Short term follow up of intertrochantric femoral neck fractures treated by DHS in adults

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دراسة قصيرة المدى لمرضى كسور عنق الفخذ البالغين المجرات لهم عمليات تثبيت داخلي بواسطة برغي الفخذ الديناميكي وصفيحة التثبيت الجانبية.

دراسة حية أجريت على ١٦٧ مريض مصاب بكسر في عنق الفخذ .تم أستبعاد خمسة منهم كون أثنان منهم لم يكونو يمشون قبل أصابتهم وثلاثة مرضى مصابون بأمراض باطنية استدعت علاجهم في أقسام أخرى.
جميع المرضى الباقين (١٦٢) تم تثبيت كسورهم بواسطة برغي الفخذ الديناميكي وصفيحة التثبيت الجانبية. كان معدل أعمارهم هو ٥٨ سنة ٢٤ منهم بكسور قليلة التهشم و ١٨بتهشم متوسط و٢٠ منهم كانوا بتهشم جديد.
وكان (٦٨%) ٤٢ مريض يعاني من هشاشة العظام قبل الكسر.
وكانت المتابعة كل ستة اسابيع لفترة تراوحت من ستة الى عشرة شهور، نتجت منها حصول التحام جيد في جميع المرضى لكن مع حصول انكباس بسيط في محل الكسر بنسبة (٦١%) ٣٨ مريض. وأنكباس متوسط في١٦%٢٦ مريض. انكباس شديد في (١٣%) ٨ مرضى و في ثلاثة منهم (٥%) أعتبرت عملية فاشلة أستدعت أخراج التثبيت الداخلي وأجراء عملية تبديل مفصل جزئي. لم تحصل خلال الدراسة أي حالات خمج بكتيري ولا خثرة وريدية عميقة.
تعتبر نسبة النجاح في هذه العملية عالية جدا بمثل هكذا نوع من الكسور ، ويمكن تحسين نتائج العملية بأختيار الحجم المناسب للبرغي والأرجاع الجيد للكسر قبل التثبيت والألمام بالخبرة المناسبة للتعامل مع هكذا كسور. لذلك ننصح بأستعمال برغي الفخذ الديناميكي وصفيحة التثبيت الجانبية لمثل هذه الكسور.

Introduction

Intertrochanteric fracture, one of the most common osteoporotic fractures in the elderly (6,19), occurs in approximately 185.2/100,000 of the northern Thai population **(38)**.
Surgical repair is now considered as the standard care .The exception to this rule is when the patient's medical co morbidity precludes surgery-
Ideally, surgery is recommended within 2days after the injury**(4,48,50)**.

The aim is to provide a stable construct, which allows early mobilization and some weight bearing to minimize the sequelae of long term recumbence .It may also restore the patient's previous level of independence and function.(32,35

The dynamic hip screw (DHS),is an ideal implant for the operative treatment of stable pertrochanteric femur fractures (AOclassification31-A.1 **(25)**
The dynamic hip screw(DHS),initially introduced by Clawson in1964,remains the implant of choice because of its favorable results and low rate of nonunion or hard ware failure **.(11,16,39)**

McLoughlin et al. found no difference in the biomechanical stability of two and four-hole DHS and supported the clinical use of the two-hole side-plate for intertrochanteric fractures **(36).**

Bolhofner et al. reported no failure in the two-hole side-plate DHS fixation in 69 patients **(8)**

The superiority of sliding hip screw devices over fixed devices for the fixation of trochanteric fractures of the femur has been clearly established**(l,2,24).** However , failure of the fixation to hold the fracture until union of the order of (10%) are still reported, and this may rise to 16 % for unstable fractures **(13,24,33,34)**

Materials and methods

Sixty seven intertrochanteric fractures Were stabilized with a135 angled DHS and tow to six –hole side Plate between February 2006 and February 2011. -

53 patients were operated on in Rahba hospital in Abu Dhabi –UAE , while 14 patients operated on in Hilla Teaching Hospital In Babylon –Iraq..

