Acta Biomed 2019; Vol. 90, Supplement 12: 82-85 DOI: 10.23750/abm.v90i12-S.8960 © Mattioli 1885

Original article

Preliminary experience with MEDGAL DHS for treatment of proximal femoral fractures

Danila Oldani[1], *Pietro Maniscalco*[2]

[1] Orthopaedic Clinic, Department of Medicine and Surgery, University Hospital of Parma, Parma, Italy; [2] Orthopedics and Traumatology Department, Guglielmo da Saliceto Hospital, Piacenza, Italy

Summary. *Background and aim of the study:* The Authors report their implant's analysis and preliminary experience with a new fixation device, the MEDGAL DHS for treatment of proximal femoral fractures, producted by MEDGAL Sp.z o.o, Niewodnicka, Poland. *Materials*: Between January 2019 and September 2019 in Orthopedics and Traumatology Department of Piacenza, 12 patients with stable pertrocanteric fractures were treated with the MEDGAL DHS. *Results:* No patients presented perioperative complications with low bleeding and mean surgical time of 40 minutes. *Conclusions:* DHS is an optimal implant for the treatment of stable pertrochanteric femural fractures. (www.actabiomedica.it)

Key words: pertrochanteric fractures, DHS, MEDGAL DHS

Introduction

Femoral fractures are one of the most common fractures encountered by orthopaedic surgeons across the globe (1). Intertrochanteric (IT) fractures are a common subtype of these and occur mostly in elderly patients with multiple co-morbidities, including osteoporosis (2), while in young adults, these fractures are generally due to high energy trauma, such as road accidents (3).

These type of fractures usually occur between the greater trochanter, the attachment site to the hip abductor and extensor muscles, and the lesser trochanter, the attachment site of the hip flexor muscle (4). The incidence of hip fractures is 2-3 times more common in females and the risk of fracture will double, every 10 years after the age of 50 (5).

The Dynamic Hip Screw (DHS) is a screw that allows for controlled dynamic sliding of the femoral head and is used to fix both the femoral head and the device to the shaft of the femur. The dynamic compression allows the weight-bearing stresses to stabilize the femur so that it may undergo remodelling and proper fracture healing (6).

Materials and Method

Twelve patients (7 female and 5 male) with stable intertrochanteric fracture of the femur (AO Classification 31 A 1) have been treated with MEDGAL DHS between January 2019 and September 2019 at Orthopedics and Traumatology Department, Guglielmo da Saliceto Hospital, Piacenza, Italy.

The youngest patient was 70 years of age and the oldest was 83 years with the mean age being 76 years.

One patient had an outcome of pregressive acetabular fractures ipsilateral of the pertrocantheric fracture.

The MEDGAL DHS is made of a titanium alloy ISO 5832-3 coated in silicon; silicon inducing bone attachment to metallic implants. In addition, these coatings are non-resorbable, and are thus suitable for long-term implantations.

These implant is available in a wide range of size and barrel angle (130°, 135°, 140°, 145°, 150°), for varied clinical situations.

The MEDGAL DHS have the possibility to have two different diameter of lag screw: 12.5 mm and 16 mm for the osteoporothic bone.

The surgical technique employed a lateral approach to the hip: the tensor fascia lata was incised and the vastus lateralis muscle was retracted, followed by an L-shaped incision into the vastus lateralis muscle. Anatomical reduction was achieved. Guide wire insertion was done below the centre in the anteroposterior fluoroscopic image and central in the lateral fluoroscopic image. Reaming was done and appropriate size lag screw was inserted, side plate was fixed with insertion of the screws. Usually a five-hole long barrel plate (130°, 135°) was used in almost all our cases (Fig. 1-2).

