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Case report

Concomitant ipsilateral femoral neck and pelvic ring fractures in the setting of a low energy fall in an elderly patient: A case report

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ABSTRACT

Introduction: Simultaneous ipsilateral fractures of the femoral neck and pelvic ring secondary to low energy falls are an extremely rare occurrence. Consequently, there is no standardized protocol for the management of such injury. Only few other cases were reported in the literature.

Case presentation: A 94-year-old woman presented with a left sub-capital femoral neck fracture, associated with comminuted and displaced fractures of the left superior and inferior pubic rami, after sustaining a fall from height. A decision was made to treat the femoral neck fracture with a left uncemented hemiarthroplasty, while the pubic rami fractures were managed conservatively.

Discussion: Coexisting femoral neck and pubic rami fractures due to low energy trauma is newly emerging in literature. Consequently, an elderly patient falling from standing height might require a CT or an MRI to reach an accurate diagnosis of the resultant injuries. While hip fractures are almost always treated surgically, pelvic ring fractures are only managed invasively when the conservative approach fails. This creates a dilemma when both fractures occur simultaneously, as appropriate measures must be taken to treat the patient with lowest risk of complications.

Conclusion: Low-energy fractures of the hip and pelvic ring should no longer be regarded as mutually exclusive. Any patient presenting with one of them should be investigated for the other. A consensus should be reached regarding the most appropriate technique to manage such injuries.

1. Introduction

In the context of low energy trauma, fractures of the femoral neck and pubic rami were thought to be mutually exclusive. Lim et al. studied 422 patients presenting for post-trauma pelvic pain, out of which none was diagnosed with two concurrent fracture types [1]. Furthermore, Lakshmanan et al. suggested that there is no need to further investigate for an occult femoral neck fracture in a patient with radiologically evident pelvic rami fractures, and vice versa [2]. However, Adams et al. reported the first case of pelvic rami fractures associated with an occult femoral neck fracture in context of a low energy trauma [3], resurfacing the debate on whether such concomitant injury is sometimes overlooked [4].

Knowing that any hip fracture is almost always treated surgically, while pelvic rami fractures are approached conservatively [2], a question is also raised concerning the most optimal management of these concurrent fractures in elderly patients.

An increase in the reporting of these concomitant injury patterns calls for a need to establish a well standardized approach for both the work up and management of elderly patients presenting after a low energy trauma, in an aim to decrease the risks of complications and trauma-related morbidity.

2. Case presentation

This is a case (reported in line with the 2020 SCARE criteria [5]) of a 94-year-old woman who presented to the emergency department few hours after sustaining a fall from standing height. The patient

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complained of severe pain in her left hip with inability to move or bear weight on her left leg. She denied any history of recent trauma and sensation of pain or discomfort in her back, pelvis, and hips prior to the fall. This patient has controlled hypertension without any other comorbidities. Usually she is not very active. On physical exam, lower limb length discrepancy was noted, along with external rotation of her left lower limb. Ecchymosis on the lateral aspect of her left thigh was evident, and the patient complained of tenderness to palpation in her left groin and hip. Hip maneuvers were hindered by severe pain. Sensation in the left lower limb was preserved. Consequently, plain radiographs of the pelvis and left hip were done showing a left anteriorly and superiorly displaced sub-capital femoral neck fracture, associated with comminuted and displaced fractures of the superior and inferior left pubic rami (Fig. 1).

A computed tomography (CT) scan of the pelvis was done, confirming the radiographic findings, and ruling out any other pelvic, hip, or sacral fractures (Fig. 2).

The patient was admitted to the surgical ward. The next day, the patient underwent uncemented hemiarthroplasty for her displaced left femoral neck fracture done by the surgeon listed as the guarantor of this case report (Fig. 3).

Her pelvic rami fractures were managed conservatively. Starting day one post-operation, the patient started physical therapy with partial weight bearing on her left lower limb. She progressively improved from partial to full weight bearing by two months post-operatively. At six month follow up, patient was clinically and functionally back to pre-operative status with full weight-bearing ambulation.

3. Discussion

Hip fractures account for 20 % of low-energy trauma fractures in patients aged 60 or older. It is common for femoral neck fractures to be associated with pelvic ring fractures when patients suffer high-energy trauma [6]. In the case of low-energy falls, it was previously thought that hip fractures and pelvic ring fractures were mutually exclusive [2] as it was believed that a low-energy fall can only produce a fracture at one site since the energy would be propagated onto a single site [2]. However, few cases where patients were found to have both femoral neck fractures as well as pelvic ring fractures following low-energy trauma have been reported in the literature [3]. This case report serves to shed further light on the fact that femoral neck fractures along with pelvic ring fractures following low-energy falls are not mutually exclusive. Due to the paucity of reported cases in the literature, there is no clear management algorithm in place for when such fractures occur.

Pubic rami fractures in the elderly commonly occur after low-energy falls, typically from standing height, and these are the most common type of pelvic fracture among the elderly [7]. These are typically associated with osteoporosis. The pubic rami form part of the anterior pelvic ring, and in terms of biomechanics, fractures of the rami are considered stable [7]. Since these fractures are stable, they allow full weight-bearing and as such, management is conservative consisting of analgesia and early mobilization with as-tolerated weight-bearing being the mainstay [7]. Were conservative management to fail, operative treatment is to be considered, with one center setting the indications for surgery as follows: persistent or increasing pain causing immobilization after more than four to six weeks [7]. Surgical management consists of anterior pelvic ring stabilization with plates and screws [7].

