

Transient osteoporosis of pregnancy in a 34-year-old female

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A 34-year-old Caucasian female presented during the third trimester of her pregnancy with bilateral hip pain that became progressively severe. Imaging of her pelvis and bilateral hips with MRI obtained during her third trimester of pregnancy demonstrated bilateral bone-marrow edema of the femoral heads and the sacrum at S1. Repeat MRI performed at 6 months postpartum revealed resolution of edema. MRI is considered the best diagnostic test for this condition in regards to sensitivity and specificity.

Case report

The patient, a 34-year-old Caucasian female G3P1, whose medical history was significant only for mild asthma, presented to her clinician with sudden-onset bilateral hip pain associated with knee and ankle pain during the third trimester of pregnancy. Her pain progressively worsened with time, reaching a threshold such that analgesics (including opioids) did little to alleviate her symptoms. Besides hip and knee pain, review of systems was negative for fatigue, headache, fever, chills, chest pain, palpitations, nausea, vomiting, abdominal pain, paresthesias, or any other symptoms. She was evaluated by physical therapy, and assigned bed-level exercises as well as recommended to use a 4-point walker. Given her unrelenting pain, which had progressively worsened over time, an MRI of the pelvis and hips was performed, while the patient was still in her third trimester of pregnancy. No plain radiographs were taken.

Bilateral hip MRI revealed increased T2 signal in the marrow of the pelvis and bilateral femoral heads consistent with bone-marrow edema (Figs. 1-4). Small bilateral joint



Figure 1. 34-year-old female with osteoporosis of pregnancy. Coronal T1-weighted image shows abnormal decreased signal (arrows) involving the bilateral proximal femurs.

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effusions were identified. No fracture was identified. The femoral head contours were normal. Findings were most characteristic of transient osteoporosis of the hip in preg-

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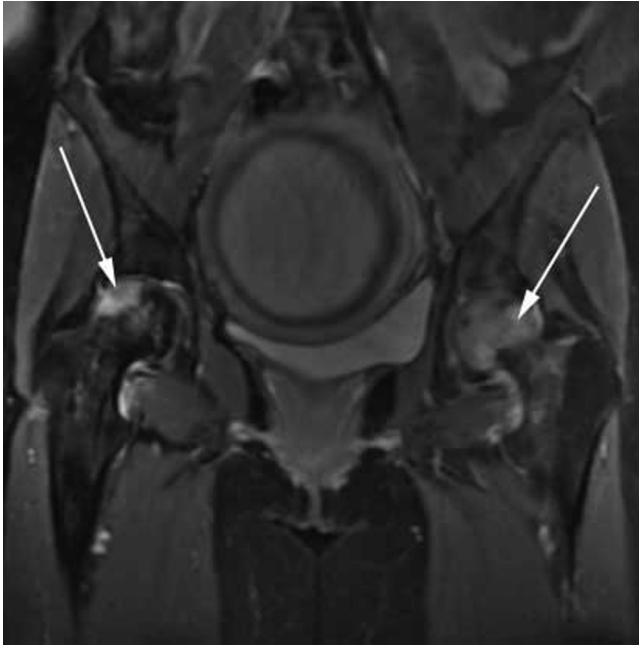


Figure 2. 34-year-old female with osteoporosis of pregnancy. Corresponding high signal (arrows) within the bilateral femurs on this coronal STIR image. Note the gravid uterus.

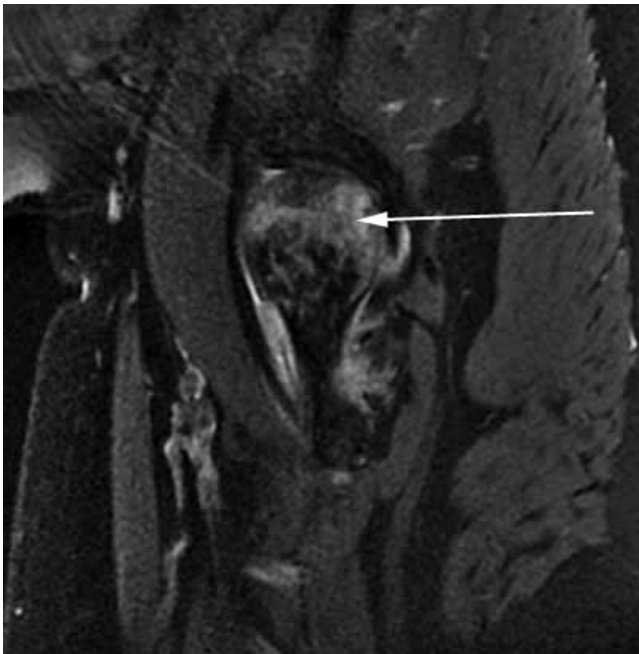


Figure 3. 34-year-old female with osteoporosis of pregnancy. Sagittal STIR image of the left hip shows abnormal increased signal (arrow) in the femoral head, with normal femoral head contour.