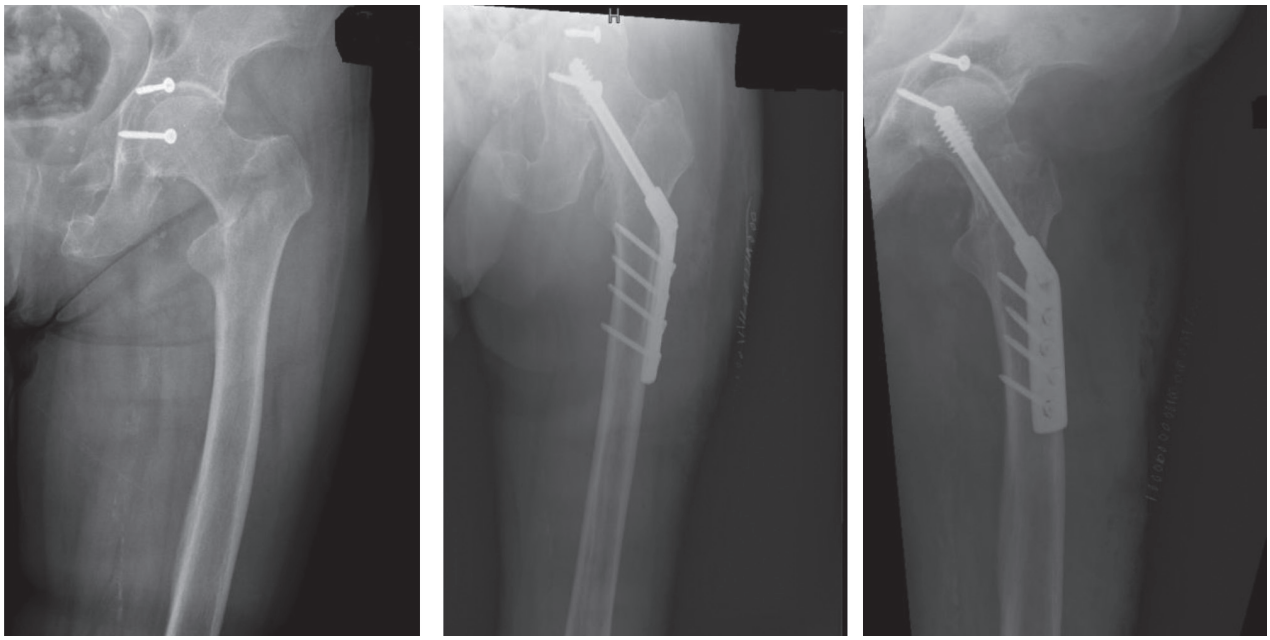

Figure 1. Pre and postoperative Rx images of the patients with a pregressive acetabular fractures

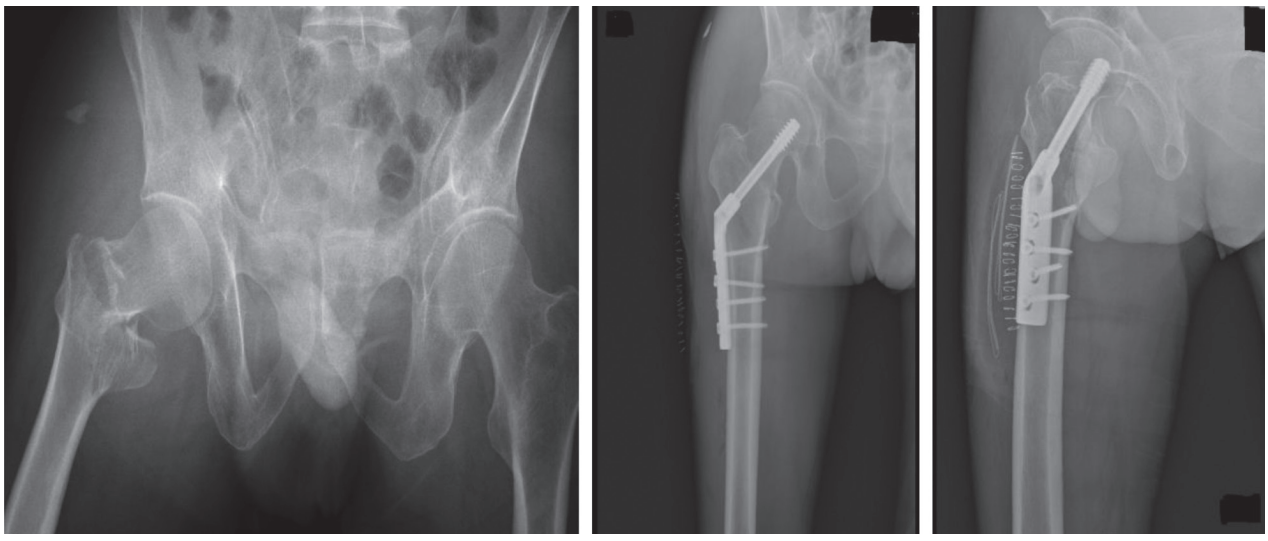

Figure 2. Pre and postoperative Rx

Postoperatively, all the patients were started on a progressive physiotherapy program. Quadriceps strenghtening exercise and hip and knee joint range of motion execises were started immediately after surgery. Full weight-bearing was allowed with the walking frame and crutches on the second day after surgery.

