

## Hip Fracture Management in Elderly Patients

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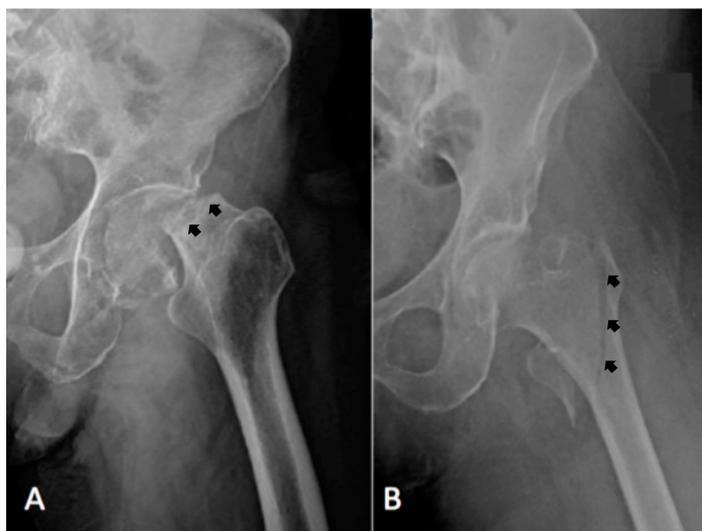
### Introduction

Hip fracture is becoming a relatively more a common problem in the elderly because of the aging population. Most fractures in elderly patients happen from low energy trauma, for example falling from a standing height. Elderly generally have poor balance and vision and have a high rate of osteoporosis which increases the incidence of fracture. The mortality and morbidity rates after hip fracture in elderly are also high. So, proper management of patients with a fractured hip can improve survival rates and allow them to go back to a normal life as soon as possible. This article will explain the types of hip fractures which are usually found in orthopaedic practice and patient management which is separated into preoperative, operative and postoperative care. Femoral neck fractures and intertrochanteric fractures of the proximal femur are the most common types of hip fractures (Figure 1).

Both fracture types have different characteristics. Femoral neck fractures are intraarticular but intertrochan-

teric fractures are extraarticular. The intertrochanteric area has a higher trabecular bone/cortical bone ratio than the femoral neck which has a lower trabecular bone/cortical bone ratio. Both factors have effects on the healing process of displaced femoral neck fractures which has a lower healing rate than a displaced intertrochanteric fracture. Due to different characteristics, both types of fractures require different treatment.

Elderly patients with hip fractures usually have a history of trauma which results from a simple fall or drop from the bed. However, there are some patients who have a hip fracture from higher energy trauma such as a fall from a bicycle or a motorcycle crash. Patients usually give a history of pain and cannot walk after the incident but there is a minority of patients who are still able to walk after the fracture if it is an impacted fracture with no displacement. In cases of displacement of the fracture patient limbs are found to be shorter when compared with the contralateral side.



**Figure 1** Hip radiograph of femoral neck fracture (A) and intertrochanteric fracture (B).

Evaluation of patients with hip fracture should not only focus on the hip, but details of other medical conditions should be evaluated because the patients in this group often have an underlying disease which might need special care for evaluation prior to surgery. The associated injuries should be evaluated, especially in the common areas, for fracture in elderly patients such as the distal radius, spine and proximal humerus. Radiographic imaging is performed for diagnosis and to plan treatment of these fractures. With anteroposterior and lateral cross table x-ray. However, in some conditions, the clinical signs in patients with suspected hip fracture do not show a clear fracture line on plain radiography. In these patients, computed tomography scan and magnetic resonance imaging are helpful to evaluate these conditions.

The standard treatment for femoral neck fracture and intertrochanteric fracture is surgery to allow for early mobilization. Nonoperative treatment is only performed in patients who cannot undergo surgery due to severe underlying diseases and medical conditions. The reason

for early mobilization in this group of patients is to avoid complications from immobilization such as pressure sore, pneumonia, urinary tract infection, deep vein thrombosis and pulmonary embolism. Thus, surgery should be performed as early as possible if the patient's condition and the surgical team and equipment are ready. In patients who cannot undergo surgery, adequate pain control and early mobilization with a wheelchair is one of the treatment options.

Initial management of patients with hip fracture is the prevention of complications from immobilization while waiting for an operation. First of all, pain management should be adequate to decrease patient suffering and allow the patient to move in the bed. To prevent respiratory system complications, the patient should be in an upright position as frequently as possible and should use a spirometer to maintain lung expansion capacity. A pressure sore protocol should be incorporated to prevent pressure ulcers by giving a schedule to the patient and reminding the patient to change positions frequently on their own

