

SURGICAL TREATMENT OF TROCHANTERIC FRACTURES BY GAMMA3 NAIL

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Fractures of the greater trochanter rank amongst severe injuries of bone tissue. They occur most frequently in patients over 65 years of age, nearly all of whom are diagnosed with osteoporosis. Non-surgical treatment does not prove to be satisfactory and results in high mortality rate. Surgical treatment is a method of fracture treatment of the trochanteric region, which enables early activation and thus prevents numerous complications in bedridden patients. Gamma3 nails are one of the most state-of-the-art implants for trochanteric fracture fixation. The implant is easy to embed, which does not require a large surgical team. This implant embedding requires the least invasive surgery and complications are rare.

This paper describes 47 patients who received surgical treatment and is focused on the first nine months of 2009. The patients were treated at the Orthopaedics Ward of Health Centre Valjevo. They were in their seventies, average age: 72.21 years, with female sex prevailing (63.82%). The outcome was as follows: excellent in 65.96%, good in 17.02% and satisfactory in 4.25% of patients. Surface infections occurred in 6.38% of patients. One implant broke.

We had one death outcome in the early post-surgical treatment.

Surgical treatment of trochanteric fractures by Gamma3 implants proved very effective as it resulted in few complications and numerous excellent functional and anatomic outcomes. Thus we recommend it as an option when decision on treatment of this type of fractures is made. *Acta Medica Medianae 2010;49(3):27-31.*

Key words: surgical treatment, trochanteric fracture, Gamma3 nail

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Introduction

Fractures of trochanteric region are severe and frequent bone injuries.

In medical literature, they are classified as transtrochanteric, pertrochanteric or intertrochanteric. These fractures affect the trochanteric region or the line between the greater and lesser trochanters.

Trochanteric fractures occur frequently in elderly patients, beginning with the late seventies. These patients are most often diagnosed with osteoporosis (Figure 1) in addition to reduced fall prevention mechanisms.

It is important to mention that the population suffering from this type of fracture most often suffers from comorbidity (cardio-vascular, respiratory, genitourinary diseases or endocrine disorder (Figure 2). The existing pathological conditions are actuated and worsened by the trauma, which results in high death rate (3).

Compared to femoral neck fracture, this type of fracture occurs equally or more frequently, according to medical literature (4). Women suffer this type of fracture twice as frequently as men or even eight times more frequently (5, 6).

Fractures of the greater trochanter are a considerable type of fractures in clinics of orthopaedics. The evidence shows that even up to 30% of beds in orthopaedics wards (7) are occupied by this pathology. Since life-span is becoming longer, elderly population is becoming larger and most patients who suffer from proximal femur belong to this group (8). Bearing that in mind, it is not surprising that this kind of pathology is characterized as "epidemics".

Taking the above into consideration, appropriate treatment, which comprises prompt activation and short period of hospitalization followed by clinic treatment, is undoubtedly an imperative for orthopaedics surgeons worldwide. It is a challenging task to accomplish, since the period of several months is not irrelevant for elderly patients. That is why implants and surgical techniques which are continuously being developed as surgical treatment are the 'Golden standard' for majority of these patients (9).

Aims

The purpose of this study was to present our experiences and outcomes in the treatment of trochanteric fractures by the use of an up-to-date implant (Gamma3 nail).

Material and methods

The retrospective study describes the findings of 47 surgically treated patients who had internal fixation of Gamma3 intramedullary nails (10). The procedure requires appropriate instrumentation, mobile Rtg and skilled team of surgeons (11).

All patients were operated on between 1/01/2009 and 30/09/2009.

The classification of trochanteric fractures used was the one by Kyle et al., a modification of Boyd classification (12).

The final functional outcomes were measured by Harris hip score (HHS) (13).

The monitoring time was between six weeks to 11 months, 7.72 months on average.

Repositioning of the fractures was done on an extension table, while the position of the fragments was checked by a mobile Rtg. We made three incisions (longer proximal incision for introduction of femoral part, medium for placing the nail into the femoral neck and distal for placing the screw).

Patients were virtualized on the first post-operative day and allowed to have 'Tac' or 'Pun' leaning. They were all administered antibiotic prevention (the second-generation cephalosporins, with the exception of those sensitive to the medications) as well as antiaggregation therapy by fractionated heparin.

The variables presented here are patients' gender, age, length of incision, mechanical complications, average radioscopic expositions during the surgery, antibiotic prophylaxis, length of postoperative hospitalization, length of postoperative infection and mortality.