nancy. Additionally, T2 signal increased slightly in the region of S1 without any evidence of fracture.

Given these findings, the patient was admitted to the hospital, where she underwent Caesarian surgery for her first child at 35 weeks and 6 days of gestation. She was 5 feet 3 inches and weighed 135 lbs just after delivery (BMI: 23.91). The weight of the infant at birth was 3628 grams. There was no indication in her record that she received heparin before, during, or after pregnancy.

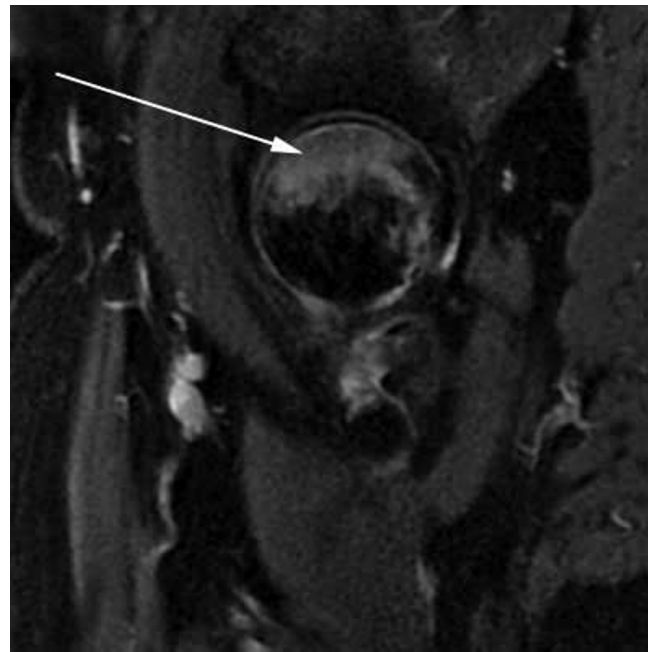


Figure 4. 34-year-old female with osteoporosis of pregnancy. Similar abnormal increased signal (arrow) seen in the right hip, in a selected sagittal STIR image.

Three days postpartum, she was comfortable on bed-rest but had persistent intense pain in the hips with lateral movement or bearing of weight. Otherwise, her physical exam was benign—no point tenderness, erythema, edema, or other signs of inflammation were appreciated on physical exam of the hip. The patient's symptoms improved gradually postpartum with supportive measures. A repeat MRI performed 6 months postpartum showed resolution of the T2-signal abnormality (edema) in the hips and sacrum (Figs. 5-6). This coincided with complete resolution of pain symptoms.

Discussion

Hip pain in adults may be due to intra-articular disorders such as avascular necrosis, arthritis, loose bodies, and labral tears; peri-articular pathology such as tendinitis and bursitis; or extra-articular conditions such as referred pain from the lumbar spine, the sacroiliac joint, and or from nerve entrapment syndromes (1). The history and physical exam provide us with helpful information with which to narrow

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the differential diagnoses, which, in turn, dictate the modality of imaging studies ordered to diagnose and/or confirm the diagnosis (1).



Figure 5. 34-year-old female with osteoporosis of pregnancy. Coronal T1-weighted image approximately 6 months postgestation shows normal signal of the proximal femurs.

Transient osteoporosis of the hip (TOH), also known as bone-marrow edema syndrome, is a rare skeletal disorder of unknown etiology. It can occur in women and middle-aged men, but most often occurs in previously healthy women during the third trimester of pregnancy. It is essentially a diagnosis of exclusion. A few case reports of transient osteoporosis of pregnancy are now in the literature (2-9). The patient typically presents with progressively worsening unilateral or bilateral hip pain without any prior history of trauma. The pain is exacerbated by activity, which limits motion of the hip (3). As such, TOH should be included in the list of differential diagnoses when sudden and progressively worsening hip pain occurs in a pregnant woman in her third trimester. The suggested etiologies include pelvic nerve compression, vascular insufficiency, or changes in fibrinolytic system with pregnancy—though a definite cause remains unknown to this date (10).