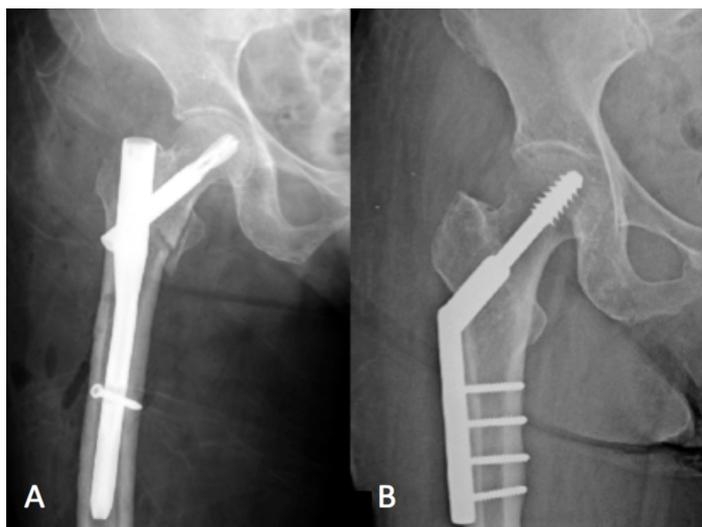
initiative. In patients who cannot change positions themselves, help is needed by a nurse or care giver.

Deep vein thrombosis can be prevented by application of an intermittent pneumatic cuff and teaching the patient to do ankle pumping exercises. Administration of an anticoagulant to prevent a blood clot can also be performed. The anticoagulant used for prevention of a thromboembolic event should have a short half-life and can be stopped for a short period of time to allow the patient to have surgery without increasing the risk of bleeding. Isometric exercises for the lower limbs and light weight lifting and motion exercises for the upper limbs should be encouraged to prevent muscle atrophy.

One controversial point is skin traction. In the past, physicians applied skin traction in patients with hip fracture in the belief that it might help to reduce and stabilize the fracture, prevent further soft tissue injury and decrease pain, but recent research has shown there is no benefit in skin traction over simple placement of a pillow under the affected leg.<sup>1-3</sup>

Preoperative evaluation in this group of patients should include a bio chemistry, complete blood count, chest x-ray and electrocardiography. Surgical treatment for femoral neck fracture and intertrochanteric fracture are different due to different characteristics of bone morphologies and blood supply. The treatment of choice for hip fractures include two main types: fracture fixation and joint replacement.

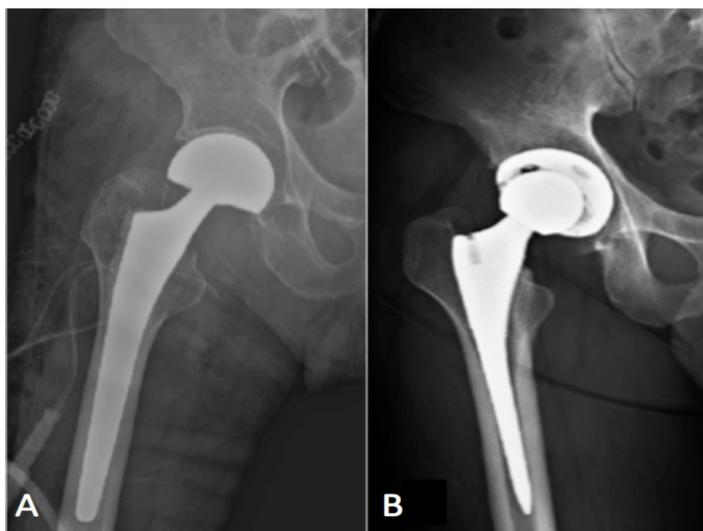
Most intertrochanteric fractures can be treated with fracture fixation. Dynamic hip screws and proximal femoral intramedullary nails are popular. The surgeon will consider an implant depending on the fracture configuration. In a fracture with a stable pattern, both instruments are effective to maintain fracture reduction until bone healing takes place. In fractures with an unstable pattern, however proximal femoral intramedullary nail fixation is the preferred treatment due to a more stable fracture construct after the implant (Figure 2). In cases of severe comminuted fracture of severe osteoporosis, joint replacement is one of the treatment options because fracture fixation may not be able to provide sufficient strength to maintain fracture reduction.



**Figure 2** Intertrochanteric fracture fixation. Intramedullary nail fixation (A) and dynamic hip screw fixation (B).

Femoral neck fracture treatment in the elderly depends on the fracture configuration. The Garden classification is the most popular classification used for communication and guiding the treatment.<sup>4</sup> The Garden classification groups femoral neck fracture into four types. Type I is an impacted–valgus configuration fracture which is an incomplete fracture. The medial cortex of the femoral neck is not breached. This type of fracture has some stability. In the author’s experience, some patients with this type of fracture are still able to walk. Type II is an undisplaced complete fracture at presentation. This type still has some stability but less than Type I. Type III is incomplete displaced fracture. The femoral neck has some contact with the femoral head. Type IV is a complete displaced fracture. The femoral neck has no contact with the femoral head. In Type I and Type II fractures, due to non-displacement, the vascular supply to the femoral head is usually intact. This is not the case in Type III and Type IV fractures where displacement of the fracture often compromises the vascular supply to the femoral head. In nondisplaced fracture or impacted fractures (Types I and II), internal

fixation with screws or dynamic hip screws are the treatments of choice due to the high healing rate. The benefit of internal fixation in this type of fracture is less intraoperative bleeding, lower infection rate and fewer intraoperative complications compared with joint replacement. In displaced femoral neck fractures (Types III and IV), joint replacement is the preferred treatment option compared with fracture fixation there is a high rate of non-union healing and high risk of avascular necrosis which requires further surgery.<sup>5</sup> The choice of joint replacement of either hemihip replacement or total hip replacement is a controversial issue. The advantages of hemihip replacement are decreased operative time, lower blood loss and lower postoperative dislocation rate. The benefit of total hip replacement is a higher functional score.<sup>6,7</sup> In the author’s experience, hemihip replacement is preferred in patients who are inactive with a limited walking distance or have a high risk of dislocated hip such as in cognitive impairment or alcoholism. A strong indication for total hip replacement is in patients with a previous acetabular lesion such as osteoarthritis.



