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ARP Case Report nº 31: Interface Gouty Tophus in the Lumbar Spine

Caso Clínico ARP nº 31: Tofo Gotoso Interfacetário na Coluna Lombar

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Case Presentation

A 58-year-old man, with a personal history of obesity and chronic alcohol abuse, was admitted to the emergency department with a recent worsening of chronic low back pain. On objective examination, there was intense pain (8/10) upon palpation of the spinous processes and paraspinous soft tissues, as well as peripheral joint deformities.

An x-ray of the lumbosacral spine was performed (Figure 1), which revealed a reduction in the height of the L3 and L4 somatic bodies, with signs of cementoplasty of the L4 somatic body and slight extravasation of cement into the L3-L4 intradiscal space. The presence of an area of radiolucency in the topography of the L3-L4 interapophyseal joints was admitted (blue arrows).

Magnetic resonance imaging revealed the presence of bone marrow edema within these vertebrae, confirming the recent evolution of these fractures. Additionally, it showed a lesion with approximately 3.5 cm in the longest axis involving the right posterior articular mass of L3-L4 (Figure 2). The lesion was discretely lobulated, well defined, and appeared predominantly hypointense in T1 and T2 weightings (A and B in Figure 2), with peripheral enhancement and signal reinforcement in the dynamic study (D in Figure 2).

Spectral computed tomography demonstrated a ground-glass density lesion, calcified at the periphery, involving the right articular facets of L3-L4 (Figure 3). The injury caused slight erosion of the articular facets (red arrows in Figure 3). The spectral study with reformatting aimed at identifying urate crystals revealed the presence of crystals in the periarticular interface topography in the region of the lesion mentioned above (A and B in Figure 4). It was therefore considered to be an interface gouty tophus of the lumbar spine.

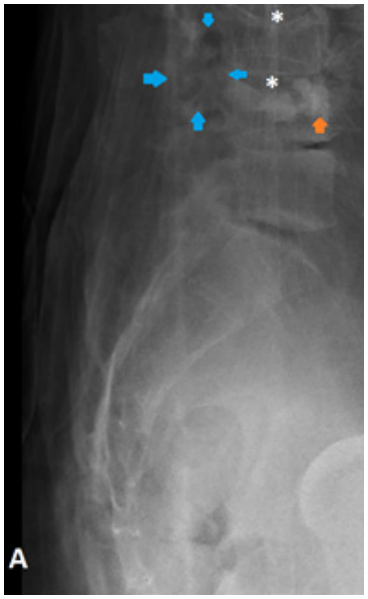

Figure 1 – Lumbosacral radiograph in lateral view (A), showing the sinking of the upper somatic platform of L3 and L4 (asterisks) and the presence of radiodense material in the L3-L4 intervertebral space in the context of post vertebroplasty (orange arrow). Also showing a discreet radiolucent area in the topography of the posterior joint mass of L3-L4 (blue arrows).

Discussion

Gouty arthropathy is one of the most common inflammatory arthropathies, affecting approximately 1-4% of the population, with a predominance in males.[1] It is characterized by an inflammatory response to the deposition of sodium

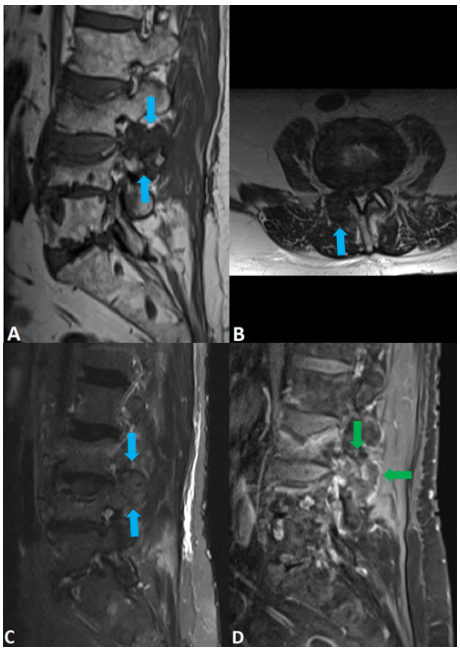

Figure 2 – Magnetic resonance imaging of the lumbar spine (Siemens Magneton Symphony™, A - T1 sagittal, B - T2 axial, C - T2fs sagittal, D - T1fs axial, after intravenous administration of gadolinium) revealed lobulated lesion adjacent to the right L3-L4 facet joints (blue arrows). The lesion was markedly hypointense on T1 (A), with a predominantly hypointense signal on T2 (B and C) and with peripheral enhancement on dynamic study (green arrow in D).

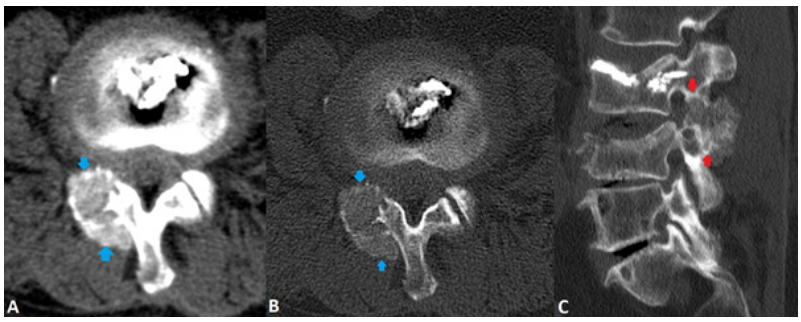

Figure 3 – Spectral computed tomography images of the lumbar spine (Phillips 7500™, A - axial soft tissue window, B - axial bone window, C - sagittal bone window) showing a ground-glass density lesion (blue arrows), calcified at the periphery, conditioning erosions on the right L3-L4 articular facets (red arrows).

