



Contents lists available at [ScienceDirect](#)

Journal of Orthopaedics, Trauma and Rehabilitation

Journal homepages: www.e-jotr.com & www.ejotr.org



Case Report

Bilateral Simultaneous Neck of Femur Fractures Arising from a Simple Mechanical Fall—A Case Report for Guidance on Safe Surgical Management



簡單跌倒後發生的兩側同時急性股骨頸骨折：病例報告和安全手術處理指引

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ARTICLE INFO

Article history:

Received 21 October 2015
Received in revised form
22 March 2016
Accepted 25 March 2016

Keywords:

hip fractures
multidisciplinary communication
rehabilitation

ABSTRACT

Simultaneous acute femoral neck fractures are rare and infrequently reported in the literature. Of the few published cases, most result from underlying pathological bone processes or violent muscle contractions including epileptic seizures and electrocution. We present the case of a 73-year-old lady with metastatic colon cancer who presented with acute bilateral neck of femur fractures following a simple fall. Following a comprehensive discussion with anaesthetic and surgical staff, and in conjunction with the patient, a decision was made to perform simultaneous bilateral cemented stem hip hemiarthroplasties. There were no perioperative complications, and the patient made a positive recovery, being transferred to a rehabilitation institute 3 days after the surgery. Two weeks later, she was discharged home to her family. We have demonstrated that this rare injury can be safely managed during a single operative session in the presence of an experienced multidisciplinary team, despite serious patient comorbidity.

中文摘要

同時發生兩側急性股骨頸骨折是罕見的，在文獻中很少報導。在少數已發表的報告中，大部份是由於病理性骨折或由於猛烈的肌肉收縮如癲癇發作和觸電。我們報告了一個73歲患有轉移性結腸癌的老太太，在簡單跌倒後出現兩側同時急性股骨頸骨折。經外科醫生，麻醉醫生和病人全面討論之後，病人接受了兩側同時進行人工水泥半髖關節置換術。手術前後並沒有出現併發症，病人在術後3天便轉到療養院，並在術後14天出院回家。

我們證明了只要有一隊有經驗的多學科團隊，儘管病人患有各種疾病，這種罕見的病症也可以用一節手術的時間安全地處理。

Introduction

Bilateral simultaneous intracapsular fractures of the femoral neck are rare, with few published reports of this injury being sustained from minor trauma such as a low-energy mechanical fall. The main body of literature describes secondary pathological aetiologies including primary and secondary bone disease, seizure disorders, and major trauma in patients younger than 50 years.

There are a number of recognised cases which describe unilateral neck of femur fractures followed by a contralateral hip fracture separated by a recognised period. These fractures are managed in two separate surgical sessions and regarded as individual injuries.¹

We believe this case highlights two novel points of interest. The first is in describing traumatic simultaneous bilateral hip fractures in the setting of a low-energy mechanism and in the absence of underlying pathology. The second lies in the limited literature on how best these injuries should be managed. Although unilateral hip hemiarthroplasty is a routine trauma procedure, clearly simultaneous operative management presents an increased risk to the patient as the length of anaesthesia and operative time is, at the very

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least doubled, alongside increased bleeding and greater physiological strain. We describe a contemporary operative plan for the safe management of this injury that has not been previously reported.

Case Report

A 73-year-old female patient presented to hospital following a mechanical fall at home, landing predominantly on her left side. She complained of left sided hip pain and was unable to mobilise. She was immediately brought to the emergency department by her husband. She denied pain in either hip prior to the fall, felt systemically well, and denied previous falls or presyncopal episodes prior to this event. She had no other injuries at the time of assessment. Her medical history included metastatic colon adenocarcinoma with known metastases to the liver, adrenal glands, and lungs diagnosed 4 years ago. She was receiving weekly palliative chemotherapy. This was confirmed on recent computed tomography imaging performed 6 weeks ago, with no radiological proven metastases within the bony pelvis or proximal femora. Her medication included opiate analgesia and salbutamol inhalers. There was no history of corticosteroid use or immunosuppressant medication. She mobilised short distances with the aid of a walking stick when outside. She had recently given up driving, lived independently with her husband, and was retired from employment.

On examination she was focally tender over both hips and unable to tolerate any passive or active movement of either hip. There were no distal neurovascular deficits on examination of her lower limbs. A secondary survey revealed no other injuries.