Tow patients were not walking preoperatively were excluded. And three were having a co existing medical problems for that had transferred to other facilities and lost from follow up .

Only 62 Patients were available for regular 6 week follow up visits until the fracture was shown to be healed .A fracture was considered healed by the presence of Painless walking and absence of fracture tenderness.-

There were 30 male and 37 female patients. The Mean age was 58 years.

.The surgery was Performed by the standard technique of DHS insertion.

Perioperative antibiotic was routinely administered. a prophylaxis for deep vein thrombosis was prescribed pre operatively & until patients started mobilization.

All patients were encouraged to walk as soon as possible after removal of the drain, usually on the second day after the operation. The patients were assessed at 6 week intervals for both clinical and radiological union of the fracture.

Results:

The mean time to union was 16 weeks(8-26), Collapse at the fracture site was minimal in 38 cases (61%),moderate in 16 cases (26%), and severe in 8 (13%) where there was significant limping due limb shortening which was ranged from 3-5cm ,the head of the screws were about to penetrate the articular surface , so the implant removed earlier (6-8 months) at that time union was already established and patients were ambulatory pain free .And 3 cases(5%) considered failed due to significant collapse of the femoral neck , in one case the base of the dynamic screw was migrated from the entry hole , while in the other two there was failure of the side plate , three out of four cortical screws were so loose to result in varus deformity after plate becomes unstable , in those three cases the option was to change to bipolar partial arthroplasty as the acetabulaum was undamaged yet and the patients were below 55 years of age. Bone cement used with one case only. All other fractures healed uneventfully .

There was no deep infection or deep vein thromboses in all our patients during the period of follow up .

