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Multiple long bones peri-prosthetic fractures in an elderly patient. The challenge of biological bone failure—A case report

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ABSTRACT

We report a case of bilateral femoral fractures and right tibial fracture in an elderly suffering from osteoporosis. Increasing geriatric population and better life expectancy can result in complicating simple fragility fractures, fixed with traditional implants, into peri-prosthetic fractures postoperatively. They then pose a real challenge in fracture fixation and prolonged rehabilitation. The aim of this case report is acknowledge the increasing prevalence of complex peri-prosthetic fragility fractures in extremes of age and the challenges they present to the surgeons and community both in terms of skills and resources.

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1. Case report

We report a case of bilateral femoral fractures and right tibial fracture in an elderly suffering from osteoporosis. Increasing geriatric population and better life expectancy can result in complicating simple fragility fractures, fixed with traditional implants, into peri-prosthetic fractures postoperatively. They then pose a real challenge in fracture fixation and prolonged rehabilitation.

A 91 years old lady was admitted after a fall in her house. She had bilateral femoral deformities and right leg pain with a past medical history of bilateral inter-trochanteric fractures, fractures of proximal tibia and proximal humerus. She was diagnosed to have osteoporosis 3 years ago and was undergoing treatment (Risedronate). She lived alone in a bungalow and mobilised with walking frame. She had social carers attending her house twice a day. She was assessed following

ATLS protocol and found to have no major injuries other than those in both thighs and right leg. These were closed injuries with no neurovascular involvement. Her radiographs are shown in figure (Fig. 1–4).

She was fit for surgery and treated with intramedullary fixation of both femurs and retrograde nailing of right tibia (Fig. 5–7). She had a prolonged rehabilitation under the orthogeriatric, physical therapy and occupational therapy teams initially in a wheel chair with protected weight bearing for 4 weeks followed by gradual full weight bearing. Currently, she is managing to mobilise using a Zimmer frame.

2. Discussion

There is an increase in geriatric population in the UK. Moreover, there is a rise in fractures fixed with implants and joint

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Fig. 1 – The radiographs showing the anteroposterior (AP) views of bilateral femur fractures.

replacements resulting in patients with prosthesis. Changing social demands on mobility and activities of the elderly can lead to an increasing number of peri-prosthetic fractures in the future.¹ A fragility fracture is defined as one that occurs as a result of a minimal trauma, such as a fall from a standing height or less, or no identifiable trauma.² Despite their mechanism, fragility fracture may display a high-energy fracture pattern and can be challenging to treat. Osteoporosis is the most common condition contributing to 95% of fractures in patients aged over 75 years old and 80–90% of fractures in patients aged between 60 and 74 years old who are hospitalised for treatment of a fracture.³ Biological bone failure in elderly patients can be predisposed by poor bone quality, medical co-morbidities and multiple prostheses and result in increased risk for this type of fracture. All patients presenting with fragility fractures should be investigated or managed for osteoporosis. However, our patient was already diagnosed with osteoporosis and hence this was not necessary. These patients need an interdisciplinary management approach, as they are more challenging than simple fragility fractures of neck of femur, wrist or vertebrae.⁴

Initial decision involves an operative fixation or conservative management. This depends on multiple factors including the general condition of the patient for anaesthetic suitability, the implants available and the biological quality of the bone. The risks of surgery like long anaesthesia, blood loss, risk of postoperative infections and risk of further fractures need to be weighed against the risks of co-morbidities associated with prolonged immobilisation of the injured legs like pneumonia and deep vein thrombosis. Furthermore, these patients can hardly comply with strict non weight bearing regimes often prescribed with conservative treatment.⁵ Hardware choices should allow for early weight bearing and mobilisation of these patients as extended

Fig. 2 – The radiographs showing the lateral (lat) views of bilateral femur fractures.

Fig. 3 – The radiographs showing the anteroposterior (AP) view right distal tibial fracture.

Fig. 4 – The radiographs showing the lateral (lat) view of right distal tibial fractures.

periods of non weight bearing are associated with substantial morbidity. Four basic principles then help to guide the choice of hardware. Osteoporotic fractures maintain stability by impaction of the fracture site, functional fracture reduction, splinting of the fracture over a long area, and the use of materials to augment the strength of the bone where needed.⁶

We managed to fix all her fractures to allow early mobilisation. We fixed the femurs with bilateral retrograde femoral nails. The distal few screws of the proximal implants were removed to ensure adequate overlap of the implants to minimise risks of future stress riser effect. As there were no implants in the knees, entry points were not difficult. We chose to use a pan-talar fusion nail for the distal tibial fracture

Fig. 5 – Showing the intra-operative views of intramedullary fixations of femur showing the implant bypassing the proximal plate.

Fig. 6 – Showing the intra-operative views of intramedullary fixations of femur.

Fig. 7 – Showing the intra-operative views of intramedullary fixations of the tibia. Note a trans talo calcaneal nail was used to fix the tibia.

in order to avoid wound problems in the leg. Furthermore, we felt that the fracture was too distal for a plate fixation.

The role of the orthogeriatric team is to ensure optimal pre and postoperative homoeostasis and achieve early mobilisation. Our patient was allowed gradual mobilisation and protected weight bearing till the fractures were clinically healed. A recent article⁷ describes a reproducible algorithm on managing elderly patients with fragility fractures by the orthopaedic team. However, it is debatable if bisphosphonates are a risk by themselves.⁸

The physical therapy team helped the patient to get back to her pre-injury mobility status. The occupational therapy team and the social services helped the patient to return home. It is expected more geriatric patients will be encountered with complex peri-prosthetic fractures involving multiple limbs in spite of taking anti osteoporosis medications from low impact trauma. Many will need complex surgery and prolonged rehabilitation incurring huge cost to the health system.⁹

We expect the development of a database similar to the neck of femur registry in future to give us the true picture of this problem. We feel there is an urgent need for a uniform multidisciplinary guidance on optimal management of these complex injuries amongst elderly patients.

Conflicts of interest

All authors have none to declare.

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