

Original Article

Treatment of Inter-trochanteric Fractures in Adults with Dynamic Hip Screws without Radiological Control - an Operational Dilemma

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Objective: The objective was to assess the early (immediate post-operative) and final outcome of fracture union, mal-union, non-union, avascular necrosis, implant failure and infection.

Material & Methods: A prospective study of fifty five patients of intertrochanteric fractures treated with dynamic hip screws (DHS) without radiological control (C-arm and X-rays) was conducted at Orthopaedic Department, Services Hospital Lahore. AO classification of intertrochanteric fractures was used and fractures were classified as A1, A2 and A3 fractures.

Results: There were 20 (40%) A1, 25 (50%) A2 and 5 (10%) A3 fractures. All fractures were reduced and fixed with DHS. 19 patients (38%) had ideally placed implants, 18 patients (36%) had less ideally placed implants and 13 patients (26%) had implants in non-ideal (unsatisfactory) position that required immediate re-do surgery. Overall complication rate was 88% in A2 fractures and 80% in A3 fractures.

Conclusion: DHS osteosynthesis in intertrochanteric fractures without radiological control should be discouraged. It is always better to refer the cases where radiological facilities are available in order to avoid morbidity, increased hospital stay and financial burden on the already financially constrained individuals.

Key Words: Intertrochanteric fracture, Hip surgery, DHS.

Introduction

Fractures around the hip are escalating due to improved survival rate in the osteoporotic elderly patients. Intertrochanteric fractures have been estimated to occur in over 20,000 patients each year in United States.¹ In our population intertrochanteric and intra-capsular fractures contribute more than 80% of all fractures occurring in elderly people. Most of these fractures occur between 60-70 years of age and the frequency of occurrence of these fractures is three times higher in females as compared to the male patients.² Reported mortality with intertrochanteric fractures ranges between 15-20 %; the high mortality is attributed to old age, greater blood loss and prolonged operating time as compared to the intra-capsular fractures.^{2,3} The aim of the fracture fixation is to provide stable fixation and early mobilization of the patients both within and outside the bed to avoid complications related to prolonged incumbency.^{1,3} In our country even at tertiary care centers in government sector, radiological facilities are deficient; either these are not available or devices remain out of order and no back-up facilities are available. The purpose of the study was to determine the final outcome of DHS by open method in terms of placement of screw, union, non-union, infection, avascular necrosis (AVN) and

walking ability of the patient.

Material and Methods

A prospective study of fifty patients with intertrochanteric fractures fixed with DHS without radiological control was carried out at Orthopaedic Department, Services Hospital, Lahore, from January 2005 to October 2005. There were 30 females and 20 male patients; age ranged from 62-80 years (average age 65 years).

Intertrochanteric fractures were classified according to AO classification:

- ♣ A1 fractures along the trochanteric line
- ♣ A2 fractures: multi-fragmentary peritrochanteric fractures
- ♣ A3 fractures: simple transverse intertrochanteric fractures

In this study 20 (40%) were A1, and 25 (50%) were A2 and 05 (10%) were A3 fractures. Patients with comorbidities such as diabetes, ischemic heart disease, renal failure and advanced Chronic Obstructive Pulmonary Disease (COPD), or unfit for general/epidural anesthesia were excluded from the study. Patients were operated under general or epidural anesthesia in supine position with sand bag under the operated limb. Per-operative antibiotic Cefuroxime 1.5 gm at the time of induction followed

by 750 mg 8 hourly for 3 days was intravenously administered. Watson and Jones approach 2 was used with extension of incision proximally towards anterior superior iliac spine. Femur neck was exposed superiorly and inferiorly after incising the capsule in "T" shaped fashion. Hoffmann's retractors were placed on superior and inferior aspects of the whole of the neck to provide a better exposure to the anterior aspect of the neck. The fracture was reduced with the help of the traction applied by a third assistant. Guide wire was inserted 3 cm inferior to the flare of the greater trochanter into the postero-inferior part of the neck of femur through eyeballing and remaining procedure of DHS insertion was completed in steps. Suction drain was placed and wound was closed in layers. The surgical procedure lasted 70 minutes on an average in stable fractures (A1) and 90 minutes in unstable (A2 and A3) fractures. Patients were evaluated regarding

placement of DHS, early and late complications like infections, cutout of DHS, loss of reduction, varus deformity, avascular necrosis and non-union. Placement of DHS is divided into three types:

- ▶ Type A: sliding screw in sub-articular bone within 5mm from the joint line and in the postero-medial part of the head
- ▶ Type B: screw placement between 5mm to 15mm from the joint
- ▶ Type C: screws either cutout, superiorly placed with various angulations or penetration into the joint with or without varus angulation

Results

Fifty patients were followed until the fractures united or a revision (redo) surgery was performed. The patients were divided into three groups depending upon the placement of screws, details of which are given in (Table 1 and Fig1, 2, 3).

Table-1: Comparison of placement of screws

| Fracture Type (Patients) | Ideal | Less Ideal | Non Ideal |
|--------------------------|----------|------------|-----------|
| A1 (20) | 09 | 06 | 05 |
| A2 (25) | 08 | 10 | 07 |
| A3 (05) | 02 | 02 | 01 |
| Total Patients % | 19 (38%) | 18 (36%) | 13 (26%) |

Among the non-ideals, five patients had screws penetrating into the joint, seven patients had screw placement towards the upper pole of the neck, not maintaining the neck-shaft angle and one had a cut-out implant superiorly.

The complications observed in the patients are mentioned in Table 2.

Overall complication rate in A1 fractures was 25%; A2 fractures had highest 88% complication rate and A3 fractures had 80% complication rate. The reason for high complication rate in A2 and A3 was inherent instability of the fracture, increased operating time and prolonged exposure of the wound, osteoporosis and unstable fixation.

Table-2: Complications in treatment of intertrochanteric fractures in adults with DHS without radiological control

| Complications | A1 Fractures (20 patients) | A2 Fractures (25 patients) | A3 Fractures (05 patients) |
|--------------------|----------------------------|----------------------------|----------------------------|
| Infections | 05 | 07 | 01 |
| Avascular necrosis | Nil | 02 | Nil |
| Non - Union | Nil | 04 | Nil |
| Varus deformity | Nil | 03 | 02 |
| Cut out of DHS | Nil | 06 | 01 |
| Total Patients % | 05 (25%) | 22 (88%) | 04 (80%) |