Results

No patients presented perioperative complications, the mean operative time was 40 minutes (range 30-55 minutes). The mean blood loss during surgery was 150 ml. No one had need to place blood drains.

All patients except one completed the physiotherapy program without any complications and returned to their normal activities. Only one patient didn't complete the physiotherapy program because had a stroke three weeks after surgery.

Discussion

Proximal femoral fractures in elderly patients represent a very significant problem in industrialized countries, due to the aging of the population.

In Italy, it is estimated that the incidence of proximal femoral fractures is approximately 90,000 per year, and that they are responsible for an annual expenditure in excess of 800 million euros in hospital costs alone. From the patient's perspective, in around 20% of cases, motor autonomy is completely lost and only 30-40% recover full autonomy in daily activities (7).

Currently, internal fixation devices for treating unstable intertrochanteric femoral fractures are classifed into intramedullary fixation and extramedullary fixation devices, both of which show advantages and disadvantages (8-9).

The use of intra-medullary devices has increased over the years (10). There have been many reports which suggest that they do not show better outcomes than the DHS especially in AO/OTA 31A1 (A1) and A2 fractures (11-14).

The recent study of Han et al (15) confirms that intramedullary fixation device, are effective for unstable intertrochanteric femoral fractures with broken lateral walls.

The use of DHS for the treatment of unstable intertrochanteric fractures is still controversial. As DHS is the traditionally accepted treatment method in stable fractures with low failure rates (16), it's know to have a high complication rates in unstable fractures (17).

Other authors showed that DHS is a recommended implant designed for the fixation of unstable intertrochanteric fractures (18-20). The advantage of a DHS are a better exposure of fracture site (9, 20), no trauma to the medium gluteus, lower expenses compared with intramedullary nailing, lower post operative bleeding. The disadvantages are: longer incision with higher intraoperative blood loss, longer operative time; failures have been noted in unstable intertrochanteric fractures, which is primarily due to posterolateral wall fractures (21, 22).

The most common mechanical complication of DHS surgery is lag screw migration and subsequent hip screw cutout (23-25).

Conclusion

In this study, we have showed our preliminary experience with DHS in AO 31A1 fractures. AO 31A1 includes simple two-part fractures of the pertrochanteric area with A1.1 fractures along the intertrochanteric line, A1.2 fractures through the greater trochanter and A1.3 fractures below the lesser trochanter. All these are stable fractures with an intact posteromedial cortex.

From our preliminary experience is shown that MEDGAL DHS is a low cost implant easy to use for the treatment of stable pertrocanteric fractures.

Longer follow up is requiered and it will be done, to evaluete long term clinical and radiographycal results.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

References

1. Parker M, Johansen A. Hip fracture. BMJ 2006; 333: 27-30.
2. Webb LX. Proximal femoral fractures. J South Orthop Assoc 2002; 11: 203-12.

