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Case Report

Conservative Management of Vancouver B1 Periprosthetic Fracture in a High-Risk Elderly Patient: A Case Study

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Abstract: Periprosthetic fractures are becoming more frequent among the elderly, especially among patients with several comorbidities and neurological conditions, such as Parkinson's disease, which makes them more prone to falls. Treating such patients is often a clinical dilemma when surgical treatment is associated with high risk. This case study presents a 75-year-old man with Parkinson's disease, diabetes mellitus, and a history of stroke who experienced a stable Vancouver B1 periprosthetic femoral fracture after a fall. While the initial advice was internal fixation by circumferential wiring and Dall-Miles cables, the patient's high operative risk led to a shared decision for conservative treatment. The patient was managed nonoperatively with close observation and mobilization protocols. The patient showed a remarkable clinical improvement without surgery. This case supports the need for personalized treatment planning and emphasizes that conservative management is a feasible and effective option for high-risk geriatric patients with stable periprosthetic fractures.

Keywords: Periprosthetic Fracture; Conservative; Vancouver B1; Computed Topography

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Introduction

Periprosthetic fractures are multifaceted and increasingly prevalent complications of joint arthroplasty, most commonly occurring around the hip, knee, or shoulder implants.[1] The increasing prevalence is primarily due to the global rise in arthroplasty procedures and the aging population.[1] Operative treatment is still the traditional approach, especially in cases of loosening of the implant or significant fracture displacement.[1] However, in well-selected patients with stable prostheses and limited fracture displacement, conservative (nonoperative) treatment is an available option.[1] Nonoperative methods, such as immobilization and limited weight-bearing, have proven to be beneficial, especially in patients

with high surgical risk or reduced functional capacity.[1] The main goal of conservative treatment is to allow healing of the fracture while preserving prosthesis stability, thus lessening the surgical morbidity and mortality rates related to operative interventions. Despite its clinical importance, there is a lack of literature focused on conservative treatment methods, with the majority of published evidence highlighting surgical intervention.[1]

This report outlines a successful case of nonoperative treatment of a periprosthetic fracture, highlighting the clinical rationale, therapeutic regimen, and outcome of the patient.[1] This article attempts to supplement the growing evidence favouring conservative interventions in carefully chosen cases and to examine the determinants influencing treatment choice.

Case Presentation

A 75-year-old man presented to the emergency room after an unwitnessed fall that he was unable to recall. He had a significant medical history of several chronic illnesses, such as Parkinson's disease, hypertension, diabetes mellitus, and a previous cerebrovascular accident, all of which led to progressive frailty, compromised postural stability, and greater vulnerability to falls. Radiographic assessment confirmed a displaced femoral neck fracture, which was the most severe of the prior osteoporotic fractures. The patient underwent uncemented hemiarthroplasty in which the femoral head was replaced by a prosthetic component with retention of the native acetabulum. The intraoperative course was uneventful, and postoperative care involved analgesia with opioids, nonsteroidal anti-inflammatory drugs (NSAIDs) and prophylactic antibiotics.

The postoperative recovery was uneventful. The wound healed normally, and early mobilization was initiated, with instructions for full weight-bearing on the affected limb to maintain peri-prosthetic muscle strength and bone remodelling. On postoperative day 7, the patient was discharged with a formal physical therapy program aimed at gait retraining, functional strengthening, and balance rehabilitation. Despite stable recovery, underlying neurological deficits and previous cerebrovascular disease persisted, increasing the risk of falling. A subsequent fall caused a Vancouver B1 periprosthetic fracture, as verified by computed tomography (CT), with overlying bony fragments observed but without prosthesis instability. (Figure 1, Figure 2 and Figure 3)

Figure 1. Anteroposterior radiograph of the right hip demonstrating a Vancouver B1 periprosthetic fracture around a well-fixed femoral stem. The fracture line was visible distal to the prosthesis with no evidence of implant loosening.

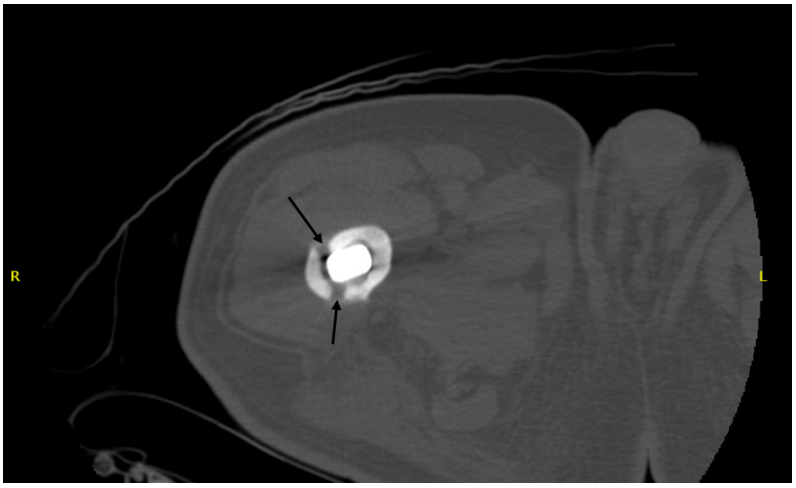

Figure 2. Axial computed tomography scan of the right hip showing the presence of a stable periprosthetic fracture (Vancouver B1 classification). Small adjacent bony fragments (arrow) can be seen near the femoral implant; however, there is no evidence of significant displacement or implant instability.

