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Review Article

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COMPARATIVE RETROSEPTIVE STUDY OF GAMMA NAIL AND DYNAMIC HIP SCREW DHS IN TREATMENT OF TROCHANTERIC FRACTURE: ABOUT 360 CASES

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INTRODUCTION

In France, 50000 women and 16000 men suffer from hip fractures per year, an increase of these numbers is predicted over the coming years (the percentage may bump up by 500% in 2015) because of population aging and the independant increase of the risk of osteoporosis , with a peak between 75 and 85 years old, it essentially concerns the eldery population, the mortality in first 6 months is equal to 15% and 25% which makes it a real public health problem.

Trochanteric fractures make a gib part of this fractures. Implants' developpement has limited the mortality via fast verticalisation with support and without disassemblying or cephalic perforating.

From the smith-peterson nail in 1931 to the Dynamic hip screw (DHS) in 1980 and gamma nail in 1988, those implants have known a lot of evolutional steps. Scientists are still arguing whether the gamma nail is more useful or the dhs because there's no specific indications. This study is meant to compare their clinical and radiological efficacy.

MATERIELS AND METHODS

This retrospective study was done in orthopedic trauma service of the university hospital center of Ibn Sina, in Rabat, Morocco for 4 years between january 2010 and december 2014.

All the patients with a trochanteric fracture were included. These patients were operated under spinal anesthesiaon an orthopedic table and under scopic control.

The characteristics of the used implants are.

Gamma nail: a 20 cm long standard nail and a diameter of 11 mm and a cervico-diaphyseal angle of 130°.

DHS: a 45 mm long cannon, 2 à 16 holes and a cervico-diaphyseal angleof 130°.

The reduction has been tried before the incision. In case of failure, it has been compeleted by a percutaneous reduction.

A postoperative radio of the hip.

A postoperative anteroposterior and lateral radiographic views of the hip are systimatically made.

After surgery, the reeducation protocol is the same for all the patients.

The verticalisation is initaly made without support and support progressively comes back.

The aftercare was at 4 weeks then at 6 weeks for 24 weeks and then at 6 months for year and then again every year.

The patients were classified on the basis of the type of the fracture using AO classification.
The patients were compared according to clinical criteria and radiological criteria. After postoperative radiological control (Both anteroposterior and lateral views), The reduction was judged according to KEMPF so-called anatomical.

The cervico-diaphyseal angle and anteversion were identical in the controlateral side with a diastasis lower than 5mm, the acceptable reduction represented axis defects lower than 5 face and 10 for anteversion, The diastasis didn't get past 10 mm, the rest of reductions were qualified as bad.

The evaluation of clinical outcomes is based on the scoring of POSTEL MERLE D'AUBIGNE.

The bleeding during the surgery wasn't quantified, we calculated the number of patients in need of a postoperative tranfusion.

Stable fractures or easy to stabilise ones are simple fracture without a damage of the Merckel spur or the posterolateral wall: Cervicotrochanteric fracture and simple pertrochanteric fractures.

Out Comes

Tableau 1.

		Group A(nb)	Group B(nb)	Total(nb)	
A.1	A1.1	40	13	53	155
	A1.2	55	15	70	
	A1.3	27	5	32	
A.2	A2.1	48	17	65	197
	A2.2	54	19	73	
	A2.3	57	2	59	
A.3	A3.1	1	2	3	8
	A3.2	1	2	3	
	A3.3	2	0	2	
Total		285	75	360	

59.64% of fracture were stable in group A versus 66.66% in group B.

Operative time has an average of 45 minutes for group A and 68 minutes for group B.

84.56% pf group A patients versus 78.66% of groupe B pull themselves up during the first week
Quality reduction outcomes are posted in « Board 2 »

Outcomes	Group A	Group B
Anatomical reduction	193(67.71%)	61(81.33%)
Acceptable Reduction	70(24.56%)	9(12%)
Bad reduction	22(7.71%)	5(6.66%)
Total	285	75

In postoperative, 13 patients of group B required a blood transfusion versus 5 of group A.
Superficiel infection appeared in 18 case (11 of group A and 7 of group B) and only one deep infection in DHS taking up surgically.

We had 25 death in group A (7 early death in less than 15days) and 10 in group B within 3 first months. This patients were valued only radiologically.

In peroperative, a fissure was noticed with 10 patients, with no consequence on mounting stability and screw's wick was broken for only one time.

As late complications we have noticed.
Varus malunion: 15case in group A and 2 cases in group B.

The study include 360 patients.

The average age is 69 years old +/- 7 years old. Among this category, 62% present polymorbidity and 86.11% have as fracture appears after a tailspin.

The treatement by a gamma nail was done for 285 patients (Group A) and 75 patients were treated by a screw plate DHS (Group B).

