

Management of trochanteric fractures

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Background: Trochanteric fractures unite invariably with conservative treatment. However the high rate of complications associated with this method makes stable reduction and rigid internal fixation the treatment of choice.

Methods: Eighty fresh trochanteric fractures were subjected to internal fixation, 50 with the DHS and 30 with the DCS. Indirect reduction or open reduction with internal fixation using prophylactic antibiotics was done. Patients were followed up clinico-radiologically for 2 years.

Results: Satisfactory fixation was achieved in 93.3% of the DCS group and 92% of the DHS group. Union was seen at 12 weeks and 16 weeks depending on the quality of reduction and fixation. Technical problems and complications were slightly higher in the DHS group.

Conclusion: Although there were no significant difference in the number of good reductions and the time to bony union between the 2 groups, as regards handling and complication, the DCS was found a more versatile implant compared to the DHS.

Key-words: Trochanteric fractures; Internal fixation; DHS; DCS.

Introduction

Trochanteric fractures of the femur are rising in incidence. By definition, intertrochanteric fractures include any fracture from the extra capsular part of the neck of the femur to a point 5cm distal to the lesser trochanter¹. These fractures occur predominantly in people over 60 years old and are 3-4 times more common in women than men². Although these fractures unite invariably with conservative treatment, the high rate of complications associated with this method makes stable reduction and rigid internal fixation the method of choice.

Internal fixation of trochanteric fractures is a life saving measure in the elderly³.

Intrinsic factors such as osteoporosis and comminution are beyond the control of the surgeon, extrinsic factors like choice of the reduction of the fracture, the type of implant used and technique of its application are within his control².

Various classifications of these fractures have been proposed; most of them include a subtrochanteric fracture as one or the other of its types. Implants used for fixation of these fractures include: pin-plate assemblies e.g. S-P nail plate; adjustable angle device e.g. McKee and McLaughlin nail plates; fixed angle devices e.g. Jewel nail plate; sliding compression screw assemblies e.g. DHS, DCS; intramedullary nails e.g. Ender nails, the gamma nail. DHS permits good impaction of fracture site with compression effect in trochanteric fracture of the femur. AO dynamic condylar screw (DCS) are designed for internal fixation of fractures of the distal and of the high subtrochanteric regions. It has been suggested that using a 95° implant may be stronger biomechanically than the 130° implants because it allows additional screw fixation to the proximal fragment. DCS is an appropriate device for reverse oblique intertrochanteric fracture with subtrochanteric extension.

In this study, we have attempted to prospectively analyze the operative results of the DHS and DCS used in the treatment of intertrochanteric fracture of the femur.

Material and Methods

Between 1998 to 2000, 80 patients with trochanteric fractures were treated. Of these, 50 were fixed with the DHS and 30 with the DCS. The patients included 29 males and 51 females ranging in age between 21 years and 84 years (average 52.5 years). Forty eight fractures affected the right side and 32 affected the left. According to Boyd & Griffin classification 3 cases were type I, 53 cases type II, 10 cases type III and 8 cases type IV. Under general or spinal anaesthesia, over a fracture table and under image intensifier control, the fractures were reduced by closed manipulative reduction, failing which open reduction was resorted to. Implants were introduced following standard techniques and instrumentation for all types of fractures.

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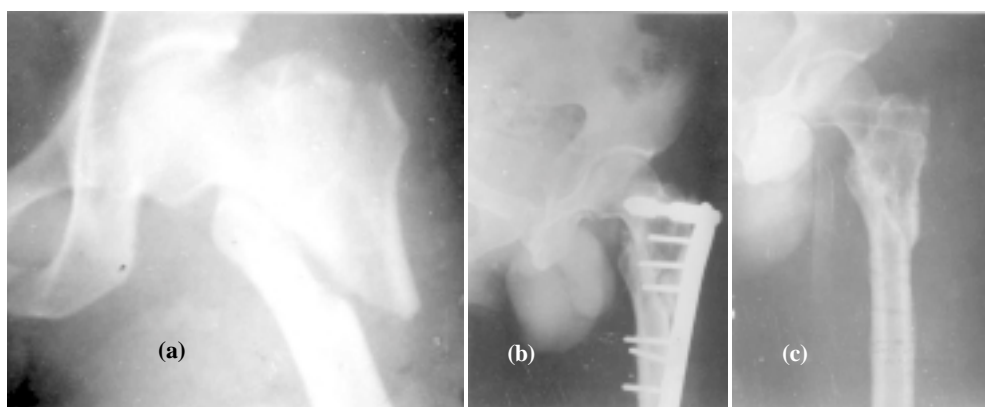
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Fig. 1. (a) Reverse obliquity fracture; (b) fixed with DCS.; (c) united fracture after DCS removal



Third generation cephalosporins were used pre-operatively and continued post-operatively for another 10 days. Patients were encouraged to move their operated limbs from the first post-operative day. Partial weight bearing with axillary crutches was started by the second week. Full weight bearing was allowed only when the x-ray showed bony union.

Results

There was no significant difference in the different types of fracture in both the groups. Post-operative X-rays showed that there was no significant difference in the total number of good reductions between the two groups. A greater number of anatomical reductions were achieved in the stable fractures in both groups.

