Emergent Hip Arthroscopy: Life-saving Intervention for Septic Hip and Secondary Multiorgan Failure

DEAN K. MATSUDA, MD; CHARITO P. CALIPUSAN, NP

abstract

This article describes the case of a 27-year-old female athletic trainer who presented to the emergency department in acute renal failure with rhabdomyolysis and disseminated intravascular coagulation following a brief onset of right hip pain and staphylococcal facial infection. Despite the absence of fever, peripheral leukocytosis, or organisms on gram stain from emergent joint aspiration, magnetic resonance imaging revealed a large hip effusion; a presumptive diagnosis of septic hip was made. Emergent hip arthroscopy was performed in the middle of the night within 3 hours of presentation. Minimally invasive, high-volume irrigation and debridement was rapidly performed using dual-portal arthroscopy. Although this approach required prolonged critical respiratory and hemodynamic support, the patient recovered from a life-threatening situation not often seen by arthroscopic or sports medicine surgeons. The unusual diagnosis of staphylococcal hip sepsis with multifocal dissemination was established, as was an atypical but important indication for emergent hip arthroscopy.

Although generally implemented to improve quality of life, this case represents the use of hip arthroscopy to increase its quantity as well. Hip arthroscopy may have an emergent indication with life-saving potential.

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Dr Matsuda has intellectual property with Arthrocare and Smith & Nephew and is the Vice Chairman of Orthopedics Overseas. Ms Calipusan has no relevant financial relationships to disclose.

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The indications for hip arthroscopy have been expanding and include conditions such as femoroacetabular impingement, labral tears, loose bodies, and the osteosynthesis of select fractures.\textsuperscript{1-3} However, few indications exist for emergent arthroscopic hip surgery, even in the trauma setting.

Arthroscopy for hip sepsis has mainly been reported in the pediatric literature because a preponderance of these afflictions occurs in this age group. El-Sayed\textsuperscript{4} reported comparable, if not favorable, outcomes with the arthroscopic equivalent of formal open irrigation and debridement hip surgeries. Although considered urgent, hip arthroscopy even in this setting may not merit middle-of-the-night intervention.

**Case Report**

A previously healthy 27-year-old female athletic trainer presented with a history of work exposure to a football player with methicillin-resistant *Staphylococcus aureus* and no history of intravenous drug abuse. She had developed a right cheek abscess and presented to her primary care physician, at which time the abscess was draining, cultures were obtained, and she was prescribed oral sulfamethoxazole and trimethoprim for suspected methicillin-resistant *Staphylococcus aureus* infection. Within 1 week, she developed new-onset right deep groin pain despite the improvement of her facial infection. Magnetic resonance imaging (MRI) revealed a large right hip effusion, surrounding edema without discrete fluid loculation, and a labral tear (Figure 1). The patient was placed on crutch ambulation, and her pain increased to the point that she was bedridden (with pain, some lethargy, and no fever or chills) and was brought to the authors’ emergency department. At presentation, she was lethargic, afibrile, and tachycardic without peripheral leukocytosis (peripheral white blood cell count 6.9, K). She had cola-colored urine. Examination of her right hip revealed no skin lesions, erythema, or fluctuance, but irritability and pain were elicited by log-roll maneuver and short-arc passive hip flexion. Ten cubic centimeters of murky yellow fluid were aspirated, which had 97,000 white blood cells/cc with 97% polymorphonuclear leukocytes and no visible organisms on stat gram stain, at which time the orthopedic nurse practitioner (C.P.N.) contacted the surgeon (D.K.M.).

At 1:30 AM, a frank discussion of the gravity of the situation transpired between the lethargic and critically ill patient, her father, and the surgeon. By 3 AM, the patient was undergoing an emergent supine hip arthroscopy under general anesthesia using an anterolateral portal biopsy of synovial tissue and fibrinous exudate in the cotyloid fossa prior to debridement and high-volume irrigation.

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endocarditis of the aortic valve and multifocal pulmonary abscesses were diagnosed (Figure 6). Intraoperative cultures confirmed methicillin-sensitive *S. aureus* hip sepsis. Vancomycin and oxacillin were initiated and later changed to ceftriaxone (for endocarditis) and oxacillin. The drain was removed on postoperative day 2. The patient showed gradual clinical improvement. By postoperative day 7, she no longer required vasopressor or respiratory support. Acute renal failure and disseminated intravascular coagulation resolved. The incisions had a benign appearance, and hip log-roll examination was minimally painful. She received inpatient physical therapy with protected weight-bearing ambulation with 2 crutches. She was discharged on hospital day 17 (Christmas Eve). She continued oxacillin via a peripherally inserted central catheter line for 6 weeks.

At 8-week follow-up, the patient reported mild hip pain, was afebrile, and her hip examination showed a positive anterior impingement test with internal rotation limited to 20°. Laboratory results confirmed no evidence of ongoing infection. The patient recently underwent revision hip arthroscopy for the elective surgical management of her untreated symptomatic femoroacetabular impingement. Gram stain and cultures were negative, and her joint had no visible exudate or global articular degeneration (Figure 7). Uneventful arthroscopic acetabuloplasty, labral refixation, and femoroplasty were performed (Figure 8).

