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RESEARCH ARTICLE

SIMULTANEOUS IPSILATERAL INTERTROCHANTERIC AND SUB TROCHANTERIC FRACTURES OF THE FEMUR: A CASE REPORT

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Abstract

Severe hip fracture occur predominantly after low-energy trauma in older patients with osteoporosis. The same type of fracture in young patients is usually associated with high-energy trauma. However, hip fracture from high-energy traumas highlight the importance of a regimented and meticulous exam to assess for other concomitant injuries, such as pelvic fractures, intraperitoneal injuries, hemopneumothoraces, or other immediate life-threatening injuries. Therefore, the proper initial management options are critical, as early failures and subsequent salvage surgery can be accompanied by significant morbidity. This is the case report with detailed history, examination of 40 years-old male patient had intertrochanteric femur fracture with ipsilateral subtrochanteric fracture.

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Introduction:-

Hip fractures are classified by anatomic location and fracture type.⁽¹⁾ The general categories include intra-capsular (femoral neck and head) and extra-capsular (intertrochanteric and sub trochanteric) fractures.^(1, 2) However, the intertrochanteric fractures are extracapsular, and thus at lower risk for complications related to interruption of the blood supply, but are at risk for displacement.^(3,4) Sub trochanteric fracture of the femur is a variant of per trochanteric fracture of the femur that lies in the area of 5cm below the lesser trochanter and may extend proximally into the intertrochanteric area and distally up to the isthmus of the shaft of the femur.^(5,6)

Regarding the mechanism of injury, the hip fractures occur as the result of a fall in the elderly population but in younger individuals, these fractures are rare and occur because of major trauma, such as a fall from a height or a motor vehicle collision.^(4,7) Researchers indicated that the intertrochanteric extracapsular fractures occur in a 3:1 female to male ratio and sub trochanteric fractures show a bimodal distribution (20 to 40 years and over 60 years).⁽⁸⁾ Consequences of hip fractures are significant in terms of loss of life and the associated negative impacts on hip fracture patients' quality of life and level of functioning.⁽⁹⁾

In the younger population, there is a high incidence of associated internal and orthopedic injury.⁽⁴⁾ As opposed to femoral neck fractures, intertrochanteric fractures are extracapsular and significant ecchymosis may be present, depending upon the time elapsed since the injury. Hemodynamic status should be closely monitored, as a large amount of blood can be lost into the thigh.⁽²⁾ Furthermore, the intertrochanteric fractures classified as stable, for which a near anatomic reduction is achievable, or unstable.⁽¹⁰⁾ In stable fractures, there no displaced at lesser trochanter, there is no comminution, and the medial cortices of the proximal and distal fragments are in alignment. In unstable fractures, displacement occurs, comminution exists, or multiple fracture lines are present.^(4,10) However,

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the large majority of intertrochanteric fractures are treated surgically and orthopedic consultation should be obtained in all case.⁽⁴⁾

This report documents unstable intertrochanteric femur fractures with ipsilateral sub-trochanteric fracture in 40 years-old male patient with history of fall from height (12 meters) who underwent to surgical approach of open reduction and internal fixation. The purpose of this presentation is to highlight the challenges, examine the various treatment modalities and implant options in treatment of subtrochanteric femur fracture for optimal postoperative outcome.

Report of the case:

Clinical presentation and history:

40 years old male patient without history of medical condition brought to ER as a case of fall from height (12 meters). Post trauma, he was unable to ambulate or weight bear with bilateral severe pain at lower limbs.

Examination:

On examination, he was conscious, alert with normal and stable vital signs. Cervical spine was protected with collar. Pelvic ring examination was stable and upper extremities had no tenderness or any limitation on movement. Clinical examination of lower limb showed thigh tenderness, deformity, swelling and ecchymosis over the left lower limb. At the right lower limb, there were leg deformity and tenderness along the tibia and ankle with a small wound measuring around 2 cm on the anterior aspect of the distal third of the leg.

Investigations and Procedure:

Initial X ray radiographs (**Figure 1**) revealed left femur intertrochanteric fracture with ipsilateral subtrochanteric fracture and mid-shaft open fracture at right tibia with ipsilateral Weber C fibula fracture (**Figure 2**). CT showed no solid organ injury but sacral ala non-displaced fracture.

According to the trauma protocol, the patient had admitted to the surgical regular ward under observation as a case of blunt trauma. The patient received three units of PRBC due to dropped in his hemoglobin level to 8 g/d. Patient underwent to medical evaluation by multidisciplinary team from anesthesia and orthopedic and they reviewed the fracture nature and geometry and concluded that this was not an isolated intertrochanteric femur fracture, in fact there are two separate fractures with big butterfly fragment in between. However, the surgical option, the technical difficulty in reducing such fractures and possible perioperative complications had discussed with the patient and he keen to get his symptoms improved with operative fixation for the proximal left femur fractures and the right leg and ankle fracture.

