

THE UNPREDICTABLE OUTCOMES OF BILATERAL SIMULTANEOUS FRACTURES OF NECK OF FEMUR: CASE SERIES

L. Lisenda, MBChB BAO, MMed, MRCS, FC ORTH(SA) Consultant Orthopaedic Surgeon, **Z. Linda**, MBChB, FC ORTH(SA), Consultant Orthopaedic Surgeon and **M. Lukhele**, MBChB, MMed, FC ORTH(SA), Professor of Orthopaedic Surgery, University of the Witwatersrand, Johannesburg, South Africa

Correspondence to: Dr. Laughter Lisenda, Division of Orthopaedics, Room 4M12, Faculty of Health Sciences, University of the Witwatersrand, 7 York Road, Parktown, Johannesburg, South Africa.

Email: lisendal@hotmail.com

ABSTRACT

Bilateral simultaneous fractures of Neck of Femur (NOF) are rare. They result amongst others from trauma, metabolic disease, electro-convulsion and simple falls. We report two cases of 40-year-old and 74-year-old females who presented with bilateral simultaneous fractures of NOF post simple falls. Both patients had staged bilateral fracture fixation; right Total Hip Replacement (THR) and cannulated screws to the left hip for the 40-year old while the 74-year old had bilateral THR. The 40-year old had multiple post-operative complications of pneumonia, deep venous complications (DVT) and failure of cannulated screws leading to conversion to a THR while the 74 year-old did not have any complications at 1-year follow-up. Osteoporosis was the underlying disease for the 70 year old while for the 40 year old no underlying disease process was found despite thorough medical workup. We advocate for thorough medical work-up to diagnose, treat and prevent future fracture fixation complications and progression of the disease process.

INTRODUCTION

Bilateral simultaneous fractures of Neck of Femur (NOF) are rare (1-11). The causes of bilateral simultaneous fracture of NOF include metabolic causes (osteoporosis, renal osteodystrophy), trauma, tumours (primary or metastatic), electro-convulsion (epilepsy, electric shock) and stress fractures (1-11). There are few reported cases that occurred after a simple fall without any underlying disease (10,11). We report two cases that presented to our unit after a simple fall with bilateral simultaneous fractures of NOF with different outcomes.

CASE REPORTS

Case 1: A 74 year-old female pensioner presented to the emergency department post sustaining a simple fall. She complained of bilateral hip pains and was unable to weight-bear. Clinically both hips were tender and externally rotated. She was on medication for her high blood pressure and was previously on hormone replacement therapy in her mid 40's after having hysterectomy. X-rays of pelvis and lateral hips showed bilateral displaced intra-capsular fractures of NOF (Figures 1a, 1b, 1c).

Figure 1

Pre-operative X-rays of the 74-year-old lady

1(a) Pre-operative AP Pelvis 1(b) Right hip Lateral 1(c) Left hip lateral



The patient was resuscitated and optimised by physicians pre-operatively. She had bilateral hybrid THR done 4 days apart two days post admission as shown in Figure 2a. Metabolic screen showed normal biochemical profile. DEXA scan confirmed osteoporosis and she was started on Bisphosphonates.

Figure 2

Post-operative X-rays of the 74-year-old lady

2(a) Immediate post-operative AP pelvis



2(b) 1 year follow-up post-operative AP pelvis



At 1-year follow-up her radiographs were satisfactory (Figure 2b) and she was mobilising independently without any aid indoors but one stick for long distance.

Case 2: A 40 years old housewife presented to a General Practitioner (GP) with a two-week history of painful hips that followed a simple fall while walking on flat ground. She had no known medical problems and was not taking any medications. Her BMI was high (39 kg/M²). She was a non-smoker and didn't drink any alcohol. She was discharged on analgesia and to bed-rest for few days until pain subsided. The initial X-rays done by GP showed un-displaced bilateral fractures of NOF that were missed (Figure 3a).

Figure 3

Pre-operative X-rays of the 40-year-old lady

Figure 3a: *Initial AP pelvis*



Figure 3b: *AP pelvis 1 week later*



Figure 3c: *Hip laterals 1 week later*



The pain got progressively worse the following week and was unable to weight bear on the right. Clinically there was no shortening of both lower limbs but was tender and unable to move both the hips. Repeat X-rays showed a displaced fracture of right NOF

(Garden 3) and a stress fracture on the left (Garden 2) (Figures 3b, 3c).

