Hemispherical Spondylosclerosis – A Polyetiologic Syndrome

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Abstract. Radiologic examination of 43 patients revealed 47 lesions of a type which we have termed hemispherical spondylosclerosis (HSS). This term describes and includes the following essential and possible radiologic findings of the disease:

1) Hemispherical (or “dome-” or “helmet-shaped”) sclerosis of the vertebra above the intervertebral disk. Thus it is a supradiscal HSS.

2) One or more small erosions of the inferior end plate of the vertebra involved.

3) Periosteal apposition on the anterior border of the vertebra along the length of the sclerosis.

4) New bone formation on the inferior end plate.

5) Anterior vertebral osteophytes.

6) Narrowing of the disk space below the affected vertebra.

HSS occurs not only as a sequel of degenerative disk disease, but also in bacterial (tuberculous and non-tuberculous) spondylitis, ankylosing spondylitis, osteoid osteoma, and metastases of neoplasms. The differential diagnosis between inflammatory and non-inflammatory pathogenesis and etiology of HSS is described. The characteristic shape of HSS, its sites of predilection (L4 > L5 > L3), and the preponderance of female sufferers from this painful condition are due to factors which, as yet, remain unknown.

Key words: Hemispherical spondylosclerosis – Radiologic features of – Site of – Pathogenesis of – Etiology of

Both bacterial spondylitis and degenerative disk disease lead to narrowing of the disk space. In the case of bacterial spondylitis there are also more or less extensive erosive changes in the vertebral bodies. Degenerative disk disease, on the other hand, promotes new bone formation such as subdiscal sclerosis of the vertebral bodies, and vertebral osteophytes. In the great majority of cases, these radiologic findings enable a differential diagnosis to be made between inflammatory conditions of the intervertebral disk, including the adjacent vertebrae, and degenerative disk disease.

Very rarely, cases are encountered which meet the radiologic criteria for bacterial spondylitis [5], but in which biopsy or necropsy nevertheless reveal degenerative disk disease [15] or a metastasis with invasion of the vertebra and adjacent intervertebral disk [12, 21].

The condition described here stands at the very limits of diagnostic radiology. So far it has been referred to as “discogenic vertebral sclerosis” [23], “condensation vertébrale localisée” [10, 20], “pseudo-infection of the intervertebral disk and adjacent vertebrae” [24], and “bland non-purulent sclerosing spondylitis” [6, 19]. The condition is in fact syndromic, with causes lying beyond disk degeneration or mild bacterial infection. We have termed the condition “hemispherical spondylosclerosis” (HSS) in view of its shape. This term indicates the main radiologic feature without reference to pathogenesis or etiology, which must be determined in individual cases from additional radiologic findings (e.g., perivertebral abscess, sacroilitis, posterior discal hernia), from case history details, and from the results of clinical and serologic examinations. Only then can appropriate treatment be given.

Materials and Methods

Radiographs and, in most cases, tomograms of the spine of 43 patients were available. Patients with kyphoscoliosis or scoliosis were excluded. The follow-up could be evaluated in seven patients. Scintigraphy of the spine was performed in four patients, and computed tomography (Philips Tomoscan 300) was carried out.
in six patients. The case history, clinical data and, in some cases, the histologic findings and the results of cultures, were known. The radiologic features of HSS were analysed both qualitatively and quantitatively (Fig. 1).

Results

HSS was observed 47 times in 43 patients (30 females, 13 males) giving a sex ratio of female: male 2.5:1.

The average age of the females was 40.3 years, and that of the males was 43.8 years. The distribution per individual vertebra is shown in Figure 2. In five of the 43 patients HSS resulted from a tuberculous infection (Fig. 3), in two patients from ankylosing spondylitis (Figs. 4 and 5), and in one patient from a metastasis of cancer of the breast (Fig. 6). One patient had a posterior discal hernia (Fig. 7). The re-