ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 9| September 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

REVIEW OF A CLINICAL CASE OF TRANSTROCHANTERIC FRACTURE

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Article DOI: https://doi.org/10.36713/epra18367
DOI No: 10.36713/epra18367

ABSTRACT

Introduction: *Intertrochanteric or transtrochanteric fractures are defined as extracapsular fractures of the proximal femur that occur between the greater and lesser trochanter. A clinical case is described below from the time of the initial incident to the final ambulatory control and updated notes on the management of intertrochanteric fractures are made.*
Objective*: to describe this clinical case objectively and to make an analysis of the subject.*
Methodology*: An objective description of the clinical case and a review with analysis of a total of 17 articles, including review and original articles, as well as cases and clinical trials, of which 9 bibliographies were used because the information collected was not sufficiently important to be included in this study. The sources of information were Cochrane, PubMed and Google Scholar; the terms used to search for information in Spanish, Portuguese and English were: transtrochanteric fracture, femur fracture, intertrochanteric fracture, femur osteosynthesis.*
Results: *the use of cephalomedullary nails reduces fracture collapse in comparison with the screwed plate. Cephalomedullary nails have been more effective in intertrochanteric fractures with subtrochanteric extension and in fractures with a reverse obliquity pattern. The type of surgical treatment is based on the fracture pattern and its inherent stability, since the failure rate is highly correlated with the choice of implant and fracture pattern.*
Conclusions: *it is of utmost importance to know the proper management of a fractured patient, especially when the fracture is severe and life-threatening. The management of proximal femoral fractures will depend on their classification and the condition of the affected individual. Therefore, a good imaging study is essential. When deciding on a surgical approach, the material to choose in the procedures has to be ordered with planning and caution, because this will vary according to the type of fracture, being usual to perform different types of surgeries in intertrochanteric fractures being more common the use of intramedullary nails compared*

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to femoral neck fractures, where it is more common the use of cannulated screws, or prosthesis depending on the type of fracture trace. Our clinical case gives a brief view on the surgical management of the pathology, which has to be understood for the best performance of the patient.

KEY WORDS: *fracture, transtrochanteric, femur, intertrochanteric.*

INTRODUCTION

Intertrochanteric or transtrochanteric fractures are defined as extracapsular fractures of the proximal femur that occur between the greater and lesser trochanter. The intertrochanteric aspect of the femur lies between the greater and lesser trochanter and is composed of dense trabecular bone. The greater trochanter serves as an insertion site for the gluteus medius, gluteus minimus, obturator internus, piriformis, and as a site of origin for the vastus lateralis. The lesser trochanter serves as an insertion site for the iliacus and psoas major, often called the iliopsoas. The femoral calcar is the vertical wall of dense bone that extends from the posteromedial aspect of the shaft of the femur to the posterior portion of the femoral neck. This structure is notable because it determines whether a fracture is stable or not. The vast metaphyseal region has a more abundant blood supply, which contributes to a higher rate of healing and less osteonecrosis in front of femoral neck fractures(1-3).

The following describes a clinical case from the time of the initial incident, to the final outpatient management and provides updated notes on the management of intertrochanteric fractures.

METHODOLOGY

An objective description of the clinical case is made and a review is made with analysis of a total of 17 articles, including review and original articles, as well as cases and clinical trials, of which 9 bibliographies were used because the information collected was not sufficiently important to be included in this study. The sources of information were Cochrane, PubMed and Google Scholar; the terms used to search for information in Spanish, Portuguese and English were: transtrochanteric fracture, femur fracture, intertrochanteric fracture, femur osteosynthesis.

The choice of the bibliography exposes elements related to intertrochanteric fractures; in addition to this factor, an analysis of a clinical case and a panoramic review of the subject are presented.

DEVELOPMENT

Clinical Case

Anamnesis.

A 72-year-old female patient was found lying at home in the morning by her relatives. Probably due to a fall from her own height. She presents pain and functional limitation in the left lower limb, her family requests attention to the emergency department by phone, this staff immediately takes the patient by ambulance to the hospital with cervical collar and immobilization. In the emergency department she is evaluated by the surgery team where she is assessed, discharged by the first aid and orthopedic assessment is requested.

The patient denies allergies and presents a personal pathological history of controlled type II diabetes and hypertensive heart disease.

