Interventions and Therapy in Rheumatology

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KEYWORDS

• Rheumatology • Glucocorticosteroids • Secondary osteoporosis • Vertebroplasty • Magnetic Resonance

KEY POINTS

- Patients affected by rheumatic conditions present frequently with secondary osteoporosis caused by long-term oral glucocorticosteroid therapy with consequent loss of trabecular bone.
- Patients with secondary osteoporosis from oral steroid therapy may be affected by vertebral fractures amenable to percutaneous vertebroplasty.
- Patient selection for vertebroplasty is based on both clinical (pain and timing of symptoms) and imaging criteria: hypointensity in T1-weighted and hyperintensity in short tau-inversion recovery or magnetic resonance sequences or increased uptake at technetium-99m scintigraphy bone scan, without computed tomography signs of bone sclerosis.
- Even if in the short time vertebroplasty significantly reduces pain and improves the quality of life, patients should be informed of the procedural outcomes in the long term, underlying the risk of refracture because of the ongoing of the osteoporosis and the possible need for reintervention.
- Vertebroplasty represents the symptomatic treatment of the fracture pain, so patients must always be included into a specific therapeutic workup of the rheumatic condition.

INTRODUCTION

In patients affected by rheumatic conditions, spine degeneration has a higher incidence than in the general population; this is because of the early involvement of disco-somatic units. In this scenario, vertebral compression fractures (VCF) are frequently observed and not only in elderly populations; they are certainly related to the disease itself but even more to the medical therapies, especially glucocorticosteroids (GCs).[1]

Since their introduction in the 1950s, GCs have been widely used in a variety of inflammatory diseases, and they are key drugs of therapeutic regimens in most autoimmune rheumatic conditions because of their effectiveness, versatility, and low cost.[2] Early data shortly after the introduction of GCs suggested potential slowing of radiographic progression in rheumatoid arthritis.[3]

However, even at low doses ($\leq$7.5 mg of prednisolone or equivalent), GCs rapidly induce bone loss,[4,5] more marked in the trabecular bone. This bone loss leads to GC-induced osteoporosis (GIO) and consequent increased risk of bone fractures, particularly elevated for vertebral fractures (2–5 times, depending on the daily dosage) that already occurs 3 months after treatment has

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started.[6] Besides bone loss, the risk of fracture is also increased by a reduced bone quality.[7] Higher dose and longer duration of GC use are strongly associated with the risk of VCF,[8,9] but a threshold dose or duration has not been well described, as wide individual variation is seen. Therefore, GC therapy is the most common cause of secondary osteoporosis.[4]

Various guidelines for GIO stress the importance of initiating an anti–osteoporosis prophylaxis[10,11] in terms of bisphosphonates and teriparatide assumption. However, many patients do not receive such treatment,[10–12] and despite efforts to prevent GIO, patients may still present with VCF,[13] requiring pharmacologic pain control (eg, acetaminophen, nonsteroidal anti-inflammatory drugs, or narcotic analgesics) and protracted immobilization; this finally induces worsening of the quality of life and causes secondary complications such as atelectasis, pneumonia, or pulmonary embolus.

In this clinical scenario, a mini-invasive approach provided by interventional radiology techniques, especially vertebroplasty (VP), plays a relevant role in the pain management of these patients. For approximately 20 years,[13] cases of GIO in rheumatology patients with VCF have been described in which VP offered a unique method for pain management.

The pathogenesis of spine pain in these patients is related to the stretching of periosteal nervous fibers caused by micromovements[14]; therefore, the goal of intravertebral cement, poly(methyl methacrylate) (PMMA), injection is the stabilization of those microfractures.[15]

So, patients with secondary osteoporosis from oral steroid therapy may present with VCF amenable to percutaneous VP; this report describes patient selection criteria, technique, and outcomes of VP in patients affected by rheumatic disease and GIO.

PATIENT SELECTION CRITERIA

Based on clinical and radiologic criteria (**Fig. 1**), it is essential to correctly select the patients suffering from GIO fractures amenable to VP to avoid harm.

First, asymptomatic patients are excluded. Clinical inclusion criteria (**Table 1**) include symptomatic patients without neurologic complications and with intractable pain not responding to conservative therapy, namely refractory after at least 3 weeks of analgesic assumption and/or decreased daily living activities.[14–16]

In addition to clinics, radiologic imaging clearly plays a pivotal role in patient selection. A vertebral collapse is typically detected with radiographs or computed tomography (CT) scan, but these data need to be verified by magnetic resonance (MR) imaging or scintigraphy bone scan, because fractures amenable to VP are those in the acute/subacute phase.[15] MR imaging (**Fig. 2**) shows marrow edema using spin-echo T1-weighted, T2-weighted, and short tau-inversion recovery sequences (STIR). It presents nuanced hypointensity in T1 and marked hyperintensity in STIR. Additionally the rim fracture can be appreciated in T1 as a linear hypointensity. Technetium-99 m scintigraphy bone scan detects an increased uptake.

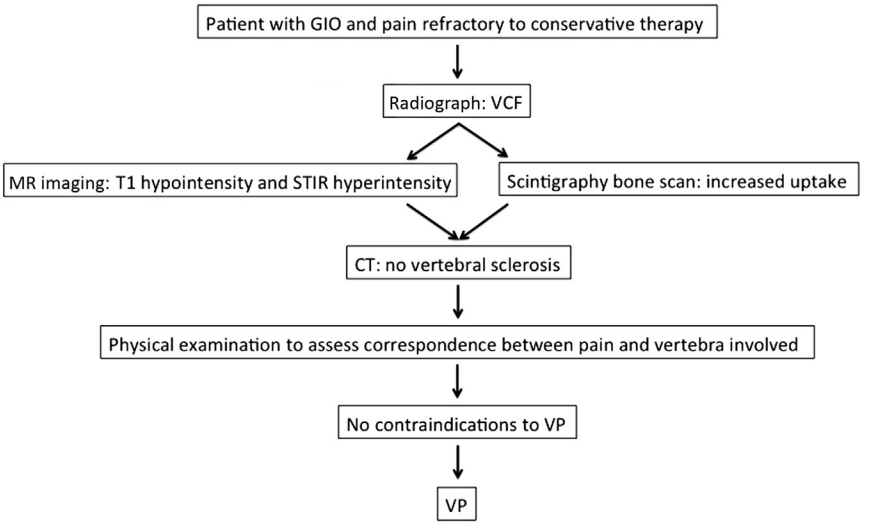

Fig. 1. Diagnostic-therapeutic algorithm.