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## Review article

# Relevant aspects of imaging in the diagnosis and management of gout<sup>☆</sup>

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## ABSTRACT

Gout is an inflammatory arthritis characterized by the deposition of monosodium urate crystals in the synovial membrane, articular cartilage and periarticular tissues leading to inflammation. Men are more commonly affected, mainly after the 5th decade of life. Its incidence has been growing with the population aging.

In the majority of the cases, the diagnosis is made by clinical criteria and synovial fluid analysis, in search for monosodium urate crystals. Nonetheless, gout may sometimes have atypical presentations, complicating the diagnosis. In these situations, imaging methods have a fundamental role, aiding in the diagnostic confirmation or excluding other possible differential diagnosis.

Conventional radiographs are still the most commonly used method in gout patients' evaluation; nevertheless, this is not a sensitive method, since it detects only late alterations.

In the last years, there have been several advances in imaging methods for gout patients. Ultrasound has shown a great accuracy in the diagnosis of gout, identifying monosodium urate deposits in the synovial membrane and articular cartilage, in detecting and characterizing tophi and in identifying tophaceous tendinopathy and enthesopathy. Ultrasound has also been able to show crystal deposition in patients with articular pain in the absence of a classical gout crisis.

Computed tomography is an excellent method for detecting bone erosions, being useful in spine involvement. Dual-energy CT is a new method able to provide information about the chemical composition of tissues, with high accuracy in the identification of monosodium urate deposits, even in the early stages of the disease and in cases of difficult characterization.

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Magnetic resonance imaging is useful in the evaluation of deep tissues not accessible by ultrasound.

Besides the diagnosis, with the emergence of new drugs that aim to reduce tophaceous burden, imaging methods have become useful tools in monitoring the treatment of patients with gout.

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## Aspectos relevantes do diagnóstico e seguimento por imagem na gota

### R E S U M O

#### Palavras-chave:

Gota

Ultrassonografia

Ressonância magnética

Tomografia computadorizada de dupla energia

A gota é uma artrite caracterizada pela deposição de cristais de monourato sódico na membrana sinovial, na cartilagem articular e nos tecidos periarticulares que leva a um processo inflamatório.

Na maioria dos casos o diagnóstico é estabelecido por critérios clínicos e pela análise do líquido sinovial, em busca dos cristais de MSU. Porém, a gota pode se manifestar de maneiras atípicas e dificultar o diagnóstico. Nessas situações, os exames de imagem têm papel fundamental, auxiliam na confirmação diagnóstica ou ainda excluem outros diagnósticos diferenciais.

A radiografia convencional ainda é o método mais usado no acompanhamento desses pacientes, porém é um exame pouco sensível, por detectar somente alterações tardias.

Nos últimos anos, surgiram avanços nos métodos de imagem em relação à gota. O ultrassom se mostra um exame de grande acurácia no diagnóstico de gota, identifica depósitos de MSU na cartilagem articular e nos tecidos periarticulares e detecta e caracteriza tofos, tendinopatias e entesopatias por tofos.

A tomografia computadorizada é um ótimo exame para a detecção de erosões ósseas e avaliação do acometimento na coluna. A tomografia computadorizada de dupla-energia, um método novo, fornece informações sobre a composição química dos tecidos, permite a identificação dos depósitos de MSU com elevada acurácia.

A ressonância magnética pode ser útil na avaliação dos tecidos profundos, não acessíveis ao ultrassom.

Além do diagnóstico, com o surgimento de drogas que visam reduzir a carga tofácea, os exames de imagem se tornam uma ferramenta útil no acompanhamento do tratamento dos pacientes com gota.

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## Introduction

Gout is an inflammatory arthritis, characterized by periods of hyperuricemia and deposition of mono sodium urate (MSU) in the articular cartilage, subchondral bone, synovium, capsule, periarticular tissues and in lower temperature areas such as the superficial tissues of the extremities, leading to an inflammatory reaction.<sup>1,2</sup> Genetic and dietary factors have been implicated in increasing the level of MSU.<sup>2</sup>

Gout occurs in approximately 0.2–0.35 per 100 inhabitants in the general population. The incidence is higher at the end of the third/beginning of the fourth decade of life, predominantly in males and in about 5% of women, usually after menopause.<sup>2,3</sup>

Usually, the diagnosis is established by clinical and laboratory workup, and the reference method is the analysis of synovial fluid; however, this is an invasive technique. Thus, the therapy can be started based on the diagnostic criteria of the American College of Rheumatology (ACR).<sup>4</sup>

The importance of an accurate diagnosis and treatment of gout should not be underestimated, because these patients will depend on the therapy throughout their lives, in order to diminish those morbidities associated with hyperuricemia. Due to the multiple differential diagnoses, and also considering the atypical presentations of gout, imaging studies may be useful in various stages of this disease.<sup>5</sup>

In the last decade, we have witnessed important advances in imaging techniques, assisting in the noninvasive diagnosis and follow-up of patients being treated for gout. To the best of our knowledge, no recent review of the imaging aspects for gout was published in Brazilian literature. To the best of our knowledge, there has not been any recently published review of imaging aspects for gout in Brazilian literature. This review aims to summarize recent advances in the literature related to imaging studies, disclosing the relevant aspects to physicians of all specialties with respect to the diagnosis and follow-up of gout patients by imaging methods, in view of the increase and the high prevalence of this disease.

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