

## Disorders of the Hip: Review Questions

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### QUESTIONS

Choose the single best answer for each question.

#### Questions 1 and 2 refer to the following case.

A 12-year-old obese boy presents with a 4-week history of right knee and groin pain. During this time, his parents report that he has developed a worsening limp and low-grade fevers. On physical examination, the patient has limited flexion, abduction, and internal rotation of the right hip because of the pain. Gentle log roll test of the leg is well tolerated. The patient is able to bear weight but ambulates with a significant antalgic gait. A frog-leg lateral radiograph of the patient's right hip is shown in **Figure 1**.

#### 1. What is this patient's most likely diagnosis?

- (A) Developmental hip dysplasia
- (B) Femoral neck fracture
- (C) Juvenile rheumatoid arthritis
- (D) Septic arthritis
- (E) Slipped capital femoral epiphysis (SCFE)

#### 2. Which of the following is the most appropriate treatment for this patient?

- (A) Closed reduction and spica casting
- (B) In situ screw fixation
- (C) Irrigation and débridement with intravenous antibiotics
- (D) Open reduction and internal fixation
- (E) Total hip arthroplasty

#### 3. A 24-year-old man presents with a 5-day history of acute-onset left hip pain. A detailed history reveals blurred vision and clear discharge from his right eye as well as pain with urinating over the same duration. His past medical history reveals cervical spine and sacral pain and keratoderma blennorrhagicum. On



**Figure 1.** Frog-leg lateral radiograph of the right hip of the patient in questions 1 and 2.

#### prior testing, he was also HLA-B27 positive. What is this patient's most likely diagnosis?

- (A) Ankylosing spondylitis
- (B) Paget's disease
- (C) Psoriatic arthritis
- (D) Reiter syndrome
- (E) Rheumatoid arthritis

#### Questions 4 and 5 refer to the following case.

A 47-year-old man with a past history of alcohol abuse presents with a 2-day history of acute-onset, right-sided hip pain that started while he was working in his yard. The patient also has a 2-month history of intermittent hip pain. On physical examination, he is afebrile and has significant limitations in rotation of his hip (ie, internal rotation to neutral and external rotation of 20°). He has a 20-degree flexion contracture and ambulates with an antalgic gait. Laboratory tests reveal a normal C-reactive protein level and white blood cell count, but his erythrocyte sedimentation rate is slightly

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elevated at 21 mm/hr. An anteroposterior (AP) radiograph of the right hip is shown in **Figure 2**.

**4. What is this patient's most likely diagnosis?**

- (A) Acute femoral neck fracture
- (B) Ankylosing spondylitis
- (C) Legg-Calve-Perthes disease
- (D) Osteonecrosis of the femoral head
- (E) Septic arthritis

**5. After further discussion, the patient reveals that he has had some vague left-sided hip pain over the last month. Standard AP and lateral radiographs of the left hip appear normal. What imaging modality is most appropriate for confirming and classifying this patient's diagnosis?**

- (A) Computed tomography (CT) scan
- (B) Indium bone scan
- (C) Inlet and outlet radiographs
- (D) Magnetic resonance imaging (MRI)
- (E) Technetium bone scan

**Questions 6 and 7 refer to the following case.**

A 32-year-old man presents to the emergency department with a 1-month history of right groin pain. Over the past 72 hours, he has been unable to bear weight on his right lower extremity. He is currently training for a marathon and has been running a minimum of 50 miles a week for the past 6 months. On physical examination, his temperature is 99°F (37.2°C). There are no obvious deformities to his right lower extremity. Range of motion of the hip is limited because of the pain: flexion, 90 degrees; abduction, 30 degrees; internal rotation, 5 degrees; and external rotation, 20 degrees. Plain radiographs of the right hip appear normal. MRI shows a low-intensity signal of the superior-lateral aspect of the femoral neck on the T1-weighted images.