After been fully optimised she had un-cemented right THR 4 days post admission. Cannulated screws (6.4mm partially threaded) to the left hip were done 6 weeks later because the patient opted for a staged procedure. While awaiting the second procedure she contracted Pneumonia, which delayed the second procedure further. Metabolic screen showed normal biochemical profile. DEXA scan was normal and histology also showed normal bone architecture from the right femoral head. She was discharged 3 weeks post cannulated screws on Xarelto® - (Rivaroxaban) but unfortunately she was re-admitted 4 weeks later with bilateral duplex ultrasound scan confirmed deep vein thrombosis (DVT's). She was then put on Warfarin for 3 months. At five months post cannulated screws she presented again with on-going pain on the left groin. X-rays showed failed cannulated screws and non-union of the left fracture of NOF (Figure 4a). Cannulated screws were removed and left THR was done at the same setting. She was discharged 3 weeks post-operatively on Xarelto® - (Rivaroxaban) as she had completed 3 months of warfarin. At six months post left THR, she was mobilizing independently off crutches.

Figure 4

Showing failed cannulated screws and post THR respectively

Figure 4a: *Broken cannulated screws*



Figure 4b: *Post left THR*



Figure 4c: (long stem) Left THR

DISCUSSION

Fractures of NOF are common fragility fractures in the elderly population accounting for about 50% of all hip fractures (12). With increasing ageing population in the developed world the incidence is postulated to increase (13). This is in contrast with bilateral simultaneous fractures of NOF that are rare (1-11). The causes of simultaneous bilateral NOF are well documented in the literature (1-11). Few case reports have been published of bilateral simultaneous fractures of NOF post a simple fall with no underlying disease process (10,11).

The mechanism of the fracture is dependent on the underlying cause. In seizure disorders and electroconvulsive disorders the cause of fractures is attributed to strong muscular contractions (1). In osteoporotic bones, these fractures occur through weakened bones from forces that would normal not cause a fracture (4). In high velocity trauma the external forces through the normal bone tissue exceeds the strength of bone tissue (3). Stress fractures are caused by excessive, repetitive strain on normal tissues and are common in repeated sports activities or military recruits (8,9).

Management of bilateral simultaneous fractures of NOF must be individualised depending on the patient factors and surgical factors (16). Unstable and patients with multiple comorbidities must be optimised prior to surgical intervention to allow the best possible outcome of these already physiological compromised patients. This should be done timely to avoid complications of recumbence like hospital acquired pneumonia and thromboembolic events. The surgeon should have a low threshold of a staged procedure to allow the body to physiological recover in between. Surgical factors include the choice of implants to be used. Cemented implants are ideally for osteoporotic bones and allows early mobilisation but carries risks of bone cement implant syndrome (14). Un-displaced fractures are treated by percutaneous internal fixation. In young patients with displaced fractures Open

Reduction and Internal Fixation (ORIF) is an option to total hip replacement. Patients must be counseled of risk of fracture fixation failure that might necessitate another operation. In cases with underlying disease, the underlying condition should be treated accordingly in addition to prevention of future falls (15). In some patients with resultant simultaneous bilateral NOF no underlying disease can be found (10,11). This subset of patients represents a difficult group to treat post consolidation of fracture healing and may need long-term follow-up to prevent failure of fracture fixation by timely intervention when warranted. For the 74-year old we used un-pressured hybrid THR because of her poor bone stock and Dorr C morphology of her proximal femurs. We opted for staged un-pressured cemented THR to decrease risk of bone cement implantation syndrome (12). Single stage procedure was planned for the 40-year old but the patient declined to have both hip fractures fixed at the same time. Subsequently uncemented THR was done on the right side and six weeks later cannulated screws were inserted on the left, as the fracture remained undisplaced. Further delay was due to hospital-acquired pneumonia, which was successfully treated. The cannulated screws failed six months later most likely from fatigue failure due to high BMI and were subsequently removed and THR done (using a long uncemented femoral stem).

