

Imaging in Axial Spondyloarthritis

Evaluation of Inflammatory and Structural Changes

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KEYWORDS

• Bone edema • Fat metaplasia • Erosion • Ankylosis • Radiography • MRI

KEY POINTS

- For radiographic evaluation of the sacroiliac joints a single view is sufficient and additional imaging increases radiation without enhancing diagnostic sensitivity.
- Bone marrow edema on fat-suppressed MRI of the sacroiliac joints occurs before radiographic abnormalities but may occur nonspecifically in about 20% of patients with mechanical back pain and in healthy individuals.
- Erosion on T1-weighted MRI of the sacroiliac joints is more specific but less sensitive than bone marrow edema for spondyloarthritis and may be observed early after symptom onset.
- Fat metaplasia on T1-weighted MRI of the sacroiliac joints is characterized by a distinct border and proximity to subchondral bone but seldom occurs in the absence of other lesions.
- Pelvic MRI is usually sufficient for routine diagnostic evaluation of spondyloarthritis but spinal imaging may be indicated in the setting of localized spinal symptoms.

INTRODUCTION

Pelvic radiography remains the primary imaging modality for routine diagnostic evaluation of spondyloarthritis (SpA), although its limited reliability and its focus on structural changes that occur late in the disease has focused attention on more sensitive imaging modalities, such as computed tomography (CT) and especially MRI. This article reappraises the role of radiography to provide an overview of current approaches to and indications for MRI evaluation, to describe the spectrum of lesions observed on MRI of the sacroiliac joint (SIJ) and spine, and to provide recent data

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on the relative diagnostic capacity of each of these abnormalities in SpA compared with other spinal conditions that may resemble axial SpA.

PLAIN RADIOGRAPHY

Plain radiography of the SIJ is still the primary imaging modality used for diagnosis, evaluation, and classification of SpA. However, it can only depict the consequences of inflammation and the enhanced turnover of joint tissue. Radiographic abnormalities are therefore limited to cancellous and/or cortical bone. The earliest abnormality that indicates inflammation in the SIJ is a loss of distinctness of the subchondral bone of the lower one-third of the iliac bone leading to the classic depiction of the serrated postage stamp (Fig. 1). This image probably reflects early inflammation in the subchondral bone marrow of the cartilaginous portion of the joint. This inflammation is followed by more obvious erosion and apparent widening of the radiographic joint space as the erosion affects both articular surfaces. Progressive sclerosis and joint space ankylosis represent late features of disease.

Radiographic abnormalities in the spine include vertebral corner erosions, squaring, and sclerosis erosion of the vertebral endplate and new bone formation manifesting as syndesmophytes and ankylosis. These features may be evident with minimal involvement of the SIJ but this is insufficient to include routine radiography of the spine in diagnostic evaluation.

Diagnostic Evaluation Using Plain Radiography

Radiographic images, together with CT and MRI scans, are digitized and stored in the Digital Imaging and Communications in Medicine (DICOM) file format.

- DICOM images require DICOM viewing software, which allows image enhancement by alteration of brightness, contrast, and magnification (for examples, go to <https://www.carearthritis.com/mriportal/cotm/showcotm07/>).

It is apparent that rheumatologists are not familiar with the use of DICOM imaging and increasingly rely on a radiologist's assessment. Because radiologists have limited clinical information, this increasing rheumatologist skill gap has the potential to compromise patient care as well as medical education. Simplified DICOM viewers



Fig. 1. Ferguson view of SIJs showing erosion of both iliac bones (arrow). On the right the appearance of erosion resembles the serrated postage stamp appearance that may be observed in early axial SpA.

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