SEPTIC HIP ARTHRITIS: DIAGNOSIS AND ARTHROCENTESIS USING BEDSIDE ULTRASOUND

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Abstract—Background: Septic arthritis of the hip is an infrequent disorder that is difficult to diagnose. Traditional methods of obtaining synovial fluid from the hip are not always available in most emergency departments. Objective: To report a case of atypical septic arthritis with the diagnosis and management significantly aided by the use of bedside ultrasound. Case Report: An 18-year-old pregnant woman presented with right hip pain, a normal temperature, and elevated inflammatory markers. She had no risk factors for septic arthritis. The differential diagnosis was broad, but the use of bedside ultrasound assisted in rapidly narrowing the differential, as well as guiding the diagnostic procedure. Conclusions: Bedside ultrasound is a useful tool to evaluate inflammatory disorders of the hip and assists in hip arthrocentesis, a procedure that has not been traditionally performed by most emergency physicians.

Keywords—ultrasound; hip; arthrocentesis; septic; arthritis

INTRODUCTION

Septic arthritis involving the hip is a rare disorder that poses diagnostic challenges to the emergency physician (1). Patients with septic arthritis of native joints typically have risk factors such as immunocompromise or injection drug use. The diagnosis of septic arthritis is a clinical one that relies heavily on synovial fluid analysis. Arthrocentesis of the hip is traditionally performed using fluoroscopic methods by radiologists and orthopedic surgeons and is not immediately available to many emergency departments (EDs), often leading to delays in diagnosis and patient care. Ultrasound-guided hip arthrocentesis has been described in the radiology and orthopedic literature, with fewer reports published in the emergency medicine literature (2–6). Hip arthrocentesis utilizing bedside ultrasound guidance allows emergency physicians to make a definitive diagnosis more efficiently. We report a case of atypical septic arthritis in an otherwise healthy pregnant patient where the diagnosis and management was significantly aided by the use of bedside ultrasound.

CASE REPORT

An 18-year-old woman presented to the ED with hip pain of 5 days duration. The pain radiated down the anterior thigh and was made worse with weight-bearing and hip movement. The pain was getting progressively worse to the point that walking was difficult. She denied fevers, chills, nausea, vomiting, or urinary symptoms. There was no flank or abdominal pain, and she denied injury. She denied recent illnesses, upper respiratory or gastrointestinal symptoms, recent dental work, or other invasive procedures. She had been taking over-the-counter acetaminophen with minimal relief. She was approximately 23 weeks pregnant at the time and her pregnancy had been uncomplicated. She had been evaluated at an outside
facility and discharged after a duplex of the right lower extremity was negative for deep venous thrombosis. She had no known medical problems, took only prenatal vitamins, and had no prior surgeries. She denied alcohol or tobacco use and also denied intravenous (i.v.) or other illicit drug use.

On examination, she was afebrile with normal vital signs. She was well appearing and in no acute distress. General, head and neck, skin, cardiovascular, pulmonary, back, and neurologic examinations were normal. Her abdomen was gravid. She was holding the right hip and knee slightly flexed. There was tenderness to the right hip joint anteriorly, and internal/external rotation of the right hip produced mild pain, but the joint was not rigid. The right lower extremity, including neurovascular, skin, and joint examinations, was otherwise normal. The other extremities were unremarkable. Differential diagnosis included right hip arthritis (infectious vs. inflammatory), avascular necrosis, occult hip fracture, muscular hip pain, radiculopathy, iliopsoas abscess, ureterolithiasis, pyelonephritis, appendicitis, adnexal pathology (cyst, tubo-ovarian abscess, torsion), femoral or inguinal hernia, and pyomyositis of the thigh. Due to her pregnancy, there was reluctance to pursue advanced imaging studies initially. Laboratory studies were ordered, which included:

- White blood cells (WBC) – 16.0, 85% polymorphonuclear leukocytes (PMNs)
- C-reactive protein – 15.164
- Erythrocyte sedimentation rate – 47
- Electrolytes, blood urea nitrogen/creatinine, glucose – normal