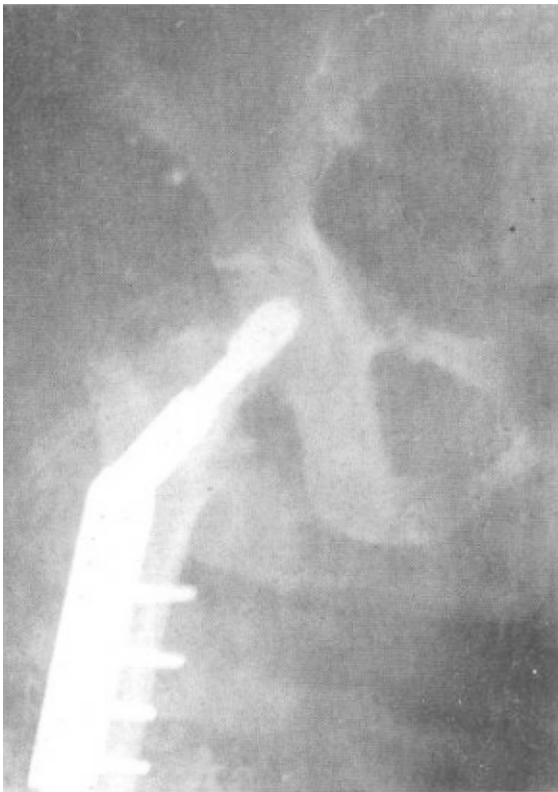


Figure-1: Type A

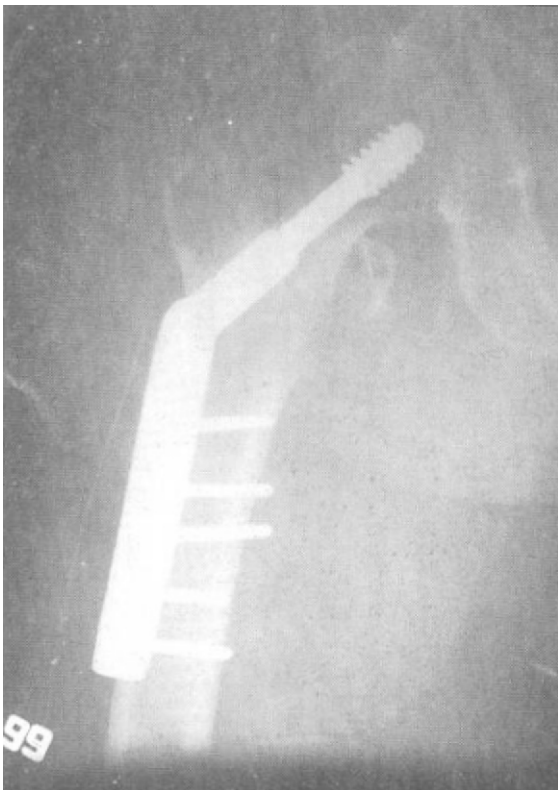


Figure -2: Type B



Figure -3: Type C

Mean hospital stay of patients was 10 days when no complication was observed; however, in patients undergoing redo surgery due to early complications e.g. non-ideal placement of the screw and infection, it was 30 ± 05 days.

After six months of follow up, 92% (46 patients) had a complete union and were able to walk with the help of walking aid.

Discussion

Higher rate of implant cutout, varus angulation and loss of reduction was noted in unstable inter-trochanteric fractures (type A2 and A3). Increased infection rate was due to long operating time and excessive soft tissue dissection required for the proper exposure of the fracture and less ideal operating condition.^{3,4}

Results were worse with poor per-operative fracture reduction as one had to rely on eye balling.

Results also showed that pre-operative fracture classification is a strong and significant determinant of post-operative stability.^{4,5,6,7,8}

In our cases with stable inter-trochanteric fractures (A1), the position of screws was ideal in 19 (38%) of patients and 18 (36%) of the patients had less ideal placement of screw. Most of these patients developed union of fractures. Weight bearing was

delayed in patients with less ideal placement of screw as compared to those patients having ideal placement of screws.

Diamon Hughsten osteotomy was done in 03 patients with A2 fractures. Diamon Hughsten osteotomy and restoration medial cortex buttressing had definite advantages to provide the inherent stability as contrary to the studies done by Steinberg et al.⁵

Pitfalls occurred when DHS insertion was incorrect and fracture was not properly reduced. Problems related to fracture reduction were due to posterior sag, varus angulation and postero-medial communication.

05 patients of type A1 fractures developed superficial infections which were cured by change of antibiotic according to culture of swab taken from the wound discharge. 05 patients of type A2 fractures developed superficial infection and 02 patients developed deep infections which were again treated by antibiotics and daily dressings. One patient of type A3 fracture developed deep infection along with non-ideal placement of the screw that was treated with removal of implants, open drainage

and antibiotics according to C/S and skin traction for six weeks. This patient had a fibrous union of the fracture site and it was painful on weight bearing. This was managed with ischial weight bearing brace and analgesics.

Potential pitfalls during DHS insertion included superior guide wire placement, guide wire breakage, loss of reduction during lag screw insertion, improper screw barrel relationship and inadequacy in determining the exact length of DHS screw. All these problems were faced due to lack of orthopedic table and C-arm facilities.

Conclusion

It is recommended that radiological control (C-arm and X-rays) is essential for the insertion of DHS in intertrochanteric fractures. DHS insertion without proper radiological facilities increases the risk of complications and hospital stay of the patients three to four folds.

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