**6. Which of the following is this patient's most likely diagnosis?**

- (A) Labral tear
- (B) Osteoid osteoma
- (C) Osteonecrosis of the femoral head
- (D) Paget's disease
- (E) Stress fracture of the femoral neck

**7. What is the appropriate treatment for this patient's condition?**

- (A) Bisphosphonate treatment
- (B) Core decompression
- (C) Curettage and bone grafting



**Figure 2.** Anteroposterior radiograph of the right hip of the patient in questions 4 and 5.

- (D) In situ screw fixation
- (E) Total hip arthroplasty

**ANSWERS AND EXPLANATIONS**

- 1. (E) SCFE.** SCFE typically occurs in obese adolescent males between the ages of 10 and 15 years. Patients often complain of groin, thigh, or knee pain and will walk with a significant limp or not at all. Figure 1 shows a frog-leg lateral radiograph with the classic findings for SCFE. The epiphysis remains in the acetabulum, and the metaphysis is displaced anterosuperiorly (best seen on the frog-leg lateral view).<sup>1</sup>
- 2. (B) In situ screw fixation.** The case patient presented with a stable SCFE. A patient with a stable SCFE is able to walk and bear weight on the affected lower extremity with or without assistive devices. Conversely, in unstable SCFE, the patient cannot ambulate or bear weight on the affected lower extremity; up to 50% of these patients have associated osteonecrosis.<sup>2</sup> In stable SCFE with minimal displacement, the treatment of choice is in situ screw fixation with a single cannulated screw.<sup>1</sup>
- 3. (D) Reiter syndrome.** Reiter syndrome (also known as reactive arthritis) is defined as aseptic arthritis caused

by an infectious agent located outside of a joint.<sup>3</sup> The classic triad involves nongonococcal urethritis, conjunctivitis, and arthritis. Classically, the disorder occurs in young males with sudden asymmetric swelling and pain in their weight-bearing joints. Between 80% and 90% of patients with Reiter syndrome are HLA-B27 positive. Pustular lesions on the palms and soles (ie, keratoderma blennorrhagicum) are commonly found. This disorder is self-limited (3–12 mo) and is treated symptomatically with anti-inflammatory agents and sulfasalazine. In general, ankylosing spondylitis and psoriatic arthritis have similar findings (swelling, pain, and positive HLA-B27 test); however, the triad mentioned above is absent in these patients.<sup>3</sup>

**4. (D) Osteonecrosis of the femoral head.** Figure 2 shows collapse of the femoral head and acetabular changes, classic findings of advanced osteonecrosis of the femoral head. Excessive alcohol intake (> 400 mL/wk) has been associated with an increased risk for developing osteonecrosis of the femoral head.<sup>4</sup> This patient does not fit the appropriate age category for Legg-Calve-Perthes disease (age range, 4–8 yr), and the history and physical examination findings are not consistent with ankylosing spondylitis (typically low back symptoms). A negative C-reactive protein, normal white blood cell count, and a 2-month history of pain make septic arthritis less likely. The lack of lower extremity deformity (shortened and externally rotated, typically for femoral neck fracture) and ability to perform some range of motion of the hip rule out an acute femoral neck fracture.

**5. (D) MRI.** MRI is 99% sensitive and specific for diagnosing osteonecrosis of the femoral head. Typically a double-density line is found on the T2-weighted images and a single-density line is found on the T1-weighted images (demarcates ischemic area of the bone). Bone scans are no longer used to diagnose osteonecrosis due to false-negative rates of 25% to 45%.<sup>4</sup> CT scans may show femoral head collapse or advanced stages of osteonecrosis but are not typically used to define the early stages of the disease. Inlet and outlet radiographs are not helpful in diagnosing osteonecrosis.<sup>4</sup>

**6. (E) Stress fracture of the femoral neck.** Stress fractures of the femoral neck are relatively rare and typically involve young active individuals (eg, runners, endurance athletes, or military recruits). In this case, the patient's age, activity level, physical examination findings, and normal radiographs make either a labral tear or a stress fracture the likely diagnosis. The MRI findings are classic for a tension-sided femoral neck stress fracture. The remaining choices have distinct findings on plain radiographs: osteoid osteoma, small well-circumscribed lytic lesion; Paget's disease, abnormal-appearing bone with mixed lytic and sclerotic changes, coarsened trabeculae, cortical thickening, enlarging bones, and bowing of the long bones; and osteonecrosis, alternating areas of lucency and sclerosis with possible collapse of the femoral head.<sup>5</sup>

**7. (D) In situ screw fixation.** Femoral neck stress fractures can be classified as tension type, compression type, or displaced. The MRI findings on the superior-lateral aspect of the femoral neck are consistent with a tension type stress fracture. These injuries are best treated with in situ screw fixation (3 cannulated screws in an inverted triangle configuration). The risks of fracture displacement far outweigh the risks of percutaneous fixation of the fracture. A compression type fracture can be treated with protected weight-bearing. The remaining treatment options are inappropriate for treating a nondisplaced femoral neck stress fracture.<sup>5</sup>

## REFERENCES

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