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Isolated thoracic spine lesion: is this the presentation of a SAPHO syndrome? A case report

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Abstract A case of an isolated lesion of the thoracic spine attributed to SAPHO syndrome is presented. A 51-year-old man was referred for inflammatory pain in the thoracic spine. The general examination was normal (especially cutaneous and rheumatologic examinations). Laboratory analysis showed only a mild inflammatory reaction. Standard radiographs showed partial condensation of T8. Computed tomography showed osteolysis of the anterior corner of T8, and MRI revealed an abnormal signal of T8, with enlargement of the prevertebral soft tissue. Percutaneous and thoracoscopic biopsies showed a nonspecific inflammatory process, and cultures were sterile. Initially, several diagnoses were advanced: infectious spondylitis, malignant tumor, lymphomas, Paget disease, seronegative spondyloarthropathies and finally atypical SAPHO syndrome. Three months later, the patient experienced

more pain. General examination was still normal. The radiological findings worsened, while the inflammatory blood tests were normal. A new thoracoscopic biopsy revealed a nonspecific inflammatory process. A diagnosis of SAPHO syndrome was made, despite the lack of typical lesions. Dramatically improving with anti-inflammatory therapy, the patient's condition was favorable at 3-year follow-up. This atypical presentation of an isolated lesion in the spine makes the diagnosis of a SAPHO syndrome difficult but possible. Spine surgeons must be aware of this rare entity, to avoid misdiagnosis and unnecessary repeated surgical biopsies.

Keywords SAPHO syndrome · Spine · Spondylitis

Introduction

SAPHO is an acronym for synovitis, acne, pustulosis, hyperostosis and osteitis. SAPHO syndrome—considered a type of seronegative spondyloarthropathy [3, 7]—is commonly recognized when skin and osteoarticular lesions are associated [2, 10]. The syndrome can be revealed by various clinical and radiological manifestations that are not necessarily all present when establishing the

diagnosis [11]. The aseptic skeletal inflammatory process is the common denominator of these manifestations. SAPHO syndrome diagnosis can be delayed because it can produce similar clinical and radiographic findings to those of osteomyelitis, lymphoma, Ewing's sarcoma, metastasis, Paget disease and other seronegative spondyloarthropathies [2, 3, 10]. We report a case of an isolated thoracic spine lesion. After contemplating different diagnoses, we finally attributed it to SAPHO syndrome.

Case report

A 51-year-old man was referred to our department for severe inflammatory pain in the thoracic spine that had lasted 2 months. The medical history was dyslipidemia and gout. At physical examination, thoracic spine mobility was limited by pain, and palpation of the spinous process of T8 was painful. The patient was neurologically intact. The general examination, especially of joints and skin, was normal.

Plain radiograph showed erosion of the anterior border and condensation of the anterior part of the T8 vertebral body (Fig. 1). The computed tomography (CT) scan confirmed a limited condensation of the T8 vertebral body, with a partial destruction of the superior and anterior vertebral endplate associated with an enlargement of the prevertebral soft tissue (Fig. 2). The prevertebral soft tissue extended initially from T7 to T8 and appeared on MRI with a hyposignal on T1 and a hypersignal on T2 with enhancement after gadolinium (Fig. 3). The vertebral bodies of T7 and T8 had the same signal as the prevertebral soft tissue. MRI signal of the intervertebral disc was normal. Technetium-99 scintigraphic scan showed an isolated fixation of the T8 vertebral body. Laboratory analysis showed an inflammatory reaction: C-reactive protein = 15 mg/l (< 6), erythrocyte sedimentation rate = 26 mm the first hour. The immunoelectrophoresis, myelogram, Bence

Fig. 1 Lateral thoracic spine radiograph at presentation showing erosions of the anterior border and partial condensation of T8 vertebrae

Fig. 2 Initial computed tomography scan of T8 vertebral body showing association of lytic and condensed lesions in bone

Jones protein, and tumoral markers were normal. A search for HLA-B27 was negative.

Two percutaneous biopsies of the vertebral body showed that a nonspecific inflammatory process and culture were sterile. We considered that the percutaneous biopsies were non-contributive, and we decided to perform a surgical biopsy under thoracoscopy. The histologic examination of the soft tissue and the vertebral body revealed a nonspecific inflammatory process with mild fibrosis and no tumoral proliferation. A search for microcrystals was negative. Cultures for bacteria, mycobacterium and parasitic agents were sterile.