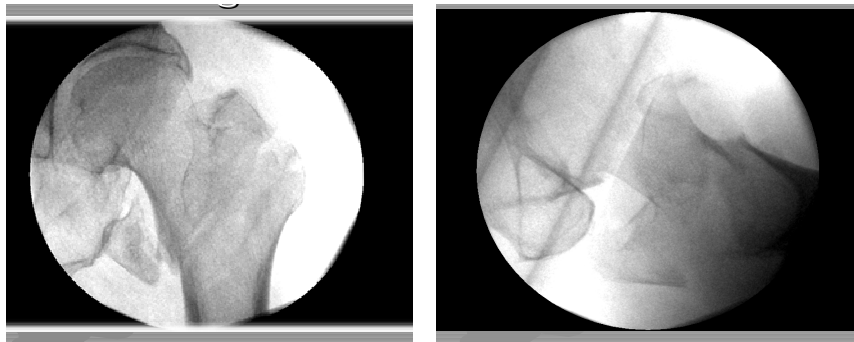


Figure 1. Description: The female patient P.B., aged 65 years (Type III fracture, according to Kyle classification)

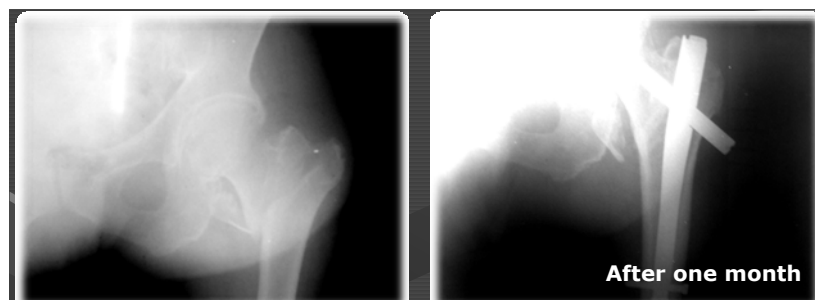
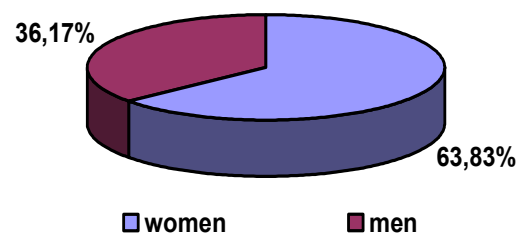


Figure 2. Description: Rtg snimak taken on a mobilnog apparatus pre- andi postoperatively

Results

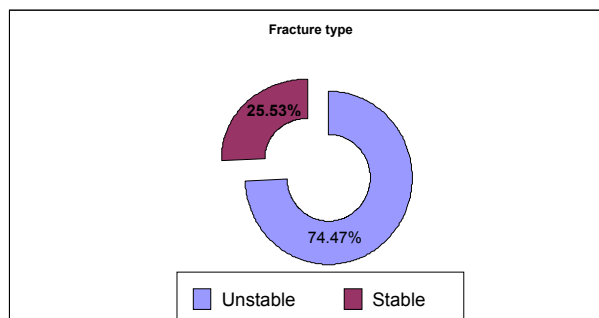
Average age of the surgically-treated patients was 72.21 years. The oldest patient was 92, the youngest was 21. Average hospitalization was 17.53 days (between 4 and 30 days). Average postoperative time was 12.57 days (between 3 and 22 days). Average time of waiting for surgery, following the admission to the hospital, was 4.85 days (between 1 and 16 days).

The study group comprised 30 women (63.83%) and 17 men (36.17%) – Graph 1.



Graph 1.

Unstable fractures: 35 (74.47%), stable fractures: 12 (25.13%) - Graph 2.



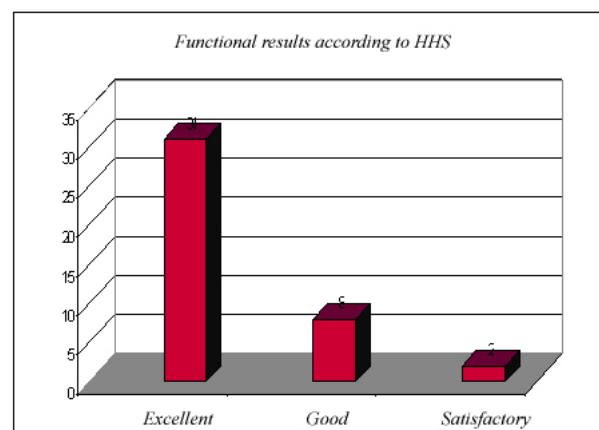
Graph 2.

The total average length of surgical incisions was 6.42 cm (between 4.8 and 9.2 cm). The length of intraoperative radioscopic exposition was 14.9 seconds (between 11.2 and 25.4 seconds). We had mechanical complications during four operations (lag screw falling off), two of which we managed to take out, while the other two remained in the soft tissues of gluteus as we concluded that taking them out would require extensive intervention which would do more harm than good to the patients; neither caused any problems in the postoperative period. All the patients who experienced the complications were overweight.

Three (6.38%) surface infections occurred, all of them being on the proximal incision. There were not any deep infections. We had one case with implant disintegration where the patient refused to undergo another surgery. One female patient, aged 91, died on the sixth postoperative day. The mortality rate in the first six postoperative months was 12.77% (6 patients).

All the patients were administered antibiotic and thrombo-embolic prophylaxis.

HHS was done in 41 cases (with the exception of 6 patients who died) and it showed excellent scores in 31 (75.61%) patients, good in 8 (19.51%) patients and satisfactory in 2 (4.88%) patients (Graph 3).



Graph 3.

