the thyroid or breast. We took advantage of this advanced technique to evaluate and follow-up the volumes of popliteal cysts. For patients who complained of aggravated arthralgia and had had pre-existing popliteal cysts, changes in cyst volumes can be an important clue to assess the cause of the pain. Serial non-invasive volume quantification has other merits including its simplicity, relatively low risk of iatrogenic infection and low cost relative to MRI.

### Rheumatology key message

- A non-invasive quantification of popliteal cyst with 3D US can be applied in rheumatology clinics.

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### Acknowledgement

**Funding:** This work was supported by the SRC/ERC programme of MOST/KOSEF (grant #R11-2002-098-05001-0) to the Rheumatism Research Center at The Catholic University of Korea, Seoul, South Korea.

**Disclosure statement:** The authors have declared no conflicts of interest.

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**Accepted 7 September 2007.**

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### Letters to the Editor

#### Cervico-brachial neuralgia caused by spontaneous resorption of ligamentum flavum calcification

Sir, Deposition of calcium in the ligamentum flavum is an uncommon degenerative disorder characterized by hydroxyapatite and/or calcium pyrophosphate deposition inside the ligamentum flavum [1–6]. The present report describes a rare case of spontaneous resorption of calcific deposits in the cervical ligamentum flavum that was associated with acute cervico-brachial neuralgia.

A 67-year-old Caucasian woman was referred to our hospital for progressive intense left cervicalgia radiating into the left arm (C7 dermatoma). No precipitating factor was identified. At clinical examination, she was apyretic and had no sensory or motor deficit. She had a stiff cervical spine when bending or rotating to the left. The left triceps reflex was reduced. There were no central neurological signs. Blood analysis showed an isolated inflammatory response [erythrocyte sedimentation rate (ESR): 65 mm/h and C-reactive protein (CRP): 122 mg/l], normal total erythrocyte and leucocyte counts and no further abnormalities on routine examination. Lumbar puncture showed an increase of total protein (1.09 g/l), 10 lymphocytes/mm³ and no germs on direct analysis. A symptomatic treatment with anti-inflammatory (ketoprofene) and analgesic medication (tramadol) was started under the diagnosis of C7 cervico-brachial neuralgia due to spondylitis. An MRI made at day 3 (Fig. 1) showed two nodules in the ligamentum flavum in front of the left lamina C6 and C7, without other abnormalities. The C6 nodule was hypointense on T1- and T2-weighted images. The nodule at C7 had a hypo-intense centre on T1- and T2-weighted images, and a hyper-intense rim on T2, that enhanced profoundly after intravenous injection of gadolinium. This argued in favour of inflammation of the C7 nodule. A CT-scan (Fig. 1) made immediately after the MRI showed two calcifications that matched with the MRI nodules. The C7 calcification was less dense than the C6 calcification and had a cloud-like appearance, arguing in favour of demineralization due to progressive resorption. CT and MRI showed that the inflamed C7 calcification comprised the left nerve root C7, which appeared otherwise normal. Radiography of shoulders, wrists, knees and pelvis showed no other calcification. Additional blood analysis showed normal concentrations of urea, creatinine, calcium, phosphate, vitamin D and parathyroid hormone. Control CT-scan made 10 days after the start of the symptoms (Fig. 1) showed that the C7 calcification had almost completely disappeared. The C6 calcification was unchanged. After 2 weeks of treatment, the symptoms had disappeared with normalization of the inflammatory response (ESR: 28 mm/h and CRP: 6.2 mg/l). Three months after symptom onset, the patient was asymptomatic and control CT-scan showed no changes.

Calcific deposits in the ligamentum flavum occur predominantly in women over 65 yrs and prevail in Japan and the French Antilles [1–5, 7]. The cervical spine is usually affected [5]. Ligamentum flavum calcifications may be asymptomatic or may be responsible for chronic myelo-radiculoopathy [4, 5, 7]. Acute worsening of chronic myelopathy has been reported [4]. The mean diagnostic delay varies between ~7 [1] and 11 months [7]. Due to the paramedial posterior localization of the ligamentum flavum, calcification within the ligamentum may cause radicular symptoms. These are found in 20% of the cases [1, 7]. Fever and inflammatory laboratory markers have been reported during acute inflammation of ligamentum flavum calcifications [7]. Lumbar puncture is usually not performed. Unlike other causes of crystal-associated cervical arthropathies [8], in the present case we found an elevation of the protein level in the cerebrospinal fluid (CSF). This elevation may be explained by an inflammatory response due to C7 nerve compression, or by the ligamentum flavum inflammation in proximity to the CSF.

Various hypotheses of calcification deposition in the ligamentum flavum have been proposed, either in favour of metaplastic or degenerative processes [5]. Histopathology of ligamentum flavum calcification shows pyrophosphate or hydroxyapatite crystal deposits [1, 5] with the same chemical composition as calcific deposits that occur periarticularly near peripheral joints [9, 10]. Radiography can help to diagnose ligamentum flavum calcifications as it may show posterior marginal opacities in the vertebral canal [3]. CT scan can show oval-shaped or nodular hyperdensities inside the ligamentum flavum, which may touch the vertebral lamina, but never reach the facet joint [1, 4, 5]. These lesions are hypo-intense on T1- and T2-weighted MRI [1, 5]. Generally, treatment of symptomatic ligamentum flavum calcifications is surgical while asymptomatic calcification require no intervention [1, 4, 5, 7].

The present study illustrates that ligamentum flavum calcifications should be considered in the differential diagnosis of acute
cervico-brachial neuralgia. CT and MRI are important to confirm the diagnosis and to show associated inflammatory phenomena. We hypothesize that the calcification resorption was either caused directly by inflammation, or by a non-inflammatory process with concomitant release of calcium crystals that lead to an acute inflammatory response. Furthermore, our case illustrates that resorption of ligamentum flavum calcification can be associated with disappearance of symptoms. Before surgical treatment is considered, in absence of neurological deficits, a medical symptomatic treatment could be proposed first during spontaneous resorption of calcific deposits.

Disclosure statement: The authors have declared no conflicts of interest.

Rheumatology key message

- Ligamentum flavum calcifications should be considered in the differential diagnosis of acute cervico-brachial neuralgia.

Fig. 1. Imaging of the cervical spine. MRI (A, B, C) made during the acute clinical stage (day 3). Sagittal T2-weighted image (A) and T1-weighted image before (B) and after (C) administration of gadolinium. It shows two calcifications inside the ligamentum flavum. The C7 calcification (arrow) in state of resorption has an inflammatory rim that is hyper-intense on T2-weighted imaging and hypo-intense on T1-weighted images and that shows contrast enhancement. The C6 ligamentum flavum calcification (arrow head) has no inflammatory aspect on MRI. A 3D CT scan in axial view (D, E, F). During the acute clinical stage (day 3) it shows a cloud-like calcification inside the ligamentum flavum at C7 (D: empty arrow), less dense than a second calcification inside the C6 ligamentum flavum (F: double arrow head). Control CT scan at day 10: near complete disappearance of the calcification at C7 (E). There was no change of the C6 calcification.

Aggressive CNS lupus vasculitis in the absence of systemic disease activity

Sir, A 35-yr-old woman was diagnosed with systemic lupus erythematosus (SLE) at age 25 when she presented with fever, arthralgia, alopecia, photosensitive rash and oral ulceration associated with high-titre anti-nuclear antibodies (ANA) (1:320).