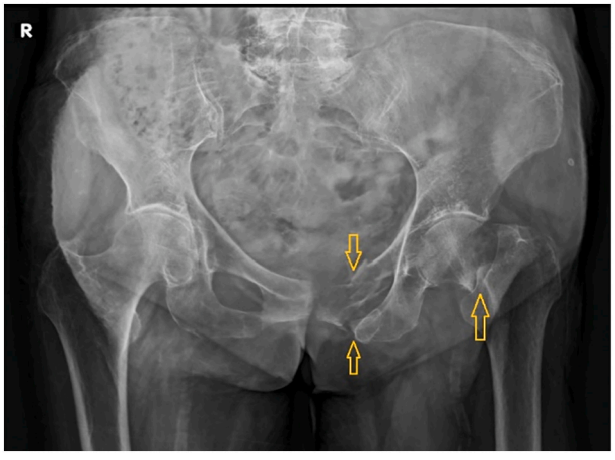

Fig. 1. Antero-posterior radiograph of the pelvis showing a left displaced sub-capital femoral neck fracture along with displaced superior and inferior rami fractures.

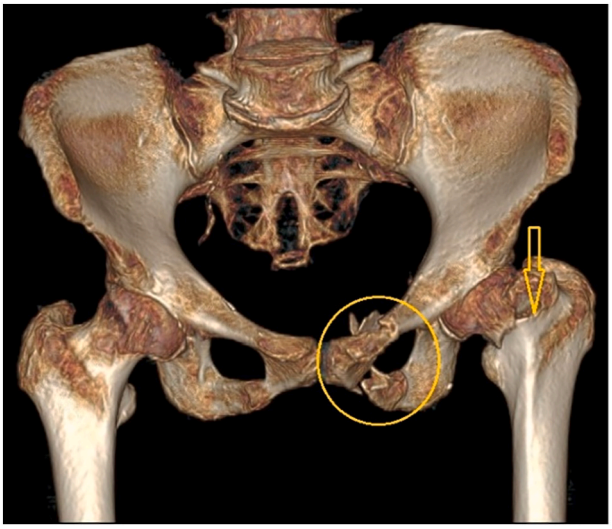

Fig. 2. Antero-posterior 3D reconstruction of the pelvis confirming femoral neck and pelvic rami fractures, and ruling out other pelvic fractures and lesions.

The patient highlighted in this case report underwent uncemented hemi-arthroplasty for her femoral neck fracture. The choice of an uncemented stem was made due to the patient's known history of pulmonary hypertension and the known risk of embolic phenomena during cement insertion as well as during insertion of the femoral component posing a significant risk of life-threatening embolism [8]. The reasoning behind not choosing a total hip prosthetic replacement in this case is due to multiple factors including: patient's age and activity level, the lack of advanced osteoarthritis. In addition, due to the associated pubic rami fractures, the idea of inserting an acetabular component would increase the chances of causing pelvic instability by inducing a posterior pelvic fracture during reaming and insertion of the component, especially with uncemented acetabular cups [9].

4. Conclusion

From here, it is safe to say that a fall from height may result in concurrent hip and pelvic ring fractures. Patients with either injuries may need to be thoroughly investigated for the possible presence of the other by using different imaging modalities, if needed. A standardized protocol on how to approach such injuries if reached can provide those patients with the best outcome with least risk of complications, morbidity, and mortality.

Consent section

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

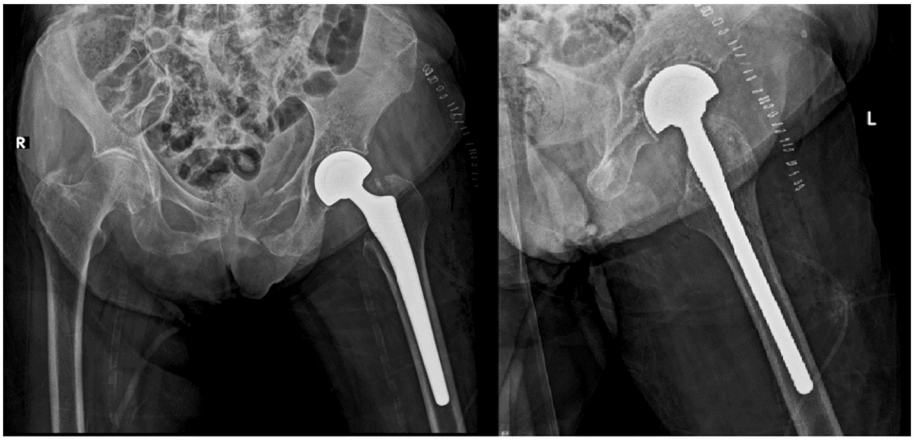

Fig. 3. Post-operative antero-posterior (left) and lateral (right) views plain radiographs of the pelvis and left hip showing a left hip hemi-arthroplasty with associated left superior and inferior pubic rami fractures.

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CRediT authorship contribution statement

DA: Writing and revision
GS: Writing
RD: Writing and revision
MD: writing and literature review
GER: surgeon responsible for everything.

Declaration of competing interest

The authors declare no conflict of interest regarding the publication of this article.

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