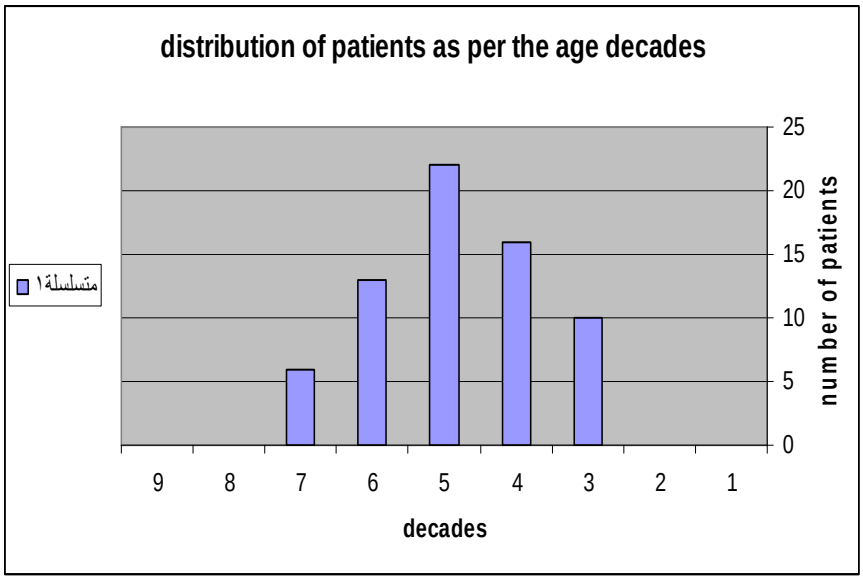


Diagram (1) age distribution of the patients

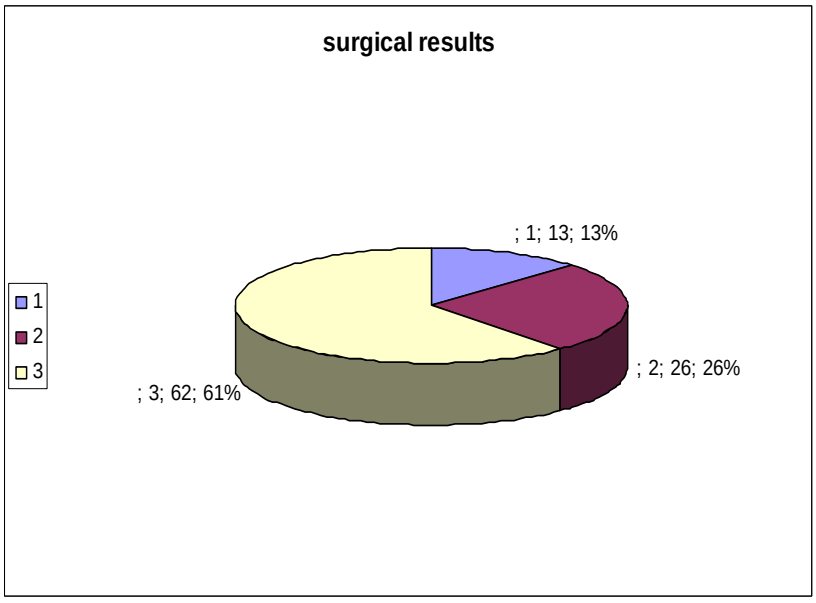


Diagram (2):The post operative bone collapse were :
Minimal in 62 % (38 pat.), Moderate in 26 % (16 pat.), Severe 13 % (8 pat)

Discussion

Successful treatment of intertrochanteric fractures depends on many factors :the age of the patient ,the patient's general health, the time from fracture to treatment, concurrent medical treatment, the adequacy of treatment and stability of fixation-
(1,41,45)

Koval etal. show that patients under 85 years old, independent in their activities of daily living prior to fracture, walking independently at discharge and with three or less medical co morbidities, are more likely to regain their pre fracture independent living status.(31)

Although good results of surgical treatments by various internal fixation devices have been reported, the DHS remains the implant of choice for most surgeons. **7,8,18,22,23**

The Mean age of incidence of intertrochantric fracture in our patients was 58 years diagram (1), a little bit younger than recorded in other series(1,42,43,45). which might be due to social reason ,as most of our patients affected are working people came as an expatriates in UAE.

The DHS allows impaction at the fracture site, Shorter operating time, no need for osteotomy, good bone healing and low rate of complication. In the earliest clinical report of the DHS, a two-hole side plate was used, and it is not clear why the four-hole Side plate became the standard of fixation. **2,8**

Clinical studies for the two-hole side-plate were published in1999 by Bolhofneretal **(8**) .And in 2004 by Di Paolaetal(15). They demonstrated good Clinical outcomes, shorter operating time, less Blood loss and fewer blood transfusion without Failure of the fixation.

In our study, the fracture Healing time, rate of complication and degree of Collapse were comparable with the literature as Shown in Tables 2 and 3 and diagram (2)..

8,11,15,20,39

More than 86% Of moderate and severe collapse were associated With established osteoporosis and an unstable Fracture pattern,complication rates have been reported in up to 44% of cases **5, 37,49 .** In our study 42(68%) of our patients were osteoporotic.

The common causes of fixation failure are instability of the fracture, osteoporosis, lack Of anatomic reduction failure of the fixation device , And incorrect placement of the lag screw in the femoral head **14,15,21 .** Steinberg et al. found an increasing rate of failure in cases with excessive lag screw sliding of more than15mm .(**43)**-

Wolfgang et al Reported pull-out of the three-and four-hole side Plate DHS in two un united intertrochanteric fractures.

The lag screw failed to telescope, and the barrel of the side-plate impinged on the base of the proximal fragment. This might result in increasing cortical screw tension thus causing breakage of all the screws holding the plate **21,49.**

In our two cases of side-plate failure, the fracture was poorly reduced and resulted in delayed bone healing. With premature weight bearing, the tension force on the cortical screws was increased and failure of the fixation finally occurred-

In our study there were five cases of lag screw about to cut-out from The femoral head. Poor bone quality, improper Screw location and an unstable fracture pattern Might compromise the stability and lead to complications. (26,27).