The diagnosis of TOH in pregnancy can be made by either plain radiographs or an MRI. However, MRI is useful for distinguishing between TOH and osteonecrosis, which can present similarly to TOH (11). MRI imaging typically shows marrow edema involving the entire femoral head and neck, with possible extension into the subtrochanteric region, and commonly associated joint effusion (1, 12). It shows increased signal intensity on T2-weighted

images and a decreased intensity on T1-weighted images (13, 14, 15). Our patient's MRI findings are consistent with these distinct MRI features of TOH in pregnancy. Familiarity with pathognomonic MRI features is important to confirm the diagnosis. Radiographic findings may lag behind clinical symptoms by 4 to 8 weeks. They would typically demonstrate regional demineralization or osteopenia diffusely involving the femoral head and neck with joint space preservation. Osteopenia typically resolves within 9 months of symptom onset (10, 13). These findings may be confused with avascular necrosis of the femoral head or

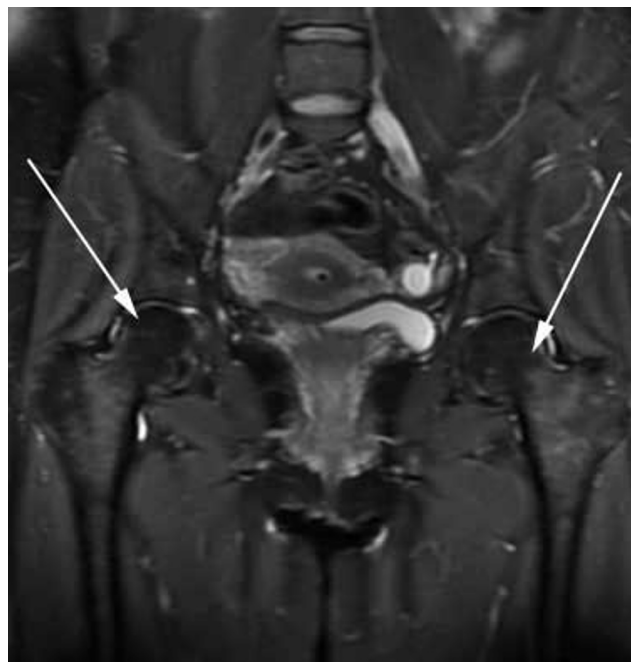


Figure 6. 34-year-old female with osteoporosis of pregnancy. Resolution of abnormal increased signal as seen on prior MRI, coronal STIR image.

femoral neck stress fracture (16, 17). However, diffuse rather than focal involvement of the femoral head or neck helps differentiate these entities from TOH (1).

Before MRI, radionuclide bone scans were used to diagnose TOH in pregnancy, due to their higher sensitivity compared to plain radiographs. Scintigraphy reveals diffuse and homogeneously increased uptake that involves the femoral head and neck (1). With the advent of MRI, this modality is rendered obsolete and is no longer used for this purpose. Furthermore, MRI does not use any radiation-like X-rays, so it is the preferred imaging modality in pregnancy. MRI is the best diagnostic imaging study for this condition (1, 16, 17).

About 40% of patients may show involvement of other joints other than the hip (17). This fact may be consistent with our patient's associated pain in knee and ankle, though no imaging studies were done for these areas to confirm our suspicion. Besides, knee pain could be a con-

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sequence of postural changes, increase in weight, and increased laxity of ligaments in pregnancy—all of which could contribute to knee pain in pregnancy (11). Knee pain in pregnancy is not uncommon (11). The process may regress in one joint but may recur in another (18).

In contrast to osteonecrosis, TOH in pregnancy resolves by 6-8 months postpartum (3). While there have been case reports of treating patients with bisphosphonates, human data on the safety of bisphosphonates in pregnancy are sparse and anecdotal (11, 19). Given the favorable prognosis with complete restoration of bone density, treatment is usually supportive and conservative, comprising bed rest and prevention of weight-bearing (use of crutches) in order to circumvent femoral fracture, and analgesics for pain control (3, 11, 15, 16). In a few rare cases, femoral fractures have been known to occur, but the great majority of cases resolve over a period of 6 months on average, without fractures (15, 16).

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