At that point, no diagnosis was made, but an infectious or tumoral lesion was ruled out. The patient was observed, and 3 months later he was still in pain. At this time, a new MRI showed an extension of the previously described abnormalities, especially the enlargement of prevertebral soft tissues that extended from T7 to T9 (Fig. 4). The general examination was still normal, and

Fig. 3 Sagittal T1-weighted MRI at presentation showing a partial hypersignal in T8 vertebral body and an enlargement of the soft tissues extended from T7 to T9

the inflammatory blood tests were normal. A new thoracoscopic biopsy was performed. Histologic findings of the vertebral body and soft tissues were identical to the previous biopsy. Rapidly, the patient clinically improved, with pain relief from treatment by nonsteroidal anti-inflammatory.

A new MRI, 5 months later, showed extension of the signal to the T7 vertebral body and extension of the prevertebral soft-tissue abnormalities from T6 to T10 (Figs. 5, 6). At this point, the diagnosis of SAPHO syndrome was made. Six months later, the patient resumed a normal life. The physical exam was normal. Standard X-rays showed condensation of T8 and paravertebral ossification bridging the T7 and T8 levels (Fig. 7). The patient at 3-year follow-up was still

Fig. 5 Sagittal T2-weighted MRI 5 months after diagnosis of SAPHO syndrome. The lesions had worsened: enlargement of the soft tissues extended from T4 to T10. The hypersignal was present throughout the T8 vertebral body, extending from the T7 vertebral body with respect to the disc space

pain-free, and no other lesion of SAPHO syndrome had appeared.

Discussion

In this case, despite the lack of osteoarticular manifestation and skin disease, which can still appear many years later, we attributed this spine lesion to a SAPHO

Fig. 4 MRI 3 months after diagnosis, demonstrating worsening of bone and soft-tissue lesions: figure on *left* without gadolinium and figure on *right* with gadolinium

Fig. 6 Axial T1-weighted MRI at T8 level, 5 months after the diagnosis of SAPHO syndrome was made. Note the bone erosion of the vertebral body and the enlargement of the soft tissues surrounding the vertebrae

Fig. 7 Plain radiograph at 9-month follow-up demonstrating the T8 “ivory” vertebrae and the syndesmophytes bridging at T7–T8 levels and partially at the level below

syndrome, based on several arguments. Firstly, several other classical diagnoses of SAPHO syndrome have been excluded with biopsies and laboratories blood tests. Secondly, all the radiographic findings (X-rays, CT scan, technetium-99 scan and MRI) that we observed were similar to those reported in SAPHO syndrome located in the spine, especially the appearance of paravertebral ossification on X-rays, the combination of osteolysis and osteocondensation and its particular localization on the vertebrae and the enlargement of prevertebral tissues on MRI. Finally, the favorable clinical outcome with non-steroidal anti-inflammatory drugs is typically observed in SAPHO syndrome.

Localization of SAPHO syndrome in the spine has been reported associated with cutaneous lesion [4, 13, 15] or osteoarticular lesions [4]. In our case, this isolated vertebral lesion was the source of a delayed diagnosis, and a SAPHO syndrome diagnosis was made despite association with other lesions.

SAPHO syndrome is commonly diagnosed when osteoarticular manifestations (the sternoclavicular joint is involved in 70–90% of cases) are associated with skin diseases (psoriasis, palmoplantar pustulosis, acne and hidradenitis suppurativa). This association is present in 15% of cases. Most frequently (75% of cases) the skin lesions appear 2 years before the osteoarticular lesions [3], but they may appear even 20 years later [10]. The spine (usually the thoracic spine) and the sacroiliac joint are affected by the disease in 30% and 15–33% of cases,

respectively [5]. Spine involvement is revealed by inflammatory pain evoking a spondylitis. When the spine is affected, one should look for the association of a unilateral sacroiliitis, which characteristically shows an extensive osteosclerosis of the adjacent iliac bone. This association was absent in our case.