The initial role on the part of the orthopedic service was to perform a detailed anamnesis, questioning about the mechanism of trauma, in addition a basic neurological examination was performed both motor and sensory, the trauma site was assessed, evaluating the joints and bones above and below the injury, a check of distal pulses was performed, a provisional immobilization was performed and continued with the following findings on physical examination:

- Left leg shortened with significant external rotation.
- Other joints with no apparent alterations on preliminary examination.
- Painful palpation at the hip.
- Very painful passive mobility in the hip.
- Neurovascular ok.
- Patient unable to stand or walk.

As an important observation it could be said that in this case a proximal femur fracture is suspected, usually in cases of intertrochanteric fracture the greater trochanter is abducted and externally rotated by the gluteus medius and short external rotators and the diaphysis is displaced posteriorly and medially by the adductors and hamstrings(4,5).

The following complementary examinations were then requested in order to provide comprehensive management of the patient as well as to be able to evidence and classify the probable fracture.

- AP of the hip: to evaluate the personality of the fracture.
- Hip profile: to evaluate the posterior comminution.
- AP of the pelvis
- AP/P of the femur.

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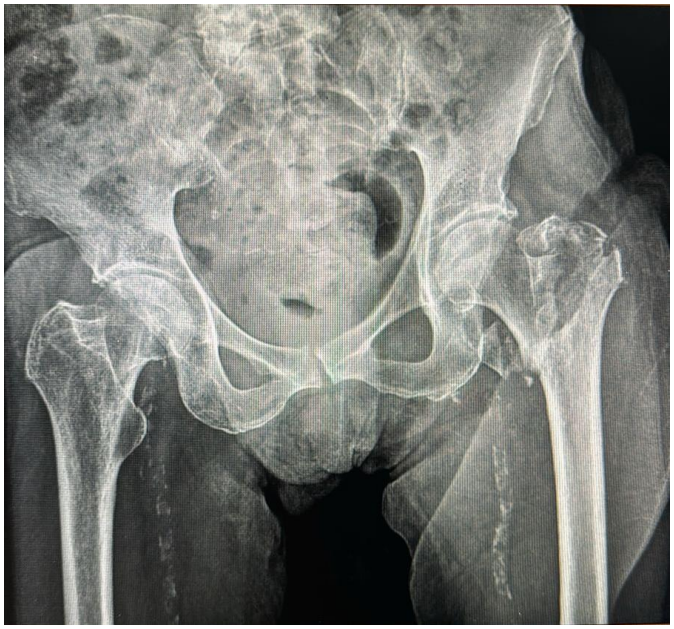
Figure 1. Anteroposterior radiograph of the pelvis of the patient in question, skeletally mature, with evidence of intertrochanteric fracture.



Source: The Authors.

Figure 2. Anteroposterior radiograph of the left hip of the patient in question, skeletally mature, with evidence of intertrochanteric fracture and involvement of the lesser trochanter.

Source: The Authors.

In addition, serum Ca, phosphate and alkaline phosphatase were requested: Serum Ca, phosphate and alkaline phosphatase, complete blood count, complete coagulogram, Na, K, fasting glycemia, 25-hydroxyvitamin D, TSH, PTH, serum protein eletrophoresis, urea, creatinine, electrocardiogram, standard chest X-ray.

Subsequently, with the results of the examinations, the fracture was classified, following the Tronzo classification scheme as a type II.

The Tronzo classification is used to classify intertrochanteric fractures:

type I: incomplete fracture

Type II: no posteromedial comminution, the lesser trochanter may be fractured

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Type III: posteromedial comminution, the shaft is displaced medially with the peak of the neck impacted on it.
Type III variant: type III combined with fracture of the greater trochanter.
Type IV: posteromedial comminution, the shaft is displaced laterally.
type V: inverse obliquity(6,7)

It was decided to perform surgery, so red blood cell concentrates were requested to compensate for the patient's condition, and an assessment by the cardiology and anesthesiology teams was also requested. Once the patient's condition was compensated and within the first 24 hours post-trauma, the patient underwent surgical treatment, with the objective of early recovery of the patient with early ambulation and full weight bearing. It was decided to provide relative stability by an internal tutor method, in this case we decided to use a gamma 3 intramedullary nail.