Figure 3. Anteroposterior radiograph of the right hip following uncemented hemiarthroplasty. The image demonstrates a well-positioned femoral prosthesis with no signs of periprosthetic lucency or implant loosening, indicating a satisfactory postoperative alignment.

The patient had minimal pain at the fracture site, consistent with a nondisplaced, stable periprosthetic femoral fracture. The fact that he was able to partially tolerate weight-bearing suggests that the structural integrity of the hip prosthesis remained intact. With the patient's complex medical history, including advanced age, Parkinson's disease, diabetes mellitus, and the nature of the fracture, multidisciplinary discussions were held with the patient and his family regarding treatment options. Surgical

stabilization using circumferential wiring and Dall-Miles cables has been proposed to prevent progression or further injury. However, due to the patient's significant comorbidities and family preference for operative management, a conservative approach was selected. The risks of nonsurgical treatment, including implant failure, non-union, and increased risk of future fractures or functional decline, were thoroughly communicated.

The patient was discharged with instructions to continue partial weight bearing using a walker, engage in physiotherapy to improve strength and balance, and adhere to a fall prevention protocol. Analgesia was maintained as required. Follow-up in an outpatient setting revealed progressive clinical improvement. Although conservative management is not typically preferred in such cases, the patient's response is favourable, and his prognosis remains cautiously optimistic.

Discussion

Periprosthetic fractures occur near prosthetic joint implants, most commonly after total hip arthroplasty (THA) or total knee arthroplasty (TKA).[2] Their incidence is rising in parallel with the aging population, which not only receives more joint replacements but also maintains higher levels of physical activity later in life.[2] These fractures are often associated with diminished bone quality, increasing age, and multiple comorbid conditions, such as dementia and hypothyroidism, all of which contribute to elevated mortality rates.[2] Shah et al. reported that patients discharged to skilled nursing facilities following such fractures have higher mortality rates than those discharged directly to their homes.[2] The Vancouver Classification is the most accepted system for categorizing periprosthetic femoral fractures (PFFs) following THA.[3] It considers fracture location, implant stability, and bone stock quality and includes three main types: A, B, and C.[3] Vancouver A fractures affect the greater or lesser trochanter and are usually managed conservatively unless significantly displaced or symptomatic. Nonunion or subacute fractures of the greater trochanter may still warrant nonoperative treatment.[3] Vancouver B fractures occur around the femoral stem and are further subdivided. B1 fractures involve a stable implant and may be treated nonoperatively in select cases, although locking plate systems with bicortical screws are often preferred for superior stability.[3] B2 fractures feature an unstable implant and require revision arthroplasty due to the high failure risk with conservative treatment.[3] B3 fractures involve both implant loosening and poor bone stock and often require complex revision, such as fluted tapered stems or proximal femoral replacement.[3] Vancouver C fractures occur below the prosthesis and may be treated conservatively if implant stability and bone quality are intact.[3] Many patients with hip fractures are elderly with comorbidities; while early surgery offers the best outcomes, nonoperative management may be preferred in end-of-life care due to high perioperative mortality rates of 10–13% at 30 days and 22–33% at one year.[4]

A meta-analysis encompassing over 3 million individuals indicated that patients with diabetes mellitus (DM) have a 1.5-fold increased risk of fractures, which can increase to 5.3-fold in the context of hip fractures.[5] In addition to increasing the fracture risk, DM also predisposes patients to post-fracture complications, including a fivefold greater risk of cerebrovascular events.[5]

The management of periprosthetic hip fractures (PPHFs) in frail individuals should not be dictated solely by fracture classification. A multidisciplinary, individualized approach is imperative because of the high anaesthetic and medical risks associated with this procedure.[6] Nonoperative management may be suitable in cases of minimally displaced fractures without implant loosening.[7,8] NOM has shown adequate outcomes in terms of healing, functional recovery, and reduced complication rates for short oblique or transverse fractures.[6] Treatment protocols for NOM typically involve initial bed rest without traction for 3–6 days, followed by gradual mobilization based on radiographic assessment of fracture displacement and femoral stem integrity.[6]

Conclusion

The present case describes a 75-year-old male with Vancouver B1 periprosthetic fracture of the femur, confirmed by computed tomography, following a mechanical fall. The main comorbidities included Parkinson's disease, diabetes, hypertension, and prior stroke. Due to his advanced age, comorbid burden, and family preferences, a conservative, nonoperative approach was adopted. He was discharged using a weight-bearing protocol, physiotherapy, and fall prevention strategies. The patient showed favourable recovery during outpatient follow-up without complications. This case demonstrates the effectiveness of individualized, nonoperative treatment in selected patients with PPHFs, highlighting the necessity of weighing surgical risks against expected functional outcomes and emphasizing comprehensive care, including rehabilitation and fall prevention.

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