As preoperative assessment process, the patient was candidate to surgical fixation of the bilateral lower limb fractures as he was stable and his hemoglobin level reached up to 11.2 g/dl. On the surgery day, the patient was taken to theatre and he was under general anesthesia in supine position on traction table. The procedure started with routine prepping and draping of the left lower limb. However, the open reduction was indicated after unsuccessful multiple trials of closed reduction of the proximal femur fracture under image intensifier. At the left lower limb and under image intensifier, small anterior incision was made over the fracture site and the fracture had reduced and maintained via two pointed reduction clamps. The entry site was just lateral to the tip of the Greater trochanter. After that, gentle reaming had started to maintain the reduction followed by administration of cephalo-medullary nail, which was locked in a static fashion proximally and distally. At the right lower limb, debridement of the wound had performed with midline incision over the patella to do the standard medial Para patellar approach. Closed reduction and internal fixation via intramedullary nail was done which was statically locked proximally and distally. Finally, the right lateral malleolus fracture had fixed via eight holes 1/3 tubular plate through direct lateral approach.

Postoperative Management and Follow-up:

Fortunately, the procedure went smooth and uneventfully. Surgery time was nine hours without post-operative complications. After that, patient transferred to the recovery room then shifted to his room. Pt was discharged home on non-weight bearing (NWB) mobilization.

Following the surgery, the patient had seen after two weeks, his surgical wounds were healed, dry and clean. 40 days after the surgery, the x-rays showed good initial improvement, secondary bone healing and callus evident on x-rays. (**Figure 3, 4, 5**). Patient had a physical therapy plan aiming for mobilization on wheelchair and partial weight bearing mobilization.



Figure 1:- Plain radiograph of pelvis showing left femur intertrochanteric fracture with ipsilateral sub trochanteric fracture.



Figure 2:- X-ray (AP left, Lateral right) showed mid-shaft open fracture at right tibia with ipsilateral Weber C fibula fracture



Figure 3:- Post-operative X-ray showing reduction by cephalo-medullary nail of left femur at intertrochanteric and sub trochanteric sites.



Figure 4:- Post-operative X-ray showing closed reduction by intramedullary nail of fracture at right tibia



Figure 5:- Post-operative X-ray showing closed reduction of right lateral malleolus fracture via eight holes 1/3 tubular plate.

Discussion:-

Anatomically, the Extracapsular fractures include an intertrochanteric or sub trochanteric fracture. An intertrochanteric fracture occurs between the greater and less trochanter. A subtrochanteric fracture occurs 2.5 inches below lesser trochanter.⁽¹¹⁾ Neck and intertrochanteric fractures of the proximal femur occur predominantly after low-energy trauma in older patients with osteoporosis. The same type of fracture in young patients is usually associated with high-energy trauma. The present case is 40 years old male had simultaneous intertrochanteric and sub trochanteric fracture after his fall from a height.

In general, the initial clinical assessment of trauma and resuscitation protocols are crucial and recommended as best clinical practice that help guide treatment.⁽¹¹⁾ Young patients with hip fractures are most likely to have other associated severe injuries because of the amount of force required to cause this type of fracture. Thus, they should be managed based on the principles of treatment of multiple injuries. Careful assessment of the associated injuries and adequate resuscitation are important determinants of the survival of the patient. Attention should be given to the control of the hemorrhage and volume replacement with crystalloids and blood. The present case had multiple fracture in addition to the left intertrochanteric and sub trochanteric fractures; there were right mid-shaft open fracture at right tibia with ipsilateral Weber C fibula fracture.

In the context of treatment, the main goal of hip fracture treatment is early mobilization as it decreases the risk of postoperative complications and improves long-term mortality rate.⁽¹³⁾ Moreover, a single-stage surgical procedure is advisable, the aim is to achieve stable fixation of all the fractures to enhance nursing care and encourage early mobilization of the patient.⁽¹⁴⁾ As a result of that the duration of surgery is likely to be prolonged, and arrangements

should be made for an adequate amount of blood for transfusion. However, the surgical plan of the present case was to internal fixation of all fracture on one surgery that run nine hours that aimed to enhance early mobilization.

The large majority of intertrochanteric fractures are treated surgically and orthopedic consultation should be obtained in all cases.⁽⁴⁾ Early studies showed a higher mortality rate for fractures treated by closed means compared with operative repair.^(15,16) Therefore, most injuries, including all displaced fractures, are treated with open reduction and internal fixation.

Concerning the Cephalomedullary nail that consist of placing an intramedullary rod down the femoral shaft combined with a sliding hip screw directed into the center of femoral head. Compared to sliding hip screws, intramedullary devices offer greater biomechanical stabilization that is especially important in the setting of unstable intertrochanteric fractures.⁽¹⁷⁾

The present case underwent to open reduction and internal fixation of unstable left intertrochanteric and sub trochanteric femur fractures by Cephalomedullary nail. This is supported from prospective randomized controlled trials that showed that the intramedullary fixation was associated with superior radiographic outcomes (limb shortening or femoral neck shortening) postoperatively and lower rates of incomplete union compared to sliding hip screw fixation in unstable intertrochanteric fractures.^(18,19)

Conclusion:-

Hip fracture from high-energy traumas highlight the importance of a regimented and meticulous exam to assess for other concomitant injuries, such as pelvic fractures, intraperitoneal injuries, hemopneumothoraces, or other immediate life-threatening injuries. The goal of surgical treatment of hip fractures is early mobilization and weight bearing. Cephalomedullary nail is a good choice of implant for sub trochanteric fracture of the femur. The advantages include minimal exposure (closed technique), better stability and early mobilization.

Ethical consideration:

The patient had informed that data from the case would be submitted for publication, and he gave her consent.

Conflicts of interest:

None.

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