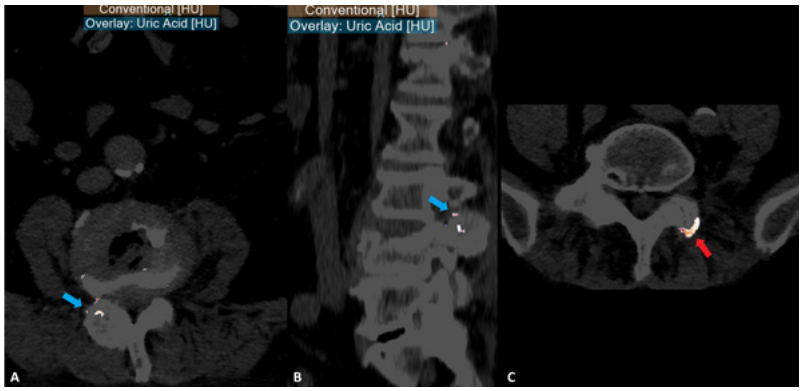

Figure 4 – Spectral computed tomography images of the lumbar spine (Phillips 7500™, conventional image overlay map with uric acid deposition, A - axial, B - sagittal, C - axial) revealed deposition of sodium monourate crystals at the localized lesion between the right L3-L4 articular facets (blue arrows in A and B), surrounded by inflammatory infiltrate. Additionally, the presence of sodium monourate crystals was found in other locations of the lumbar spine (red arrow).

monourate crystals in the joints and periarticular tissues (especially bursae and tendons).[1,2] These crystals induce a local inflammatory reaction, giving rise to joint effusion, bone erosions and gouty tophi. Its etiology is multifactorial, including genetic predisposition, comorbidities and diet.[1]

Gout is a multisystem disease with classic renal and rheumatological manifestations, and may only present as asymptomatic hyperuricemia. Classically, gouty arthropathy presents as an acute monoarthritis with pain, erythema and edema in the first metatarsophalangeal joint (podagra), which can evolve into oligo- or polyarthropathy.[1,3] Patients with chronic hyperuricemia (especially after more than five years without treatment) tend to develop gouty tophi. These result from the accumulation of sodium monourate crystals and secondary inflammatory infiltrate, and are located mainly in the peri-articular topography, in the bursae or in the ear pinna.[4,5]

Gouty arthropathy mainly affects the peripheral joints (hands and feet) due to the lower degree of solubility of the crystals at lower temperatures.[5] Although there are few cases reported in the literature, the presence of gout in the axial system is not as infrequent as previously assumed, being present in up to 29% of patients diagnosed with gout.[1,6,7] Theoretically, gout can involve all structures of the axial skeleton, however, it appears to be more frequent in the lumbar spine, with a predilection for the articular facets, as seen in the clinical case described.[4,5]

Similar to the appendicular skeleton, the erosive changes in the axial skeleton associated with gout only appear several years after lack of control of uricemia levels, and there appears to be an association between the presence of peripheral tophi and axial gouty tophi, as in the present case.[6]

Axial gout may present as asymptomatic, but may be associated to spinal cord compression, radiculopathy, spondylolisthesis or cauda equina syndrome.[5]

The diagnosis of gout and gouty arthritis is traditionally based on clinical aspects and the identification of urate crystals in synovial fluid. The characteristics of gouty tophi on MRI are not very specific. Typically, they present with low signal on T1-weighted sequences. The signal on T2-weighted sequences varies depending on the calcium concentration. In dynamic studies, tophi may present uniform or peripheral enhancement.[8] In conventional tomodensitometric studies, gout appears as a soft tissue mass, with ground-glass density, lobulated, juxta-articular, associated with bone erosions with sclerotic edges. and with preservation of the density of the adjacent bone.[4,5]

Currently, spectral computed tomography (CT) is a non-invasive method for visualizing, characterizing and quantifying sodium monourate crystals, with very high sensitivities and specificities (78-100% and 89-100%, respectively).[7,9,10] Spectral technology uses information obtained with different energy levels, allowing better characterization and differentiation of components from different tissues. In gout, this technology has proven useful in the early diagnosis, treatment and follow-up of the disease, having already been incorporated into the gout diagnostic criteria of the American College of Rheumatology / European League Against Rheumatism in 2015.[1,11]

Diagnosing axial gout can be challenging. The main differential diagnoses to consider are primary bone tumors, metastases, infection and calcium pyrophosphate deposition disease.[4]

In the case presented, the gold standard for diagnosis would be excisional biopsy, which, histologically, would reveal granulomatous infiltrate and needle-shaped crystals with negative birefringence under a polarized light microscope.[5] However, given the presence of peripheral gouty tophi and the findings on spectral CT imaging, the diagnosis of interface gouty tophus was assumed.

Conclusion

Although uncommon in the spine, gout should be considered in the differential diagnosis of injuries to the axial skeleton, especially in the presence of gouty tophi in other locations. Spectral CT is a valuable non-invasive tool in the detection of urate crystals; therefore, its use should be preferred over conventional CT in suspected cases.

Ethical Disclosures / Divulgações Éticas

Conflicts of interest: The authors have no conflicts of interest to declare.
Conflitos de interesse: Os autores declaram não possuir conflitos de interesse.
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Suporte financeiro: O presente trabalho não foi suportado por nenhum subsídio ou bolsa.
Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.
Confidencialidade dos dados: Os autores declaram ter seguido os protocolos do seu centro de trabalho acerca da publicação dos dados de doentes.
Protection of human and animal subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).
Protecção de pessoas e animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

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