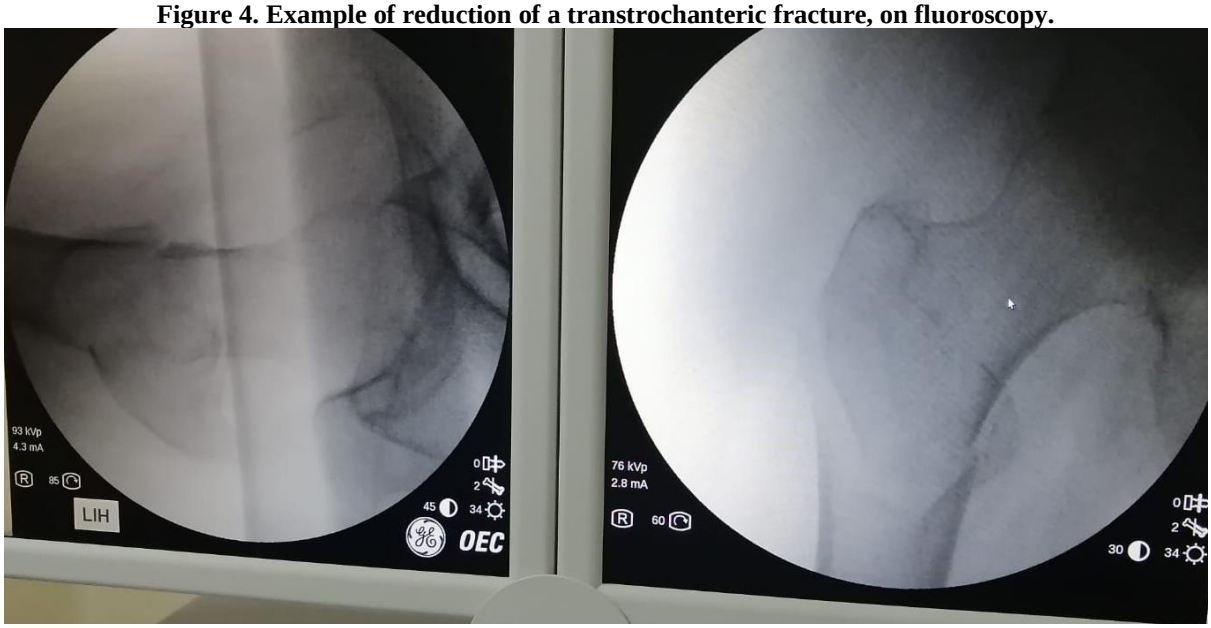
Subsequently, the patient was taken to the surgical room where, after spinal anesthesia and sedation, she was positioned on a traction table. Below is an example of how to position the patient on the traction table, which is not that of our patient in question.

Figure 3. Example of positioning on a traction table.

Source: The Authors.

Subsequently, a reduction of the fracture was performed with traction and alignment was evidenced under fluoroscopy, then asepsis was performed on the patient's limb. Below is an example of a reduction of a transtrochanteric fracture, which is not of our patient in question.

Figure 4. Example of reduction of a transtrochanteric fracture, on fluoroscopy.



Source: The Authors.

As already mentioned in the preoperative period, we decided to use a short gamma 3 intramedullary nail made of titanium because it has the following characteristics:

- Less devitalization
- Less lever arm
- Closer to the mechanical axis of the femur
- Prevents medialization of the diaphysis

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- Allows longitudinal compression
- Intramedullary position
- Eliminates the need for lateral wall integrity.
- The implant combines the features of the sliding screw hip plate and intramedullary rods.

The advantages are technical and mechanical: in theory, these implants can be inserted closed with limited exposure of the fracture, which reduces blood loss and tissue damage compared to the screw plate. In addition, due to their intramedullary location, they are subjected to lower moment forces.

The use of cephalomedullary nails reduces fracture collapse compared to screw plate.

Cephalomedullary nails have been found to be more effective in intertrochanteric fractures with subtrochanteric extension and in fractures with a reverse obliquity pattern(3,4,7).

Returning to our case, then antisepsis was performed, placement of fields and a lateral incision was made slightly posterior, taking as reference the anterior superior iliac spine of the greater trochanter, then skin was cut, subcutaneous cellular tissue, tensor of the fascia lata, until we found the greater trochanter where the introduction of the initiator was performed, then the guide was passed, and then the corresponding drills were introduced, then an example of another patient in which drilling is being performed, below is an example of another patient in which drilling is being performed.

Figure 5. Femur seen under fluoroscopy.

Source: The Authors.

Then, in our patient the short gamma intramedullary nail was placed, a new cut was made for the insertion of the sliding screw, after measuring and drilling the canal, to finally place a distal locking screw, place the plug, perform cleaning, synthesis and healing.

Once the surgical procedure was finished, the patient remained in hospital for the following 48 hours, starting in-hospital physiotherapy and due to the good evolution it was decided to discharge her from the hospital with support, an order for X-rays was also sent for a control return and postoperative medication was also given.