Satisfactory fixation was achieved in 28 patients (93.3%) in the DCS group (Fig 1) and 46 patients (92%) in the DHS group. Union was achieved at an average of 12 weeks for those fractures where reduction was stable and fixation satisfactory. In unstable fractures with unsatisfactory fixation the average time of bony union was 16 weeks.

Post-operative infection was insignificant in both the groups. There was only one case of superficial infection in the DHS group, which was controlled with antibiotics. Nail penetration was found in one case of the DCS group and nail cutting through the cortex of femoral neck in one case and head in one case of the DHS groups. Five cases in DHS groups and 2 cases in DCS groups had shortening ranging 1 to 3 cm All these cases had unstable fractures and unsatisfactory fixations.

Four cases in DHS groups and 2 cases in DCS group had coxa vara which was immediate post-operative where satisfactory reduction could not be achieved. Two cases in DHS groups and one case in DCS group complained of hip pain. Four cases in DHS groups and 2 cases in DCS group had restriction of terminal range of hip movements (ranging

from 10° to 25°). Four cases in DHS group and 2 cases in DCS group had difficulty in sitting cross legged.

There were no failure of union, deep infection and no requirement for repeat surgery in both the groups. The final results were recorded as excellent, good, fair and poor using criteria modified after Kyle⁴ suitable for Indians. (Table I,II). It was found that excellent results were seen in 92% in DHS group and in 93.3% in DCS group.

Table I. Evaluation of outcome of patients (after Kyle⁴)

Criteria	DHS	DCS	Total	%
Pain	2	1	3	3.7
Limp	3	2	5	6.3
Shortening				
None	46	28	74	92.5
0-1 cm	2	1	3	3.7
1-3 cm	3	1	4	5
> 3 cm	-	-	-	-
Total	5	2	7	8.8
Coxa vara				
None	46	28	74	92.5
0-10°	2	1	3	3.7
10-20°	2	1	3	3.7
20°	-	-	-	-
Total	4	2	6.6	7.5

Table II. Functional restriction.

Function	DHS	DCS	Total	%
Sitting cross legged possible	46	28	74	92.5
Not possible	4	2	6	7.5
Squatting possible	50	30	80	100
Not possible	-	-	-	-
Walking without support	50	30	80	100
With support	-	-	-	-

Discussion

Dynamic hip screw is considered gold standard for management of tochanteric fractures. There is added advantage of controlled collapse of the fracture. For some

years we treated these fractures with the DHS exclusively, seeing many good results. The not so good fixations we encountered were in the form of loss of reduction and cut-through of the screw through the femoral head or neck.

Another undesirable aspect of this implant is that it requires a very long incision for the insertion of the side plate/barrel plate since it had to travel upwards and medially to make contact with the lateral femoral cortex.

We have been fixing trochanteric and subtrochanteric fractures with the AO 95° dynamic condylar screw. This implant does not require an incision longer than its own length since the barrel plate traverses and almost horizontal line on its way to the lateral cortex of the femur. Also, its use combines the ease of insertion of the sliding screw plate with the mechanical effectiveness of the angle blade-plate. Another advantage is that, we could add two more cancellous screws through the fracture improving fixation and effectively controlling rotation.

The ideal of controlled collapsed rests on the principle of the collapsing forces being perpendicular to the fracture line. A device that traverses in alignment with these compressing forces does excellently. The DHS therefore is an ideal implant for type I & II fractures. In reverse obliquity trochanteric fractures, the fracture line does not conform to this ideal. Here the screw of the DHS is almost parallel to the fracture line and perpendicular to the compressing forces. This would in most cases lead to medial migration of the

distal fragment and loss of reduction. We agree that the 95° DCS performs significantly better than did sliding hip screws⁵. Infection, nonunion, implant breakage and loosening are reported complications⁶⁻⁸. We have not seen implant failure or other causes for re-operation.

Reference

1. **Russell TA.** Fracture of the hip and pelvis. *Campbell's operative orthopaedics. Greshaw AH. 8th Edition, St. Louis Missouri, USA: Mosby yearbook Inc.* 1992; 2: 895-987.
2. **Laros GS:** Intertrochanteric fractures. *Surgery of the musculoskeletal system. Everts CM. 1st Edition, New York: Churchill Livingstone.* 1983; 2(5): 123-148.
3. **Ganz R, Thomas RJ & Hammerle CP:** Trochanteric fracture of the femur. Treatment and results. *Clin Orthop.* 1979; 138: 30-40.
4. **Kyle RF, Gustilo RB, Premer RF.** Analysis of six hundred and twenty-two intertrochanteric hip fractures. A retrospective and prospective study. *J Bone Joint Surg (Am).* 1979; 61: 216-21.
5. **Haidukewych GJ, Israel TA, Berry DJ.** Reverse obliquity fractures of the intertrochanteric region of the femur. *J Bone Joint Surg (Am).* 2001; 83-A(5) : 643-50.
6. **Kinast C, Bolhofner BR, Mast JW & Ganz R.** Subtrochanteric fractures of the femur. Results of treatment with the 95° condylar blade-plate. *Clin Orthop.* 1989; 238: 122-130.
7. **Haria RD, Gorasia BD.** Study of operated cases of subtrochanteric fracture. *Ind. J Orthop.* 2000; 34 (3): 156-160.
8. **Nungu KS, Olerud C, Rehnberg L.** Treatment of subtrochanteric fractures with the AO dynamic condylar screw. *Injury.* 1993; 24 (2): 90-92.