Kim et al. reported a failure rate of more than 50% in osteoporotic, unstable fractures and recommended primary bipolar hemiarthroplasty for this group of patients (**12,29,40,42**).

On the contrary ,Kaufer Stated that bone quality ,fracture pattern , fracture reduction were important factors regarding failure, but the implant selection and implant placement were of relatively greater importance than the others (28).

Table 2 Comparison of healing time and complications

	Bolhofner	Clawson	DiPaola	Rao	This study
Healing time (weeks	**15 (8-17)**	**---------**	**13(7-24)**	**18(16-20)**	**16 (6-12)**
Mechanical or technical failure (%)	**4.29**	**18.46**	**NONE**	**4.03**	**5 % (3 cases)**
Pneumonia, DVT or infection (%)	**8.57**	**29.89**	**NONE**	**10.48**	**NONE**

(Table 3)Relation between degree of collapse and type of fracture

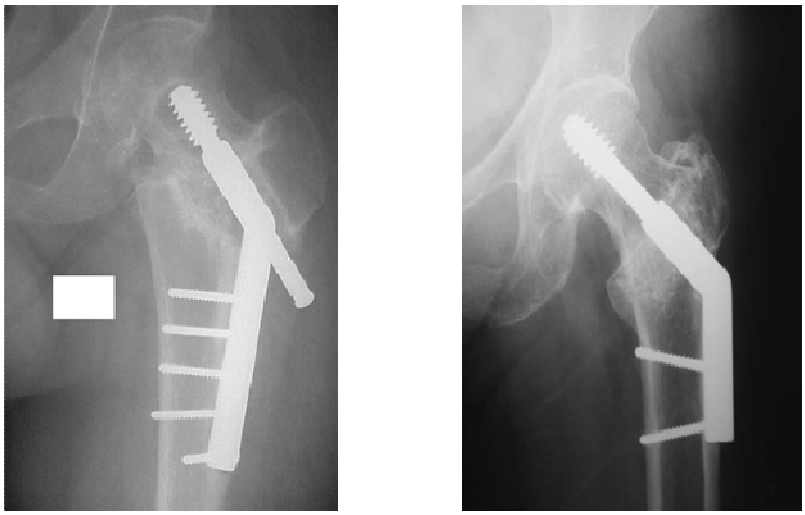
AO Classification type	Number	Minimal collapse	Moderate collapse	Severe collapse
3A.1-1	**20**	**20**	**0**	**0**
3A.1-2	**12**	**11**	**1**	**0**
3A.2-1	**10**	**7**	**2**	**1**
3A.2-2	**7**	**0**	**5**	**2**
3A.2-3	**13**	**0**	**8**	**5**
	62	**38**	**16**	**8***

*** 3 cases failed**

Among our patients, there were no cases of deep vein thrombosis. The incidence of post-operative deep vein thrombosis in Asia was reported much lower than the western population (**9,44**).
Atichartakarn Et al. and Chumnijarakij stated that routine prophylaxis of deep vein thrombosis in Thai patients Was unnecessary due to less than 4% incidence after Pelvis and lower extremity surgery (**3,10,17)**.

Fixation with four hole side plate(3 holes used) (Moderate collapse)

Fixation with tow hole side plate (no collapse)



Screw migration & neck collap

sample of good result

Conclusion

ADHS is commonly used in the Treatment of intertrochanteric hip fractures. The Major complication involves cut-out of the lag screw From the femoral head. Side-plate failure is uncom Mon and rarely reported . bone quality ,fracture pattern , fracture reduction, are important factors in determining the result of treatment , but the good surgical technique and proper choosing of the implant regarding the size and proper placing of the lag screw , with good reduction of the fracture can minimize the complication . From our study Fracture collapse was associated with an osteoporotic - unstable fracture pattern, improper fracture Reduction and screw placement.

The DHS is adequate and recommended for fixation of intertrochantric hip fractures .

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