The outcomes are varied as per our two cases. The young patient had multiple post-operative complications despite finding no underlying disease process while the elderly patient had no complications.

CONCLUSIONS

Bilateral NOF fractures must be kept in mind in patients who present with bilateral hip pain following a minor fall. Atraumatic simultaneous bilateral NOF are indicative of underlying disease process until proven otherwise. The outcome of patients with these fractures is unpredictable. Definitive management must not only be limited to fracture fixation but the underlying disease must be looked for and treated accordingly to prevent future complications of the fracture fixation and disease process.

Conflicts of interest: The content of this article is the sole work of authors. No benefits have been received from any commercial party. There is no identifiable personal information on the manuscript and we didn't seek consent from patients.

REFERENCES

1. Powell, H.D. Simultaneous bilateral fractures of the neck of the femur. *J Bone Joint Surg. (Brit)* 1960; **42**(2):236-252.

2. Schroder, J. and Marti, R.K. Simultaneous bilateral femoral neck fractures: case report. *Swiss Surg*. 2001; **7**(5):222-224.
3. Gao, Y.S., Zhu, Z.H. and Zhang, C.Q. Simultaneous bilateral fractures of the femoral neck caused by high energy: A case report and literature review. *Chinese J Traumatol*. 2015; **18**(5):304-306.
4. Chadha, M., Balain, B., Maini, L, and Dhal, A. Spontaneous bilateral displaced femoral neck fractures in nutritional osteomalacia—a case report. *Acta Orthop Scand* . 2001; **72**(1):94-96.
5. Madhok, R. and Rand, J.A. Ten-year follow-up study of missed, simultaneous, bilateral femoral-neck fractures treated by bipolar arthroplasties in a patient with chronic renal failure. *Clin Orthop Relat Res*. 1993; **291**:185-187.
6. Cagirmaz, T., Yapici, C., Orak, M.M. and Guler, O. Bilateral femoral neck fractures after an epileptic attack: A case report. *Intern J Surg case reports*. 2015; **6**:107-110.
7. Shaheen, M.A. and Sabet, N.A. Bilateral simultaneous fracture of the femoral neck following electrical shock. *Injury* . 1984; **16**:13-14.
8. Naranje, S., Sezo, N., Trikha, V., Kancherla, R., Rijal, L. and Jha, R. Simultaneous bilateral femoral neck stress fractures in a young military cadet: a rare case report. *European J Orthop Surg Traumatol*. 2012; **22**(1):103-106.
9. Khadabadi, N.A. and Patil, K.S. Simultaneous bilateral femoral neck stress fracture in a young stone mason. *Reports in orthopedics*. 2015. Article ID 306246, 4 pages <http://dx.doi.org/10.1155/2015/306246>.
10. Park, J.H., Jeong, H.J., Shin, H.K., Kim, E., Ko, T.S. and Choi, Y.M. Simultaneous bilateral fracture of femoral neck in Korea: A case report. *Hip & Pelvis*. 2015; **27**(1):53-56
11. Sood, A., Rao, C. and Holloway, I. Bilateral femoral neck fractures in an adult male following minimal trauma after a simple mechanical fall: a case report. *Cases J* . 2009; **2**(1):92.
12. Keating, J. Femoral neck fractures. In: Buchholz RW, Heckman JD, Court-Brown CM, Tornetta P, eds. *Rockwood and Green's Fractures in Adults*. Philadelphia, PA, USA: Lippincott Williams & Wilkins; 2010:1561–1596.
13. Sambrook, P. and Cooper, C. Osteoporosis. *Lancet*. 2006; **367**: 2010–2018
14. Donaldson, A.J., Thomson, H.E., Harper, N.J. and Kenny, N.W. Bone cement implantation syndrome. *Br J Anaesth*. 2009; **102**(1):12-22.
15. Woolf, A.D. and Åkesson, K. Preventing fractures in elderly people. *BMJ*. 2003; **327**: e89-e95.
16. McGoldrick, N.P., Dodds, M.K., Green, C. and Synnott, K. Management of simultaneous bilateral neck of femur fractures in an elderly patient. *Geriatric Orthopaed Surg Rehab*. 2013;**4**(3):71-73.