An initial anteroposterior X-ray of the pelvis revealed bilateral intracapsular neck of femur fractures ([Figure 1](#)). Full-length bilateral femur views were also obtained, which ruled out distal femoral metastases. Preoperative investigations included a normal electrocardiogram and established pulmonary metastases on chest X-ray. Her admission bloods revealed a mild anaemia with a haemoglobin level of 11.0 g/L. She had a normal renal function, liver function, and bone profile. There was no evidence of coagulopathy with an international normalised ratio of 1.3. Her preoperative status permitted acute surgical intervention according to national guidelines.²

Our initial working diagnosis was bilateral acute neck of femur fracture secondary to trauma. Given her medical history, a pathological fracture process must be considered. However, she reported good mobility and no pain in either hip prior to the fracture. A recent computed tomography scan did not reveal bony lesions that

would have contributed to the fracture process. Additionally, infection was considered but deemed unlikely based on clinical assessment and admission biochemical blood markers.

This case presented a number of difficult management decisions. Firstly, no clinician or surgeon in our tertiary trauma unit had seen or managed bilateral simultaneous neck of femur fractures before. Secondly, given her concurrent metastatic cancer, a decision had to be made regarding the timing of surgery and whether the required procedures should be staged. The lead consultant reviewed the literature and held a discussion with senior anaesthetic, surgical, and orthogeriatric colleagues. After a lengthy debate and further discussion with the patient and her family, the decision was made to proceed with bilateral cemented-stem hip hemiarthroplasties in a single session under general anaesthesia supplemented by epidural regional anaesthesia. This anaesthesia combination was used to improve postoperative pain management and allowed lower doses of general anaesthetic-related drugs to maintain anaesthesia. This reduced the associated perioperative risks associated with general anaesthesia and symptoms of both postoperative nausea and vomiting. A standard hemiarthroplasty setup was used with the patient in the lateral position and utilisation of an anterolateral approach bilaterally. This operative plan was in line with recently published national guidelines.³ Particular attention was paid to meticulous haemostasis and modern low-pressure cementing techniques to reduce the risk of bone cement implantation syndrome. Periarticular 0.2% Ropivacaine (100 mL) was infiltrated prior to closure of the deep tissues to help with postoperative pain management and promotion of early mobilisation. A preagreed 30-minute recovery period was permitted between left and right hip hemiarthroplasty with no pause in general anaesthesia. This allowed assessment of patient surgical fitness to continue with the contralateral procedure. This included a brief rest, patient repositioning, prepping and draping, and arterial blood lactate measurement, which was found to be within normal limits. There was a combined total of 600 mL blood loss during the operation. Safe perioperative monitoring included invasive arterial blood pressure monitoring. Intraoperatively, both fractures had the typical characteristics of acute fractures with liquefied intracapsular haematoma and no macroscopic evidence of a pathological bone process. The postoperative radiographs were satisfactory ([Figures 2 and 3](#)). The patient was permitted to fully weight-bear on both sides, which would not have been possible in staged procedures. Clearly, this was significantly beneficial for the patient's rehabilitation as protected weight bearing precautions are difficult to safely adhere to in the elderly patient population.

The patient made good early progress with the physiotherapy team and was mobile within 24 hours of surgery. She was transferred to a local rehabilitation hospital, where she spent 12 days prior to being discharged into the care of her family.

Discussion

There is paucity in the literature regarding simultaneous bilateral neck of femur fractures that result purely from low-energy trauma such as a simple mechanical fall.

One case reported by Tair⁴ described the injury in detail, but little was included on the specific management plan or guidance for clinicians in the future.

The overwhelming majority of reported cases that describe this injury describe an underlying pathological process such as primary or secondary bone disease including hypocalcaemia, osteoporosis, osteomalacia, renal osteodystrophy, and multiple myeloma.^{5,6} Iatrogenic causes have also been reported. May⁷ described bilateral femoral neck fractures following radiotherapy. Furthermore, in patients younger than 50 years who have sustained this injury,



Figure 1. Anteroposterior (AP) radiograph displaying bilateral intracapsular femoral neck fractures.



Figure 2. Right cemented stem hip hemiarthroplasty on postoperative Day 1.



Figure 3. Left cemented stem hip hemiarthroplasty on postoperative Day 1.

Despite our patient having an underlying malignancy, there was no evidence to suggest that this contributed to the injury given a complete range of normal up-to-date laboratory and radiological investigations. Thus, one has to assume that the low-energy mechanism of her mechanical fall was the primary contributor. Vestergaard et al⁹ described a very similar case in a patient on long-term steroid therapy. Although our patient was not on steroid medication, this specific risk factor must not be overlooked.

