

Defining the Role of Ultrasound in the Diagnostic Workup of Septic Arthritis in the Pediatric Hip

Nicholas Patrick Lopreiato, Alejandro Marquez-Lara, Salvatore Anthony Rizzo¹, Chelsea Minoughan, Wendy Ramalingam¹Wellspan

INTRODUCTION: Septic arthritis of the hip is a rare but serious condition that is often difficult to distinguish from more benign etiologies for an irritable hip in a child. Over the last few decades there has been an attempt to use objective criteria to help establish the diagnosis of septic arthritis. Previous studies have shown the role of laboratory markers and clinical signs in helping make the determination of septic arthritis from other causes of hip pain. What is less clear is the role that ultrasound plays in the workup for septic arthritis. Ultrasound has been shown to be useful in determining the presence of a hip effusion, but it is not fully known how the use of ultrasound aids in the diagnosis of septic arthritis. The purpose of this study is to determine if an effusion seen on ultrasound is a predictor of septic arthritis.

METHODS:

After obtaining approval of our institutional review board, we retrospectively reviewed the records of 323 consecutive patients who underwent an ultrasound for an irritable hip at a high volume pediatric hospital. Exclusion criteria were patients over the age of 18, patients who did not undergo a complete laboratory workup for septic arthritis to include a complete blood count, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP), patients who had incomplete documentation of their history or vitals, patients with an underlying oncologic or rheumatologic disease, patients with history of hip disorder to ipsilateral hip, and history of infection in the ipsilateral extremity. Patients were then divided between septic arthritis and other causes of hip pain. We defined the septic arthritis group as patients who went to the operating room for an irrigation and debridement of the hip who either had a positive blood or synovial fluid culture, was diagnosed with septic arthritis on the operative dictation, or if the patient had greater than 50,000 white blood cells noted in their synovial fluid. IBM SPSS v28.0 was used for the statistical analysis. Univariate analysis assessed the significance of each of the key variables (presence of joint effusion, temperature, weight-bearing status, CRP, ESR and peripheral white blood cell count). Variables that remained significant were entered into a multivariate model using logistic regression to identify predictors of septic arthritis. A p-value of < 0.05 was considered to be significant.

RESULTS: A total of 249 patients met inclusion criteria for this study. Univariate analysis showed that the significant predictors of septic arthritis in all patients presenting with hip pain was CRP >2.0 g/dl, serum White Blood Cell count >12,000 cells/mL, maximum temperature >38.5C, reported history of fever, and presence of effusion on ultrasound. These factors were then analyzed in a logistic regression model, which found that only CRP (Odds Ratio 11.5, Confidence Interval 1.7-76.1) and effusion on ultrasound (Odds Ratio 6.1, Confidence Interval 1.4-35.2) remained significant as predictors of septic arthritis.

DISCUSSION AND CONCLUSION:

The differential diagnosis for an irritable hip in a child is broad, and the need to diagnose septic arthritis of the hip quickly and accurately is important in optimizing outcomes. Previous studies have established the importance of laboratory and clinical markers in diagnosing septic arthritis, however the role of ultrasound is less clear. This study demonstrates that the presence of an effusion as determined by an ultrasound of the hip can help differentiate septic arthritis of the hip from other etiologies of hip pain. While other studies have shown that patients with septic arthritis of the hip typically have an effusion, we believe this is the first study to statistically quantify the importance of ultrasound in the diagnostic workup.