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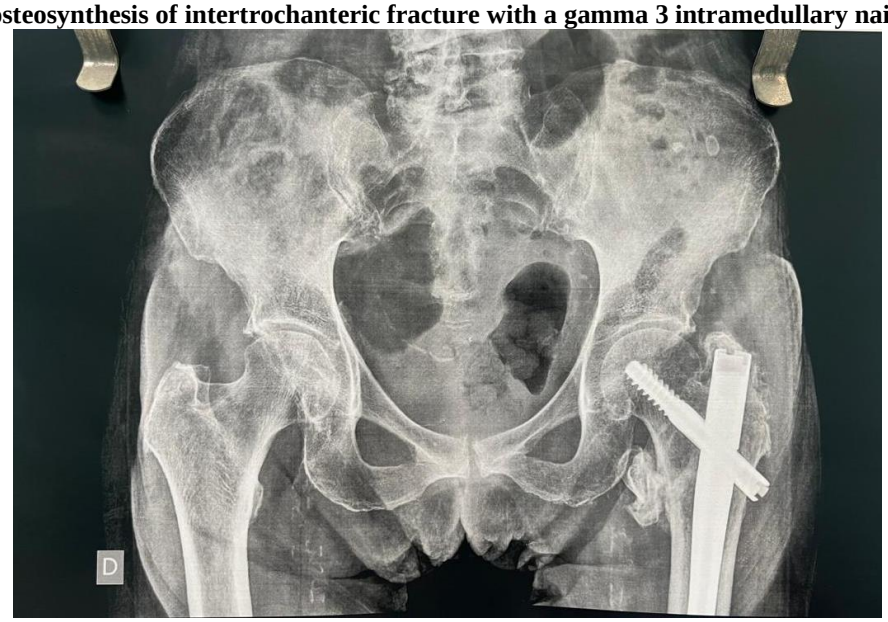
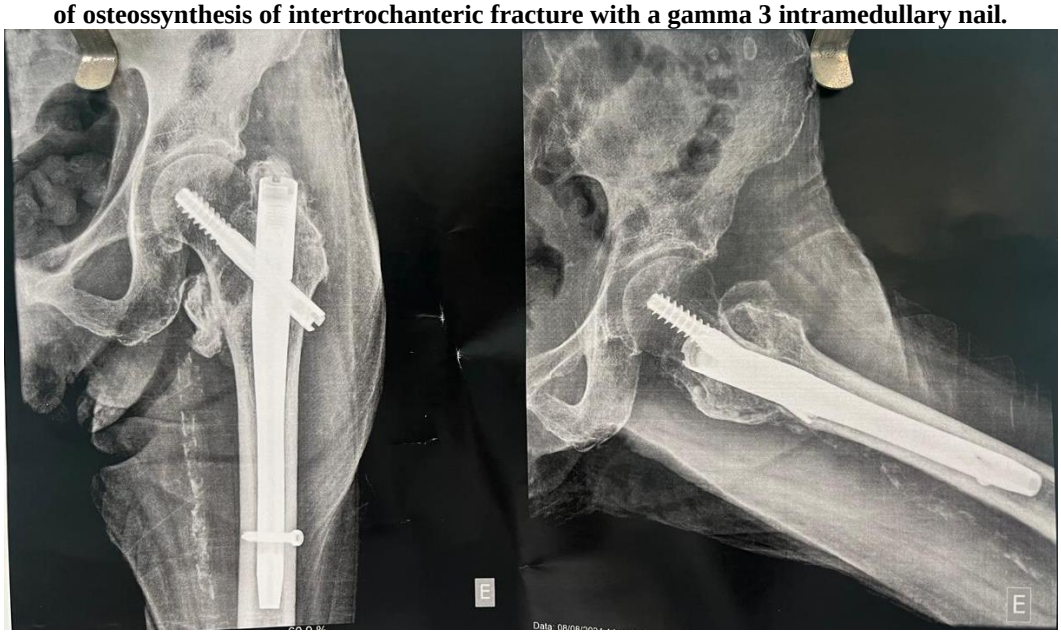
Figure 6. Anteroposterior radiograph of the pelvis of the patient in question, skeletally mature, with evidence of osteosynthesis of intertrochanteric fracture with a gamma 3 intramedullary nail.



Source: The Authors.

