C3/C4 in a 54-year-old man with degenerative spinal cord disease. Sagittal T2-weighted MRI shows a hypointense posterior intraspinal mass at C3/C4 continuous with the ligamentum flavum. (b) On T1-weighted MRI the lesion has a mixed density. (c) Axial T1-weighted scans demonstrate the compression of the spinal cord due to the lesion.

all patients there were dense adhesions to the dura which made the surgery more difficult as compared to removal of ligamentum flavum cysts without hematoma. To prevent recurrence of the cyst the flavum was removed at a safely margin of 3 mm. The postoperative course of all patients was uneventful. Preoperative symptoms subsided within days.

Histological examination of the operative specimen of the thoracic lesion showed the typical appearance of the ligamentum flavum with densely packed elastic fibers (Fig. 2a). There was focal proliferation of granulation tissue and accumulation of hemosiderin-laden macrophages (Fig. 2b and c) indicative of previous hemorrhage. Widespread dystrophic calcification was found in the elastic tissue (Fig. 2d and e). No evidence of infectious or neoplastic changes was found.

Follow-up examinations of at least 2 years postoperatively were unremarkable without any residual symptoms in all instances. There was no recurrence of hematoma or of a ligamentum flavum cyst.

4. Discussion

Ligamentum flavum hematomas are rare lesions. From 1992 to date less than 50 cases have been reported in the English literature, mostly in the form of single case reports [1,3–5,9,12–18,20–32]. While the hematoma was located in the lumbar spine in most instances, only nine cases were described with locations in the thoracic or cervical spine. Remarkably, the first case of a thoracic ligamentum flavum hematoma was reported only in 2001, and the first case of a cervical ligamentum flavum hematoma in 2005. All cervical ligamentum flavum hematomas reported so far were localized at level C3/C4, and all thoracic lesions were localized at level T7/T8 or below (see Table 1). Most of the patients reported so far had a history of minor trauma with a progressive clinical course over several weeks which had initially been attributed to disk herniation or spinal canal stenosis. All patients reported so far were at least 30 years of age (mean 62.7 years) which clearly indicates that ligamentum flavum hematoma is a disease of advanced age. Even though cervical ligamentum flavum hematomas are rare, they pose a special problem since they usually present with much more severe deficits than lumbar lesions as demonstrated by our cases.

It is puzzling to note that most ligamentum flavum hematomas reported earlier occurred in the lumbar spine. We suggest that the reason for this is that the lumbar spine is stressed more often by load-bearing forces than the thoracic and the cervical spine. As opposed to the thoracic spine, the lumbar spine is more mobile which makes it more prone to shearing forces after minor trauma. Considering these factors, it still remains unclear why the cervical spine is affected only exceptionally. The major reason for this might be a different composition of the connective tissue on the cervical spine compared to the thoracic and lumbar spine.