There is variation in the literature describing operative management: whether to carry out one- or two-stage hip hemiarthroplasty, and the use of cemented or uncemented implants. Firstly, hip hemiarthroplasty is the most described procedure. Although there is no evidence to support the efficacy of patient positioning for this method, we feel that the surgeon should use the position that they are most comfortable using. The general risk of postoperative dislocation should be considered as per any other routine hemiarthroplasty. In our case, this involved using a lateral position including turning the patient on the operating table after completion of the first procedure. Other operative options for the management of bilateral femoral neck fractures have been described including the use of closed reduction and percutaneous fixation. This would not have been appropriate for our patient given the degree of displacement seen on the initial radiographs and the unacceptably high rate of avascular necrosis requiring revision surgery.

Deciding upon cemented or uncemented femoral stems is also dependent upon the general medical status of the patient and potential risk factors for cement implantation syndrome, including significant cardiovascular disease. This potentially fatal syndrome can manifest as hypoxia, hypotensive episodes, cardiac arrhythmias, and cardiac arrest. McGoldrick et al¹⁰ reported one-stage bilateral uncemented hemiarthroplasties in an elderly gentleman with significant cardiovascular risk factors, and for this very reason cement was not used during implantation. It should be noted that we used a low-pressure cementation technique to reduce this risk of this significant event and would advocate this for the majority of patients undergoing bilateral hemiarthroplasty, in the absence of significant risk factors. Blood loss can be high even in unilateral hemiarthroplasty surgery. Meticulous haemostasis and careful surgical technique are of paramount importance. The surgeon may wish to consider the use of tranexamic acid in high-risk cases. However, we did not elect to use it in this case because of the theoretical increased risk of venous thromboembolic disease owing to the presence of concurrent active malignancy. Prophylaxis of venous thromboembolic disease was particularly important in the management of this patient. As per hospital protocol, we selected 5000 units of dalteparin daily via subcutaneous injection.

The rarity of this injury and the limited literature makes for an interesting debate regarding the management of this patient group. The bilateral nature of these injuries should not detract from managing patient comorbidities perioperatively according to current national guidelines. In conjunction with the experience and preferences of the responsible surgical and anaesthetic team, we believe this case contributes well to the decision-making process for future management of this rare injury.

Conflicts of interest

The authors have no conflicts of interest to declare: they confirm that they did not receive payments or other benefits or a commitment or agreement to provide such benefits from a commercial entity. No commercial entity paid or directed, or agreed to pay or debit, any benefits to any research fund, foundation, educational institution, or other charitable or nonprofit organisation with which the authors are affiliated or associated.

major high-energy trauma has been accountable. Konforti and Chokanov⁸ described bilateral femoral fractures following a high-energy crushing injury in a 37-year-old male.

Funding/support

The authors confirm that they did not receive grants or outside funding in support of their research or preparation of this manuscript.

References

1. Powell HDW. Simultaneous bilateral fractures of the neck of femur. *J Bone Joint Surg (Br)* 1960;**42-B**:236–52.
2. National Clinical Guidelines Centre. *The management of hip fractures in adults*. 2011. Available from, www.ncgc.ac.uk [Accessed 1 September 2015].
3. Safety Guideline: reducing the risk from cemented hemiarthroplasty for hip fracture. Association of Anaesthetists of Great Britain and Ireland. *British Orthopaedic Association*. 2015. Available from, www.aagbi.org/news/reducing-risk-cemented-arthroplasty-hip-fracture-2015-new-draft-safety-guideline [Accessed 1 September 2015].
4. Tair GR. Simultaneous bilateral fractures of the femoral neck. *Scott Med J* 1988;**33**:341–2.
5. Taylor LJ, Grant SC. Bilateral fractures of the femoral neck during a hypocalcemic convulsion: a case report. *J Bone Joint Surg (Br)* 1985;**42**:536–7.
6. Chadha M, Balain B, Maini L, et al. Spontaneous bilateral displaced femoral neck fractures in nutritional osteomalacia: a case report. *Acta Orthop Scand* 2001;**72**:94–6.
7. May VR. Simultaneous bilateral intracapsular fracture of the hips: one case due to trauma, one of fracture fatigue, and one following pelvic irradiation. *South Med J* 1964;**57**:306–11.
8. Konforti B, Chokanov K. Simultaneous bilateral nailing by two teams of surgeons in fractures of the femoral neck. *Khirurgiia Sofia* 1956;**9**:75.
9. Vestergaard P, Olsen ML, Paaske Johnsen S, et al. Corticosteroid use and risk of hip fracture: a population-based case-control study in Denmark. *J Intern Med* 2003;**254**:486–93.
10. McGoldrick NP, Dodds MK, Green C, et al. Management of simultaneous bilateral neck of femur fractures in an elderly patient. *Geriatr Orthop Surg Rehabil* 2013;**4**:71–3.