Figure 7. Anteroposterior and profile radiograph of the left hip of the patient in question, skeletally mature, with evidence of osteossynthesis of intertrochanteric fracture with a gamma 3 intramedullary nail.



Source: The Authors.

In the postoperative return the patient was in optimal conditions and very grateful, we evaluated the control radiography which is the one previously presented. Subsequently, the patient was followed up in good condition.

It is important to say that this type of osteosynthesis is not free of possible complications that could occur such as loss of fixation, especially collapse in varus, migration of the screw into the head, pseudoarthrosis, rotational deformity, osteonecrosis, infection, PTE, among others.

DISCUSSION

Intertrochanteric fractures occur in both the elderly and the young, but are more common in the elderly population with osteoporosis due to a low energy mechanism. The female to male ratio ranges from 2:1 to 8:1(3,8).

Non-surgical treatment is infrequently indicated and should only be considered in non-ambulatory individuals and those at high risk of perioperative mortality or seeking palliative care measures. The results of this method of treatment are poor because of an increased risk of pneumonia, urinary tract infection, decubitus and deep vein thrombosis(1,3,9).

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The type of surgical treatment is based on the fracture pattern and its inherent stability, as the failure rate is highly correlated with the choice of implant and fracture pattern. Fractures with lateral femoral wall involvement are considered an indication for intramedullary nailing and will not be treated with a sliding hip screw. Unstable fracture patterns, such as fractures with comminution of the posteromedial cortex, a thin lateral wall, displaced fractures of the lesser trochanter, subtrochanteric extension of the fracture, and fractures with reverse obliquity are also indications for intramedullary nailing(3,7).

CONCLUSIONS

It is of utmost importance to know the proper management of a fractured patient, especially when the fracture is severe and life-threatening. The management of proximal femoral fractures will depend significantly on their classification and the condition of the affected individual. Therefore, a good imaging study is essential. When deciding on a surgical approach, the material to choose in the procedures has to be ordered with planning and caution, because this will vary according to the type of fracture, being usual to perform different types of surgeries in intertrochanteric fractures being more common the use of intramedullary nails compared to femoral neck fractures, where it is more common the use of cannulated screws, or prosthesis depending on the type of fracture trace. Our clinical case gives a brief view on the surgical management of the pathology, which has to be understood for the best performance of the patient.

BIBLIOGRAPHY

1. *Karakus O, Ozdemir G, Karaca S, Cetin M, Saygi B. The relationship between the type of unstable intertrochanteric femur fracture and mobility in the elderly. J Orthop Surg. 2018 Dec;13(1):207.*
2. *Sharma A, Sethi A, Sharma S. Treatment of stable intertrochanteric fractures of the femur with proximal femoral nail versus dynamic hip screw: a comparative study. Rev Bras Ortop Engl Ed. 2018 Jul;53(4):477–81.*
3. *Attum B, Pilson H. Intertrochanteric Femur Fracture. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Sep 10]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK493161/*
4. *Bucholz RW, Heckman JD, Rockwood CA, Green DP. Rockwood & Green's fracturas en el adulto. Madrid: Marbán; 2003.*
5. *Koval KJ, Zuckerman JD. Fracturas y luxaciones. 2 ed. Madrid: Marban; 2003.*
6. *Lustosa L. Tronzo classification of trochanteric fractures. In: Radiopaedia.org [Internet]. Radiopaedia.org; 2022 [cited 2023 Feb 23]. Available from: https://radiopaedia.org/cases/tronzo-classification-of-trochanteric-fractures*
7. *Bryam Esteban Coello García, Byron Xavier Cabrera Castillo, Holger Xavier Rojas Espinoza, Gerson Santiago Salinas Salinas, Sthefany Natali Loyola Banegas, Aracely Johmara Borja Loja, et al. INTERTROCHANTERIC FEMUR FRACTURE. EPRA Int J Multidiscip Res IJMR. 2023 Mar 4;3–11.*
8. *Kani KK, Porrino JA, Mulcahy H, Chew FS. Fragility fractures of the proximal femur: review and update for radiologists. Skeletal Radiol. 2019 Jan;48(1):29–45.*
9. *Wang F, Meng C, Cao XB, Chen Q, Xu XF, Chen Q. [Hemiarthroplasty for the treatment of complicated femoral intertrochanteric fracture in elderly patients]. Zhongguo Gu Shang China J Orthop Traumatol. 2018 Sep 25;31(9):818–23.*

Conflict of Interest Statement

The authors report no conflicts of interest.

Funding

The authors report no funding by any organization or company.