

Bilateral femoral neck fractures resulting from a grand mal seizure in an elderly man with Down syndrome

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Abstract

Simultaneous bilateral hip fractures are exceedingly rare and usually occur following a seizure. To our knowledge, only 22 cases of such injuries have been reported in the literature during the past forty years and the majority of fractures are treated with open reduction and internal fixation. We present a case of a 66-year old man with Down syndrome and severe dementia who was diagnosed with bilateral displaced femoral neck fractures following an epileptic seizure. He was treated with single staged bilateral uncemented monopolar hemi-arthroplasties through lateral Hardinge approaches. The treatment choice was governed by fracture displacement, the lack of pre-existing osteoarthritis, length of time to diagnosis, the patient's age, ambulatory status and mental impairment, with the intention to minimize post-operative complications such as avascular necrosis, non-union and hip dislocation.

Introduction

Hip fractures are amongst the most common injuries presented to orthopedic surgeons. Although many surgeons will manage several femoral neck fractures in one day, it is exceedingly rare to have a patient present with bilateral hip fractures. To our knowledge, 22 cases of bilateral femoral neck fractures have been presented in the literature over the past forty years, all of which were the result of seizures,¹ and only one of these cases involved a patient with Down syndrome.² Such injuries raise many questions ranging from the optimal type of operative fixation to rates of post-operative complications and overall patient prognosis.

Case Report

We present a case of a 66-year old man with Down syndrome, advanced dementia, and a seizure disorder. He was brought to the emergency department following a six-minute tonic-clonic seizure witnessed by his group-home worker. He had been seizure free for over one year and was treated with oral phenytoin. He was verbally non-communicative due to his dementia, but he had previously been fully ambulatory without walking aids.

While in the emergency department, he complained of abdominal pain and was diagnosed with an ileus. Unable to ambulate after the seizure, he could not leave the hospital and was seen by a general surgeon who ordered a CT scan of his abdomen. The radiologist reported findings consistent with an ileus, right lower lobe pneumonia and bilateral displaced femoral neck fractures. An anteroposterior X-ray supported this diagnosis (Figure 1) and a frog leg lateral image was obtained since the patient could not elevate either limb for a cross table lateral film.

In our case, the time from injury to diagnosis was almost 72 hours, rendering the probability of femoral head avascular necrosis after reduction and internal fixation very high. The patient had no pre-existing hip pain and minimal evidence of osteoarthritis. With this information, and considering his age, mental status, seizure disorder and prior ambulatory status, the decision was made to perform single staged bilateral uncemented monopolar hemi-arthroplasties (Synergy, #11 stem, -3 mm insert, 49 mm head) (Smith and Nephew Andover, MD, USA) of the hips through lateral Hardinge approaches.

Intra-operatively, the fractures were found to be more comminuted than typical femoral neck fractures. On the left side, the fracture extended into the greater trochanter in the sagittal plane, representing what may have been an avulsion fracture of the abductors (Figure 2). This fragment did not interfere with fixation of the femoral stem, and it was affixed to the femur with non-absorbable sutures. Post-operatively, the patient was allowed to weight-bear as tolerated immediately and was sent home on a 28-day course of low molecular weight heparin in accordance with the American College of Chest Physicians guidelines.³

Discussion

When presented with bilateral femoral neck fractures resulting from a seizure, most surgeons advocate urgent reduction and internal fixation.¹ However, many factors play a role in

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Key words: bilateral fracture, femoral neck, seizure, Down syndrome, hemi-arthroplasty.

Contributions and disclosures: JM and JL performed the literature review and wrote the first draft of the manuscript. PM critically reviewed the manuscript for intellectual content. This manuscript was written without financial support or compensation to the authors in any form. The report herein does not constitute endorsement of products by the authors or the publisher. The authors report no conflict of interest.

Received for publication: 19 January 2010.

Accepted for publication: 3 March 2010.

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Licensee PAGEPress, Italy
Orthopedic Reviews 2010; 2:e10
doi:10.4081/or.2010.e10

operative decision making. The rates of avascular necrosis and non-union of displaced femoral neck fractures treated with open reduction and internal fixation are 9.7% and 18.5%, respectively.⁴ This results in re-operation rates of 20-26%.⁵ For these reasons, most authors consider arthroplasty a reasonable option, particularly in an individual over 60-65 years of age. Life expectancy must also be considered, and the survival rate of individuals with Down syndrome is only 13% to 68 years of age.⁶ The debate between total hip arthroplasty and hemi-arthroplasty in the elderly population persists, but there is some evidence to aid in decision making.

Total hip arthroplasty in the acute fracture setting results in greater dislocation rates than elective primary total hips or hemi-arthroplasties for acute fractures.⁴ This risk increases further in demented patients and in those with seizure disorders. Although a true difference has not been shown, the lateral Hardinge approach does not violate the posterior joint capsule and theoretically, should have a lower posterior dislocation rate than the posterior Moore's approach.⁷

Unlike most femoral neck fractures caused by minor trauma, those resulting from seizures may be significantly more comminuted. This is likely the effect of persistent muscle contracture during the seizure, but also due to increased rates of osteopenia in epileptic patients and decreased bone mineral density in individuals with Down syndrome.⁸⁻¹⁰ There is also evidence to suggest that certain anti-



Figure 1. Anteroposterior X-ray of the pelvis with bilateral displaced femoral neck fractures.

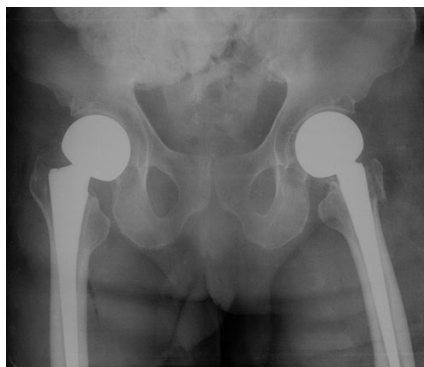


Figure 2. Post-operative anteroposterior X-ray of the pelvis with bilateral uncemented monopolar hemi-arthroplasties. A fragment at the left greater trochanter is the result of a pre-operative abductor avulsion fracture.

epileptic medications, particularly phenytoin, are associated with decreased bone mineral density.^{11,12} Alternate means of fixation must be available to address the comminution intra-operatively and these patients should be considered for vitamin D and calcium supplementation.

The musculoskeletal manifestations of seizures extend beyond the classic posterior shoulder dislocation. In patients admitted to hospital with a diagnosis of seizure, fractures are present in 1.1% of cases.¹³ Although femoral neck fractures from seizures are rare, they are often diagnosed in this setting on a delayed basis, which may affect surgical management.¹⁴⁻¹⁶ The mortality rate at one year following a hip fracture is approximately 20% and

morbidity increases significantly if the fracture is not addressed early.^{4,17} Since 55% of older adults with Down syndrome suffer from seizures¹⁸ and may have decreased bone mineral density,^{8,10} there should be a high index of suspicion for musculoskeletal injury in patients presenting with seizures and for non-communicative patients in pain.

Conclusions

In older adults with Down syndrome and limited communication skills, diagnosis of orthopedic injury may be even more difficult and should be given strong consideration upon presentation. The immediately non-ambulatory patient post seizure should be suspected as having a hip fracture until proven otherwise. Although bilateral femoral neck fractures present more challenges than unilateral hip fractures, the goals of treatment should remain the same: to restore early mobility, to reduce the chances of re-operation, and minimize the likelihood of post-operative complications such as avascular necrosis, non-union and hip dislocation.

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