**Figure 3** Joint replacement after hip fracture: hemihip (A) and total hip (B).

After the operation, the patient is sent for an x-ray. The postoperative fracture fixation x-ray evaluates the instrument position and fracture alignment and position. In the cases of joint replacement, limb length, prosthesis alignment and position, periprosthetic fracture, femoral head in the acetabulum in hemihip replacement and the acetabular component in total hip replacement should be evaluated. If a dislocation of the hip or postoperative fracture is detected, immediate treatment is required.

Patient care after the operation is very important. The hemodynamic status of the patient should be monitored closely. Intravenous fluid supplement must be enough to replace blood loss. Bleeding through vacuum drain and urine output are recorded and in the case of massive bleeding, blood components are necessary to replacement blood loss. The patient should be in an upright position as soon as possible if the anesthetist permits. Oxygen supplement is an option in some patients who have postoperative desaturation. In this type of patient, closely monitoring the oxygen saturation is mandatory. However, if the patient has sudden desaturation or loss of consciousness, pulmonary embolism should be ruled out.

Ankle pumping exercises and intermittent calve compression should be started immediately to prevent a thromboembolic event. Hip precaution awareness and protocol to prevent a dislocated hip after joint replacement is applied in high risk patients. The positions which are high risks for dislocated hip are flexion, adduction and internal rotation. Adequate postoperative pain control is very important. A pain score of less than three is considered adequate. The benefit of good pain control is patient satisfaction and allows the patient to move and ambulate sooner which will decrease postoperative complications. Pain medication should be tailored for each patient. Pain medication should incorporate multimodal analgesia to inhibit pain signals at different pathways. Certain types of

pain medication should be avoided in some patients, for example non-steroidal anti-inflammatory drugs should not be prescribed in patients with poor kidney function. Opioids are effective for pain relief but some patients may not tolerate the side effects, such as nausea, vomiting or dizziness. Post-operative ambulation should be initiated as soon as possible. A pick up walker is the gait aid of choice in patients who have poor balance and muscle strength as it adds stability that is effective for prevention of falling.

The weight bearing protocol after the operation differs from person to person. Full weight bearing on the side of the hip fracture is usually allowed in patients with hip replacement or fracture which has a stable construct. Partial weight bearing or foot touch weight bearing are recommended for patients with an unstable fracture with severe osteoporosis and patients with joint replacement with intraoperative fracture that requires bone healing. Before a patient is discharged from the hospital, the caregiver should be taught how to care for a postoperative patient, such as how to assist the patient to transfer to different positions, wound care, and how to recognize signs and symptoms that indicates an urgent condition which necessitates bringing the patient to hospital. Wound discharge, erythema and fever are signs of wound infection that require further treatment. Signs of a dislocated hip include a sense that the hip has moved out of the hip socket, pain and a shortening of the dislocated limb. A swollen limb and pitting edema are signs of deep vein thrombosis.

Further fracture prevention is important. Modifications of the environment, such as increased light in a dark room, installation of anti-slip flooring and removal of floor steps can decrease falls. In patients who require a wheelchair for ambulation, adjustments in the home should be done prior to patient discharge from the hospital. A hip protector can be worn cover the hip area. The hip protector will absorb the force in the event the patient

falls. This instrument can decrease the rate of fracture; however, for maximum benefit the patient needs to wear the hip protector as frequently as possible.<sup>8</sup> Most hip fractures are due to osteoporosis. So, treatment of osteoporosis can decrease the rate of refracture at the hip and also decrease the rate of spine fracture. Bone mineralization density should be measured to obtain a baseline and as a guide to treatment. The cause of osteoporosis should be identified and treated. In some conditions, an osteoporosis specialist and endocrinologist should be consulted. After healing of a fracture, the patient should do some aerobic exercise to increase aerobic capacity, muscle strength and power, and improve balance and coordination. However, high impact exercises, such as running or activities which require jumping, should be avoided in patients with hip replacement to prolong the life of the joint prosthesis.

In conclusion, hip fracture in the elderly is a common problem which will tend to increase in the future as the population ages. This type of fracture requires proper management in every step from preoperative care to intraoperative management and postoperative care and rehabilitation. Knowledge in every aspect is very important for medical personnel who are involved with this group of patients to decrease the morbidity and mortality rates and increase patient functions to allow the patients to return to normal activity as soon as possible.

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