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Case Report

Sonography of active rheumatoid arthritis during pregnancy: a case report and literature review

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ABSTRACT

Disease activity in rheumatoid arthritis usually subsides in pregnancy, however a subset of patients have worsened symptoms with joint pain and swelling. Monitoring and mitigating disease activity in pregnancy is important for preventing deforming structural changes which can affect the ability of the patient to care for themselves and the newborn. Ultrasound is a safe and low-cost imaging modality for detecting active changes from an inflammatory arthritis, which can help guide management. We describe a case of an acute disease flare during pregnancy, readily detected with ultrasound, and present a review of sonographic evaluation of rheumatoid arthritis in pregnancy.

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Introduction

Pregnancy in rheumatoid arthritis is usually associated with a decrease in disease activity in the majority of patients, said to be secondary to hormonal protection and presence of anti-inflammatory cytokines [1]. However, approximately 40% of patients have increased disease activity [1,2]. In the presence of a flare, uncontrolled active inflammatory changes can result in deforming disease with erosions and subluxations, and development of secondary degenerative arthritis from articular cartilage damage and joint space narrowing. Postpartum disease flare is also a well described phenomenon

[1]. In the pregnant patient, rheumatoid arthritis is associated with preterm delivery, increased rate of cesarean section, and reduced birth weight [3,4]. Additionally, many of the standard systemic treatments are considered fetotoxic [5]. Therefore, to prevent disease progression and mitigate negative outcomes, diagnosing and managing active changes from rheumatoid arthritis during pregnancy is critical.

Conventional radiographs, ultrasonography, and MRI are all used to detect disease activity [6]. Although conventional radiographs are ubiquitous, they have a limited role in detecting the earliest evidence of active disease including synovitis and bone marrow edema [6]. MRI with intravenous gadolinium provides exquisite soft tissue detail to detect changes of active disease including synovitis, bone marrow edema, and

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osteitis; however, in the pregnant patient, its use is limited due to the mounting evidence documenting the risk of intravenous gadolinium to the fetus [7–11]. Ultrasound, in this circumstance, provides a lower cost imaging option that is capable of detecting synovitis, tenosynovitis, and periarticular erosions [12,13].

In this report, we describe a case of active changes from rheumatoid arthritis well seen on ultrasound in a pregnant patient, and present a review of the literature on the use of ultrasonography to diagnose active disease.

Case report

The patient is a 29 year old pregnant (17 weeks) female with a history of juvenile idiopathic arthritis, diagnosed at age 4. The pattern of disease was consistent with persistent oligoarthritis (lower limb predominant); without a history of uveitis. She was Antinuclear Antibodies (ANA) positive, rheumatoid factor and cyclic citrullinated peptide (CCP) seronegative at the time of diagnosis. After initial management with infliximab (Remicade, Janssen Pharmaceuticals, Horsham, PA 19004) and methotrexate, she was maintained on etanercept (Enbrel, Immunex Corporation, Thousand Oaks, CA 91320) with good response until she made plans for pregnancy, at which time she was weaned off the TNF- α inhibitor therapy. She had discontinued taking etanercept and nonsteroidal anti-inflammatory medications 5 months prior in preparation for pregnancy. At the time of presentation, the only medication being taken was prenatal vitamin supplements.

She first communicated with the rheumatologist reporting symptoms of fluctuating asymmetrical joint swelling involving bilateral wrists and left ankle for 1 month. She denied morning joint stiffness, warmth or significant joint pain. Updated laboratory data, including complete blood count, sedimentation rate and C-reactive protein level were within normal limits. Given the asymmetrical symptoms and suspicion of subclinical synovitis, ultrasound evaluation was requested for further clarification of disease activity.

Sonographic evaluation of the right hand and foot demonstrated active synovitis, characterized by marked synovial hypertrophy and hypervascularity within the imaged joints (Figs. 1, 2 and 3). There were small erosions noted at the second metacarpophalangeal joint and the second metatarsophalangeal joint. The total grayscale synovitis score was 26 out of 33, and the total Power Doppler synovitis score was 21 out of 21. Moderate hypervascular tenosynovitis was also noted involving the extensor tendons.

Based on these findings, the patient was diagnosed with a rheumatoid arthritis flare with active changes. Subsequently, she was seen in the rheumatology clinic where a physical examination revealed polyarthritis concordant with the ultrasound findings. The presence of polyarthritis including multiple small joints with radiographic erosive disease support transition from oligoarticular JIA to rheumatoid arthritis in adulthood. After rheumatologic consultation and appropriate discussion of the potential side effects to the mother and fetus from systemic therapy, the patient declined low-dose oral glucocorticoids and oral disease modifying antirheumatic drugs.

She was then offered targeted steroid injections from which she reported therapeutic benefit in both the anesthetic and steroid phase.

Discussion

The management of rheumatoid arthritis in pregnancy lends itself to a complex interplay between monitoring disease activity and mitigating symptoms with nontoxic yet effective therapies. For some patients, pregnancy is not protective and results in a flare of disease activity. Therefore, detection and tight control of inflammatory changes is warranted to prevent joint destruction which can result in poor long-term prognosis with deforming changes.

MRI with intravenous gadolinium for the evaluation of rheumatoid arthritis is of limited utility in the pregnant patient. Ray et al. report an association with an increased risk of a broad set of rheumatologic, inflammatory, or infiltrative skin conditions in the fetus, and for stillbirth or neonatal death after gadolinium enhanced MRI [8]. The American College of Radiology recommendations state that MRI contrast agents should not be routinely provided to pregnant patients since gadolinium passes through the placenta barrier and stays in the amniotic space where it could dissociate from the chelate molecule, releasing the toxic gadolinium ion [10]. The American College of Obstetricians and Gynecologists committee opinion states that gadolinium use should be limited to situations in which the benefits clearly outweigh the possible risks [14].

The utility of diagnostic ultrasound for inflammatory arthritis has significantly grown over the past two decades [6,12,13,15–17]. Ultrasound is able to assess active inflammatory changes such as synovitis, tenosynovitis, and enthesitis. Several studies have demonstrated comparable rates of detection of synovial inflammation between ultrasound and MRI [18–20]. Ultrasound can also evaluate for chronic structural changes such as erosions. In a meta-analysis which included 913 patients, Baillet et al. concluded that ultrasound has comparable efficacy to MRI for erosion detection [21]. Given the untoward side effects of MRI with intravenous gadolinium, ultrasound plays a welcomed role in the evaluation of disease activity as it is easily accessible, cost-effective and allows multiple joints to be imaged concomitantly.

The definitions for the sonographic findings associated with active rheumatoid arthritis are outlined by the OMER-ACT7 group [12]. The hallmark of an inflammatory arthritis is synovitis which is readily detected on ultrasound as synovial thickening which can be hypervascular in its acute and subacute stages, while a more chronic fibrous pannus can present without hypervascularity. Effusions may also represent a part of the inflammatory response at the level of the joint and is well visualized on ultrasound. While synovial fluid and synovial thickening are both hypoechoic (synovial fluid may be also be anechoic), an effusion will be displaceable and compressible, while synovial hypertrophy is not. Synovial fluid is hypovascular while synovial hypertrophy, along with color Doppler signal constitutes the imaging hallmark for synovitis [22]. Tenosynovitis can also represent active changes

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