**DISCUSSION**

Urgent hip arthroscopy may be indicated in cases of hip sepsis and trauma (eg, hip dislocations with or without femoral head fractures and perhaps bullet/foreign body removal to minimize third body wear). To the authors’ knowledge, emergent life-saving hip arthroscopy has not been reported.

Yamamoto et al described a series of 4 patients having successful management of adult hip sepsis; however, none of these patients presented in critical condition. Fangtham and Baer reported a patient with hip sepsis from community-acquired methicillin-resistant *S. aureus* with secondary pneumonia from septic emboli who died 13 hours after presentation despite aggressive cardiopulmonary support with intubation and high-dose vasopressors, intravenous antibiotics, and continuous hemodialysis. It is unknown whether emergent surgical hip decompression would have changed that outcome. Although the current patient had methicillin-sensitive *S. aureus*—rather than methicillin-resistant *S. aureus*—hip sepsis, similarities exist. The current patient presented with extra-articular dissemination with multifocal pulmonary abscesses, septic endocarditis, acute renal failure, rhabdomyolysis, and disseminated intravascular coagulation. Although it is conceivable that a pulmonary or cardiac septic embolus may have seeded the right hip, the treating team of intensive care, orthopedic, and infectious disease specialists believe that the septic right hip was the source of secondary dissemination after initial seeding from the facial infection based on the history of preceding hip symptoms and clinical likelihood.

The use of magnetic resonance imaging without contrast proved valuable because a large effusion was clearly visualized. A magnetic resonance arthrogram
may have been misinterpreted as intra-articular fluid from a contrast injection. The hip joint has a relatively inextensible capsule, which has been estimated to hold a maximum of 8 to 20 cc of fluid.\textsuperscript{5,6} The current patient’s hip effusion was the largest the authors have seen, and along with the periarticular soft tissue edema, supported the presumptive diagnosis of hip sepsis.

Open arthrotomy has been successfully used for the management of hip sepsis. However, Yamamoto et al\textsuperscript{5} reported that it is difficult to achieve thorough synovectomy with mini-incision arthrotomy in adult patients, and dislocation of the femoral head may be required, risking complications such as aseptic necrosis of the femoral head, postoperative dislocation, and a prolonged recovery period. Although open surgical dislocation of the hip using a trochanteric osteotomy appears to be a safe procedure without reported avascular necrosis, the authors would be concerned about the exposure of trochanteric cancellous surfaces in the setting of infection. Several studies support the arthroscopic equivalent as an effective alternative in the management of septic hips.\textsuperscript{5,7,9,12-17} Although atypical, hip arthroscopy may have an emergent indication with life-saving potential. It was an effective option, offering several advantages in this setting. The less invasive nature of arthroscopy enabled rapid, high-volume irrigation and debridement of the joint while minimizing blood loss and secondary surgical stress to the patient, who was in critical condition with disseminated intravascular coagulation. The use of 2 portals permitted rapid intervention. Although postoperative drainage is controversial, with some favoring\textsuperscript{12-14} and others discouraging\textsuperscript{5,9} its use, no postoperative portal complications occurred.

Three-portal (anterolateral, anterior, and lateral), 3-directional hip arthroscopy using high volumes of irrigating fluid (average volume, 23 L) with 2 or 3 arthroscopes was used in the aforementioned studies.\textsuperscript{5,9} Yamamoto et al\textsuperscript{5} reported that the operative time is approximately 2 hours, and his patients had a period of postoperative hip traction. In contrast, the current authors used their standard dual-portal technique (anterolateral viewing portal, modified midanterior working portal) and a 70° arthroscope, with a total of 12 L of physiologic saline irrigant at 60 mm Hg arthroscopic pump pressure with a traction time of 35 minutes, which included the chondroplasty of unstable rim cartilage (presumably from femoroacetabular impingement). The rapidity of the procedure combined with the relatively moderate amount of irrigation was prudent. Higher volumes and pressures may predispose patients to fluid extravasation and secondary complications, including abdominal compartment syndrome.\textsuperscript{10,11} Moreover, by keeping the setup relatively simple, the authors were able to perform emergent surgery with a night surgical team unfamiliar with hip arthroscopy.

Intravenous antibiotic management and cardiorespiratory support contributed to the successful treatment of this patient; hip arthroscopy alone would be insufficient and not advised. The current patient may have died if a multipronged approach not been immediately used. The on-call nurse practitioner might not have contacted the surgeon at midnight had she not recognized the gravity of the situation; waiting until 8 AM may have proved to be a fatal error. The authors believe that the decisions made and the actions taken were necessary, appropriate, and life saving.

The authors performed repeat hip arthroscopy 1 year postoperatively symptomatic femoroacetabular impingement that was given a low priority in the initial emergent setting.

**CONCLUSION**

The significance of this case report is the application of emergent hip arthroscopy beyond hip preservation. Although generally implemented to improve quality of life, this case represents the use of emergent hip arthroscopy to increase its quantity as well.

**REFERENCES**