Current Perspectives on Imaging for Systemic Lupus Erythematosus, Systemic Sclerosis, and Dermatomyositis/ Polymyositis

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KEYWORDS

• Systemic lupus erythematosus • Jaccoud arthropathy • Systemic sclerosis
• Dermatomyositis • Interstitial lung disease • Radiographs • Ultrasound

KEY POINTS

- Systemic rheumatic diseases often cause joint pain and physical examination findings of arthritis.
- Plain radiographs are an important starting point for the detection of abnormalities in the joints.
- Musculoskeletal ultrasound and MRI offer greater sensitivity for the detection of synovitis, tenosynovitis and erosions than plain radiographs in systemic rheumatic disease.
- Chest computed tomographic scanning is an important component of the evaluation for organ system involvement of patients with dermatomyositis, polymyositis and systemic sclerosis.

INTRODUCTION

Systemic rheumatic diseases, such as systemic lupus erythematosus (SLE), systemic sclerosis, and dermatomyositis (DM), frequently pose diagnostic challenges to the clinician. Early on, patients may not only present with myriad symptoms, but each symptom may be subtle and subject to numerous interpretations. Distinguishing

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between various possible diagnostic entities can be difficult. Fatigue, fever, rash, and joint pain may accompany the onset of infectious diseases and malignancies, as well as the systemic rheumatic diseases. Over the course of time, new symptoms may arise. Some may be related to the underlying disorder, others to complications of therapy or to entirely different medical or psychosocial concerns. The clinician may need to rethink the diagnosis or consider the possibility that the patient has developed an overlap syndrome in which features of more than 1 disease may coexist. The ability to make appropriate therapeutic choices depends on the skillful interpretation of laboratory and radiographic data that are important supplements to the clinician's experience and judgment. Imaging can be particularly useful for answering questions about the pathogenesis and extent of organ system involvement, especially in the joints and the lungs.

SYSTEMIC LUPUS ERYTHEMATOSUS

SLE is often thought of as the prototypical immunologically mediated systemic disease. Although a wide array of organs may be affected by the immunologic dysregulation characteristic of lupus (**Table 1**),[1] joint symptoms are by far the most frequent manifestation seen at initial presentation.[2] From 45% to 70% of patients will complain of joint pain and/or be found to have physical examination evidence of inflammatory arthritis at disease onset. Furthermore, up to 95% will eventually experience arthralgia or arthritis. Radiographic evaluation of the joints is, therefore, likely during the course of virtually every lupus patient's disease. The usual starting point of this evaluation is with plain radiographs of the affected joints. Modalities such as ultrasound and MRI are used particularly in circumstances in which assessing the degree of synovitis or destructive change will influence diagnosis and management choices.

One of the most important diagnostic distinctions to be made is between rheumatoid arthritis (RA) and lupus. Patients may present in similar fashion. Both diseases are more likely to occur in women and are likely to result in joint symptoms at a younger age, sometimes far younger, than joint symptoms that arise from the most common cause of arthritis, osteoarthritis. Both can be accompanied by constitutional findings, like fatigue, malaise, and fever, and by organ-specific symptoms outside the musculoskeletal system. Both occur in patients with a variety of autoantibodies that can clarify, as well as obscure, the diagnosis, and both SLE and RA can lead to joint deformities. Although no single radiographic feature is unique to lupus, findings can be quite different from RA and plain radiographs can help clarify both early and late diagnosis.

Plain Radiographs

Early on, radiographs of symptomatic joints in SLE can be completely normal. As time goes on, a variety of features may emerge. The hallmark feature has been characterized as deformity without articular erosions on plain radiographs (**Fig. 1**), termed Jaccoud arthropathy, adopting the nomenclature first applied to rheumatic fever.[3] This feature has subsequently been reported to occur in a host of other disorders, including DM and scleroderma.[4] Subsequent investigators have emphasized that joint pain in SLE can occur in the absence of synovitis. Symptoms may be transient and without structural consequences for the joints. Others have noted that deformities may occur that are "reducible," so that an examiner can physically reposition malaligned joints into anatomic alignment. This is in contrast to RA, in which permanent, or "fixed," deformities are typical of the full expression of the disease.

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