Discussion

Injuries of the proximal femur used to be called "...the last big events in the life of the injured patient...".

Fractures of trochanteric region most frequently occur in elderly people. 4/5 of the injured are older than 60 (4), secondary to osteoporosis (metabolic process caused by disbalance in protein distribution, which results in the damage of trabecular bone composition), as well as weakened protection mechanisms (muscle contraction, reflex response of the upper limbs and body...) when a person falls. Such patients are also, in most cases, 'burdened' by joint comorbidity (KVS, respiratory conditions, hormone disbalance, urogenital tract...).

The clinical picture of these injuries is characterized by shortening of the injured leg, external rotation, more or less expressed, immobility of the injured leg, pain with passive movements, crepitation of the fracture site, hematoma in the injured spot (14).

Prevention of these injuries comprises osteoporosis treatment and optional protection devices (hip protector system) (15).

Nowadays, the treatment may be non-surgical or surgical.

Non-surgical methods are not too effective (mortality rate in the first 6 months is up to 40%) (16). Such methods leave the patient bed-ridden for longer period of time (6 to 10 weeks), upon which it is nearly impossible to return to previous condition.

Surgical treatment is a method in trochanteric fractures which implies open repositioning and internal fixation, in corrected, that is, repositioned position of the injured bone segment. Older implants (rigid angular plate, McLaughlin nail) resulted in frequent complications upon fixation (penetration into the hip joint, slow rate of cicatrisation, cicatrisation impossible, implant breakage). Fixation of dynamic implants considerably reduces the rate of implant penetration into the hip joint, which is the result of design which enables dynamization at the axis of the femur neck. Up-to-date implants comprise DHS (dynamic hip screw) (17), Gamma3 locking nail, (18) and Medoff sliding plate (19). Fixation of these implants reduces the rate of fractures cicatrized in a bad (most frequently varus) position.

According to outcomes of clinical application of Gamma3 nail, compared to outcomes of other authors (20), surgical treatment of trochanteric fractures by Gamma3 nail in our health centre is equally efficient.

The advantages of Gamma3 nail are easy fixation, with one or two surgeons, repositioned axle load towards medial in relation to the longitudinal axes (as it is an intramedullary implant), possible dynamization, minimal invasiveness and possible early activation. This applies to all intramedullary implants.

The disadvantages are a complex instrumentation, longer period of radioscopic exposition as well as the price of the implant.

Conclusion

Surgical treatment of fractures of the greater trochanter is an optional method.

Fixation of Gamma3 nail in the treatment of these injuries is simple, it does not require more than two surgeons, and it saves periosteal

circulation, enables early activation and short period of time before attaining full leaning. Also, this method is minimally invasive; it provides a high cicatrisation rate, in most cases in the right position, low complication rate. It's comfortable for a surgeon, too.

The advancement, the development of new, improved implants and surgical techniques is aimed at preventing fractures of the great trochanter from being "...the last big events in the life of the injured patient ...". To us, surgeons, it is an imperative.

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OPERATIVNO LEČENJE TROHANTERNIH PRELOMA GAMMA 3 KLINOM

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Prelomi trohanternog masiva predstavljaju teške povrede koštanog tkiva. Najčešće ih zadobijaju osobe starije od 65 godina, u najvećem broju slučajeva sa osteoporozom. Neoperativno lečenje ne daje zadovoljavajuće rezultate i prati ga visoka stopa smrtnosti. Hirurško lečenje predstavlja metodu izbora u zbrinjavanju preloma trohanternog regiona, omogućavajući ranu aktivaciju, čime se sprečavaju brojne komplikacije koje prate bolesnike vezane za postelju u dugom vremenskom intervalu. Gama3 klin predstavlja jedan od najsavremenijih implantata za fiksaciju trohanternih preloma. Ovaj implantat omogućava dinamizaciju preloma, lak je za ugradnju i ne zahteva brojnu operativnu ekipu. Ugradnja ovog implatata podrazumeva minimalno invazivnu hirurgiju. Komplikacije su retke.

U radu smo obradili 47 operativno lečenih bolesnika u prvih 9 meseci 2009. godine. Svi bolesnici su zbrinuti na Odeljenju za ortopediju Zdravstvenog centra Valjevo. Prosečna starost operisanih iznosi 72,21 godinu. Predominiraju osobe ženskog pola (63,82%). Odličan rezultat smo registrovali kod 65,96% bolesnika, dobar kod 17,02%, zadovoljavajući kod 4,25%. Imali smo 6,38% površnih infekcija, kao i jedan slučaj lomljenja implantata. U ranom postoperativnom toku (šesti dan) zabeležili smo jedan smrtni slučaj. Operativno lečenje trohanternih preloma ugradnjom Gamma3 implantata pokazalo se vrlo efikasnim, dajući mali broj komplikacija i visok stepen odličnih funkcionalnih i anatomskih rezultata, pa ga u tom smislu preporučujemo kao jednu od opcija prilikom odluke o lečenju ove vrste preloma. *Acta Medica Medianae 2010;49(3):27-31.*

Ključne reči: hirurško lečenje, trohanterni prelomi, Gamma3 klin