In 10% of cases the osteoarticular disease precedes the skin lesion. In such cases, the diagnosis may be delayed if the location of the joint involvement is unusual. Moreover, an isolated osteoarticular involvement renders the diagnosis of SAPHO syndrome difficult, but not impossible [2, 5, 10, 11]. The laboratory analyses are of limited value for confirming the diagnosis but are useful for excluding other diseases [3]. One can observe, as in our observation, an inflammatory reaction with moderate elevation of erythrocyte sedimentation and C-reactive protein values. Usually, the white blood cell count is normal or mildly elevated. Biopsy is often necessary when presentation is not typical, to rule out other diagnoses such as tumors or infections necessitating specific treatment. There is no specific histopathologic finding in SAPHO syndrome. In the acute phase, histopathologic analysis may show polymorphonuclear leucocytes, plasma cells, edema and prominent periostitis. At a later phase, bone sclerosis and fibrosis predominate [3].

In a non-typical clinical presentation, radiologists play a pivotal role in establishing the diagnosis [3]. The general radiological manifestations in bone are a combination of osteoproliferative (hyperostosis) and osteo-destructive (osteitis) changes.

Localization of SAPHO of the spine has some clinical and radiographic findings that should orient the diagnosis. On radiographs, three manifestations could be observed, often in combination [5, 15]. The first lesion is an osteosclerosis of one or more vertebral bodies, beginning at the anterior corner of the vertebral body, as we observed in our case, (Fig. 1) and then extending to all the vertebra similar to “an ivory vertebra” (Fig. 7). The second lesion affects the discovertebral junction, whose appearance can be similar to an infectious spondylitis (loss of vertebral height, erosions of the endplate). The third lesion is an enthesitis of the junction of the annulus and the vertebral body, beginning with erosion of the anterior corner of the vertebral body, which is replaced later on by paravertebral ossification, similar to marginal syndesmophytes but more massive, as in our case (Fig. 7). Hyperostosis with massive bridging along the spine may be accompanied by ankylosis of the disc spaces and associated kyphosis [8, 15]. Technetium-99 scintigraphic scan shows a nonspecific hyperfixation of the vertebrae often associated with a sternoclavicular joint fixation [11]. In our case, fixation was observed only at the T8 level.

The vertebral lesions show hypointensity on T1-weighted images and hyperintensity on T2-weighted and

postcontrast T1-weighted images, while the involved disc spaces are not enhanced [8, 13, 15]. These lesions were observed in the anterior aspect of the vertebral body or on each side of the endplate (Fig. 3). MRI eventually shows extension to other vertebral bodies not seen on plain radiographs (Fig. 3) and prevertebral soft-tissue enlargement, typically located underneath the anterior common vertebral ligament (Figs. 3, 4, and 5). This feature has been poorly reported [8, 13, 15]. Moreover, MRI shows findings against an infectious spondylolysis, such as lack of abscess or epiduritis, and commonly no modification of the signal into the disk (Fig. 5). But a hyper-signal into the disk may be observed if discitis is present. This occurs in 15–30% of cases [13, 15].

A diagnosis of SAPHO should be made only when other diagnoses have been ruled out, such as: infectious diseases, tumor metastasis, sarcomas (especially Ewing's sarcoma in the pelvis), lymphomas, Paget disease and seronegative spondyloarthropathies [2, 5, 10]. Although SAPHO syndrome may later reach the criteria of seronegative spondyloarthropathies [3, 7], in our case, the criteria for a seronegative arthropathy were not present [7].

Long-term prognosis of SAPHO syndrome is good [9]. Pain relief is commonly obtained with nonsteroidal

anti-inflammatory drugs (NSAIDs) [9]. In our patient, pain relief was obtained with such drugs. Because precise knowledge of the pathogenesis of SAPHO syndrome is lacking, a variety of therapeutic approaches exists. NSAIDs and corticosteroids produce symptomatic improvement [12, 16]. Antibiotics such as tetracycline are used when organisms of low infectivity (e.g., *Propionibacterium acnes*) are assumed to be involved in the pathogenesis [16]. More recently, intravenous infusion of diphosphonate (pamidronate) has been proposed to reduce bone turnover (as calcitonin has previously shown benefit), evidence of which has been demonstrated on bone biopsies in SAPHO [12]. Although tumor necrosis factor α (TNF)-blocking agents have only been used in limited cases, with rapid and good long-term results [14, 16], the use of TNF α -blocking is supported by histologic studies that revealed high amounts of TNF production in bone biopsies of patients with SAPHO [16]. These new therapeutic approaches need further investigation.

SAPHO syndrome is rarely observed and can affect the spinal column in different ways. Spine surgeons must be aware of this syndrome to avoid repeated, unnecessary surgical procedure, delayed diagnosis and inappropriate treatment [6].

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