3. Paganini-Hill A, Chao A, Ross RK, Henderson BE. Exercise and other factors in the prevention of hip fracture: the Leisure World study. Epidemiology 1991;2(1):16-25.
4. Rockwood CA, Green DP, Bucholz RW. Rockwood and Green's fractures in adults. 7th ed. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2010.
5. Dhanwal DK, Cooper C, Dennison EM. Geographic variation in osteoporotic hip fracture incidence: the growing importance of asian influences in coming decades. J Osteoporos 2010;2010:757102.
6. Shetty A, Ballal A, Sadasivan AK, Hegde A. Dynamic hip screw with trochanteric stablization plate fixation of unstable inter-trochanteric fractures: a prospective study of functional and radiological outcomes. J Clin Diagn Res 2016;10:6.
7. Ministero della Salute, CCM. Indagine multicentrica sugli esiti delle fratture degli arti inferiori negli anziani a seguito di incidente domestico, 2007.
8. Zhang L, et al. Treatment of unstable intertrochanteric femoral fractures with locking gamma nail (LGN): A retrospective cohort study. Int J Surg 26, 12-17
9. Lee WT, Murphy D, Kagda FH, Tambiah J. Proximal femoral locking compression plate for proximal femoral fractures. J Orthop Surg (Hong Kong) 22, 287-293
10. Kokoroghiannis C, Aktselis I, Deligeorgis A, Fragkomichalos E, Papadimas D, Pappadas I. Evolving concepts of stability and intramedullary fixation of intertrochanteric fractures: a review. Injury 2012;43:686-93.
11. Parker MJ, Pryor GA. Gamma versus DHS nailing for extracapsular femoral fractures. Meta-analysis of ten randomised trials. Int Orthop. 1996;20:163-68.
12. Barton TM, Gleeson R, Topliss C, Greenwood R, Harries WJ, Chesser TJ. A comparison of the long gamma nail with the sliding hip screw for the treatment of AO/OTA 31-A2 fractures of the proximal part of the femur: a prospective randomized trial. J Bone Joint Surg Am. 2010;92:792-98.
13. Evolving concepts of stability and intramedullary fixation of intertrochanteric fractures—a review. Kokoroghiannis C, Aktselis I, Deligeorgis A, Fragkomichalos E, Papadimas D, Pappadas I. Injury. 2012;43:686-693.
14. Barton TM, Gleeson R, Topliss C, Greenwood R, Harries WJ, Chesser TJ. A comparison of the long gamma nail with the sliding hip screw for the treatment of AO/OTA 31-A2 fractures of the proximal part of the femur: a prospective randomized trial. J Bone Joint Surg Am. 2010;92:792-798.
15. Han L, Li JJ Controlled study on Gamma nail and proximal femoral locking plate for unstable intertrochanteric femoral fractures with broken lateral wall. Scientific Reports (2018) 8:11114
16. Den Hartog BD, Bartal E, Cooke F. Treatment of the unstable intertrochanteric fracture: Effect of the placement of the screw, its angle of insertion, and osteotomy. J Bone Jont Surg Am 1991 Jun;73(5):726-33.
17. Saarenpaa I, Heikkinen T, Ristiniemi J. Functional comparison of the dynamic hip screw and the gamma locking nail in trochanteric hip fractures: a matchedpair study of 268 patient, Int'lOrtho p 2009; 33: 255 - 60
18. Mavrogenis AF, Kouvidis G, Stavropoulos NA Sliding screw implants for extracapsular hip fractures- J Long Term Eff Med Implants. 2012;22:1-10.
19. Dhamangaonkar AC, Joshi D, Goregaonkar AB, Tawari AA Proximal femoral locking plate versus dynamic hip screw for unstable intertrochanteric femoral fractures..J Orthop Surg. 2013;21:317-322
20. Upadhyay S, Raza HK. Proximal femoral locking plate versus dynamic hip screw for unstable intertrochanteric femoral fractures. J Orthop Surg. 2014;22:130-131.
21. Palm H, Jacobsen S, Sonne-Holm S, Gebuhr P. Integrity of the lateral femoral wall in intertrochanteric hip fractures: an important predictor of a reoperation. J Bone Joint Surg Am. 2007;89:470-75.
22. Hsu CE, Shih CM, Wang CC, Huang KC. Lateral femoral wall thickness. A reliable predictor of postoperative lateral wall fracture in intertrochanteric fractures. Bone Joint J. 2013;95-B:1134-38.
23. Parker MJ (1992) Cutting-out of the dynamic hip screw related to its position. J Bone Joint Surg Br 74(4):625
24. Hsueh K-K, Fang C-K, Chen C-M, Su Y-P, Wu H-F, Chiu F-Y (2010) Risk factors in cutout of sliding hip screw in intertro- chanteric fractures: an evaluation of 937 patients. Int Orthop 34(8):1273-1276
25. Pervez H, Parker MJ, Vowler S (2004) Prediction of fixation fail- ure after sliding hip screw fixation. Injury 35(10):994-998

Received: 1 October 2019
Accepted: 3 November 2019
Correspondence:
Dr. Danila Oldani
Orthopaedic Clinic, Department of Medicine and Surgery,
University Hospital of Parma, Parma, Italy
Tel. 3202742752
E-mail: danila.oldani@studenti.unipr.it