Secondery fracture: 3 case of diaphyseal fractures in group A as a result of tailspin, replaced by a gamma long nail.
Mechanical complications.

Plate medialization: one case in groupe B.

Disassembly of osteosynthesis equipment: one case in group B.

Cervical screw protrusion: one case in each group A and B.

Cervical screw cut-out: 9 cases in group A ans only one case in groupe B.

In clinical evaluation, we omitted dead patients in two groups, outcome sin board 3.

Fonctionnel outcomes	Group A	Group B
Good	205(78,84%)	40(61,53%)
Average	37(14,23%)	16(24,61%)
Bad	18(6,92%)	9(13,84%)
Total	260	65

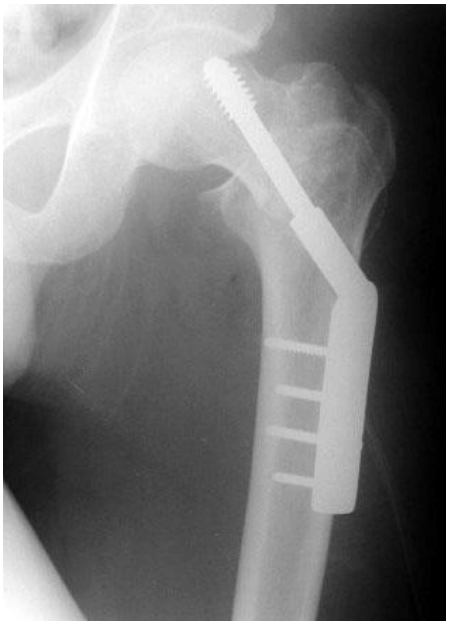

Figure1.
Title: left hip radiography.
Legend: cut-out of cervical screw.

Figure 2.
Title: Right hip radiography.
Legend: fracture with gamma nail caused by a fall.

DISCUSSION

Through years, screw plate DHS was considered as a gold standard for treatment of trchanteric fractures.[9]

After gamma nail development , the choice between the the two implants becomes less evident.

Operative time of DHS placament is more important[10][11][12][13], it presents 68 minute versus 45 minute for gamma nail in our study . screw plate DHS requires more big contaneous opening[10][11] besides the necessity of a dissection roughtly extent according to the fracture .. Wagman[14] rely on CPK dosage as a marker of muscular disorders, found 368 ui/l fpr DHS and 65ui/l for PFN. In Ronga series[15], there is less bleeding in group A1 fracture with DHS than PFN. Penot[16] quantifies a 148 ml bleeding for gamma nail and 522ml for DHS. We have found the same outcomes in literature.[17] [18] Even in postoperative , patients who needed more transfusions were ones treated by DHS in our serie.

Reduction quality is better for DHS, what was more logic as much as it placed in an open focus . Anatomical reduction is not needed for this fracture type as much as the mean objective on our treatment is presented by quick verticalization.

Superficiel infection concerned 18 case (3.85 with group A and 9.93 with group B) and a deep infection in group B required a re-surgery. We explain this by surgical approach which is more important and extends operative time .Important factor for infection prevention for operating site.[18] [19] [20]

There is more mechanical complications in group B, this could be clarified with a lack of experience of our surgeons who used to place more gamma nail than DHS. Kempf.[7] in a serie of 121 patient treated with gamma nail, we find 13 mechanical complications. Penot.[16] we do,'t find a significant difference ne (DHS 6,2% /gamma nail 8,9%). In a meta-analysis.[10] we find an advantage for PFN againt DHS but there is no difference between gamma nail and DHS.

Penot[16] find 85% of patients operated with gamma nail who put themselves up in first week versus 76% of patients operated with DHS. For osteosynthesis with gamma nail, standing posotion don't depend on fracture stability, what explain that earlier standing position concerns patients treated with gamma nail.[7]

The delay of standing position was noticed for group A against group B, and it is explained with incision size and dissection necessary for placing a DHS. The same reasons lead to a extension of the period of hospitalisation for patients operated with DHS.

Clinical evaluation find a superiority of gamma nail against DHS. Bad outcomes of DHS are presented with patients who knew mechanical complications.

CONCLUSION

We tried to compare gamma nail to DHS in a global vision with all types of fractures. A low difference between outcomes didin't allow to deal with it defenitively. Dhs allows an anatomical reduction, and a good fonctionnel outcome for steady fracture, in contrast, nailing offer a great mechanical stability with a operative time more brief et a small incision.Walk recovery is earlier, what presents a mean step in treatment. DHS restricted to steady fracture accoding to its low cost.

Consent
The patient has given their informed consent for the case to be published.

Competing interests
The authors declare no competing interest.

Authors' contributions
All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

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