A bedside ultrasound of the right hip with comparison to the left was performed, revealing significant right hip effusion. Right hip arthrocentesis was performed under direct bedside ultrasound guidance by the emergency physician. Approximately 20 cc of turbid, cloudy, brown, and foul-smelling fluid was obtained and sent for analysis, revealing:

- Gram stain – rare WBCs, several PMNs, no organisms.
- No crystals present.
- Cell count – red blood cells 19K, WBC 35.6K, 83%
- PMNs
- Glucose - < 5
- Protein - 6.3

Orthopedic Surgery was consulted and the patient was taken to the operating room for washout, where more grossly purulent fluid was encountered. The patient did well postoperatively and was placed on 6 weeks of i.v. antibiotics in consultation with the Infectious Disease service. Further infectious work-up was negative, including gonococcal assays. All cultures (synovial fluid and blood) remained negative. Her pregnancy proceeded without further complication.

**Figure 1** shows a sagittal-oblique view of the right hip with a significant effusion. Comparison is made to the left hip (**Figure 2**) with a minimal amount of synovial fluid present. The hip arthrocentesis was successfully performed in a single attempt under sterile conditions utilizing direct bedside ultrasound guidance with an 18-gauge 3.5-inch spinal needle. Care was taken to identify and avoid the femoral nerve and vascular structures.

**DISCUSSION**

Hip arthrocentesis is a procedure traditionally performed under fluoroscopic guidance by interventional radiologists and orthopedists. It is a procedure that typically requires procedural sedation when performed in children. The use of ultrasound to guide hip arthrocentesis was described in 1989 by Mayekawa and colleagues and has been performed by emergency physicians in mostly pediatric patients, with good results (4–7). Bedside ultrasound assists in the identification of hip effusions and allows arthrocentesis to be performed under direct guidance,
making aspiration of this joint more feasible for emergency physicians who have experience in the use of bedside ultrasound and ultrasound-guided needle placement. Ultrasound played a crucial role in this patient as it allowed the differential diagnosis to be rapidly narrowed and definitive diagnosis to be made without exposing the fetus to potentially harmful ionizing radiation. It is theorized that the relative immunosuppression of pregnancy contributed to this patient’s condition, as no risk factors or underlying etiology were found.

Ultrasound of the hip in this case was performed with a linear 10-MHz transducer. The hip was imaged in a sagittal-oblique fashion, from an anterior approach, with the indicator pointed toward the patient’s umbilicus and the transducer aligned along the long axis of the femoral neck. The curve of the femoral head and recess of the femoral neck were identified and the effusion was noted. Comparison was made to the contralateral hip by scanning in a similar fashion. On the affected hip, the probe was turned to a transverse orientation and the femoral vasculature was identified medially and followed along the proximal thigh to assure that the anticipated needle trajectory was outside the path of any major neurovascular structures. After initial identification, the area was prepped and draped in a sterile fashion. Ultrasound gel was applied to the transducer and the probe was then covered with a sterile sleeve that is often used for central venous access. Sterile ultrasound gel was applied to the very proximal anterior thigh, and the pertinent anatomy was again identified using ultrasound. A sterile 18-gauge, 3.5-inch spinal needle with the stylet removed was attached to a 30-cc syringe and advanced under real-time ultrasound guidance to aspirate the effusion. After an adequate sample had been removed, the needle was withdrawn and pressure held over the puncture site for 2 min.

CONCLUSION

We report a patient with a final diagnosis of septic arthritis involving the hip joint who presented with normal vital signs and no risk factors for the disease. Even though septic arthritis is an uncommon disorder, rapid diagnosis is essential to minimize complications (8). Left untreated, septic arthritis rapidly destroys the joint space, leading to significant patient morbidity.

Bedside ultrasound is a very useful tool, not only to rapidly identify hip effusion, but also to provide guidance in performing arthrocentesis by the emergency physician.

REFERENCES