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RESEARCH ARTICLE

REVERSE SCREW TECHNIQUE FOR GUIDEWIRE PLACEMENT IN DHS SURGERY

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ABSTRACT

Introduction: DHS is a commonly used fixation procedure in stable inter-trochantric fractures. The proper placement of lag screw is important in reducing the incidence of implant failure which depends upon the fluoroscopically assisted placement of guide pin in centre –centre position. This guide pin often gets erroneously removed during reaming or tapping procedures mostly in osteoporotic patients. We studied the incidence of inadvertent guide pin removal in DHS procedure and its association with osteoporosis, With an overview of repositioning of this guide pin using reverse screw technique. **Methods:** We conducted a prospective study on 100 patients with stable inter-trochantric fractures. We graded the osteoporosis according to Singh index grading system. The incidence of inadvertent removal of guide pin during reaming or tapping procedure and its association with osteoporosis was studied. **Results:** 100 patients with stable trochantric fractures underwent DHS procedure. Guide pin got removed in 70 patients out of which Singh index 3 or less than 3 was present in 58 patients. **Conclusion:** On the basis of the study, We found that the erroneous withdrawal of guide pin during reaming or tapping occurs more often in patient with poor bone stock that is Singh Index 3 or less than 3. The primary placement of guide pin should be up to subchondral bone and reaming or tapping should be done gently and carefully and reaming should not be done beyond the guide pin. The reverse screw technique for guide pin placement is an effective method in inadvertently removed guide pin.

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INTRODUCTION

DHS is a commonly used procedure in stable peritrochantric fractures. Internal fixation is the mainstay of the treatment for peritrochantric femoral fracture with screw-side plate device (Haidukewych, 2009; Hornby, 1989) Compression or dynamic screw is a good option for the treatment of stable peritrochanteric fractures. The placement of hip screw device is familiar to most experienced orthopedics surgeons (Crenshaw,; Rockwood, 2006; Aros, 2008) Proper placement of lag screw is a key in reducing the incidence of implant failure. This lag screw placement depends upon fluoroscopically assisted insertion of guide pin through angle guide in centre-centre position. This guide pin often inadventerly gets removed while reaming and/or tapping, particularly in osteoporotic patients. The repositioning of this erroneously removed guide pin in the centre of reamed portion is required (Crenshaw).

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We reported 100 cases over period of two years out of which guide pin got erroneously removed in 70 patients during reaming or tapping or both and was repositioned exactly in same position by reverse screw technique that is inserting the guide pin through DHS lag screw reversely placed. Inter-trochantric fractures mostly occur in elderly patients in whom bone stock is poor. The placement of guide pin and DHS screw in osteoporotic bone in old patient has less purchase as compared to young patients. We studied the incidence of erroneous with drawl of guide pin and its relationship to bone quality and overviewed the repositioning of the guide pin by reverse screw technique.

MATERIALS AND METHODS

A prospective study was conducted in GMCH, Jammu over a period of 2 years from Jan. 2018 to Jan. 2020. 100 patients with stable inter-trochantric femoral fractures who underwent treatment with dynamic hip screw were included in the study. The patients were in the age group of 43 to 97 years (average 65.4). There were 64 females and 36 males. 69 patients had fracture in right hip while 31 having fractured left hip. The

mode of in jury was trivial trauma like simple fall; slip etc in most of cases.

The injury surgery interval ranges from 48 hours to 2 weeks. The patient was put on skin traction. The per-trochantric fractures were then classified according to Evans classification. The radiograph of contralateral hip was used to determine the grade of Osteoporosis according to Singh Index (Singh, 1970) The patients underwent routine investigations; co-morbidities were settled, evaluated by anesthetist and prepared for surgery. An informed written consent was taken for the surgery. The patient was operated under epidural/spinal anesthesia.

Surgical Technique: The patient was placed under radiolucent fracture table with perineal post in scissor position. The fracture reduction was achieved with limb in extension, traction, and internal rotation under C-arm guidance. The limb was prepared and draped under all aseptic precautions. Tip of greater trochanter and proximal femoral shaft identified and 5 cm incision made on lateral side 2 cm below the tip of greater trochanter and along the femoral shaft. Skin and subcutaneous tissue incised. The fascia lata splitted along the line of incision. The fascia of vastus lateralis along with muscle identified and the muscle was elevated anteriorly off the lateral intermuscular septum while coagulating the branches of profunda femoris arteries. The vastus lateralis muscle incised by L-shaped incision at the origin and reflected medially. Fracture reduction achieved under C-arm guidance. An entry portal for guide wire insertion made 2 cm below the vastus lateralis ridge or at the level of lesser trochanter.

A 2.5 mm guide pin was then directed into femoral neck and head using angle guide and the position checked under fluoroscopic guidance in both AP and lateral views. The accepted position was centre-centre in both views and guide pin advanced to approx. 5mm from articular surface and measurements taken. The triple reamer set 5mm less than the above measurement was used over the guide pin for reaming the proximal femur and subsequently tapping was done in patients with good bone quality. We experienced that during reaming or tapping, the guide pin inadvertently got removed particularly in osteoporotic patients. The repositioning of guide pin in the centre of reamed cavity often required multiple C-arm exposures. To overcome this situation, we, in our study, repositioned the erroneously removed guide pin exactly in the centre-center position by reverse screw technique. Step 1: Insert DHS lag screw in the reamed hole in reverse direction that is threaded portion facing surgeon and smooth shaft towards femoral head. Step 2: Inset the guide pin through reversely placed DHS lag screw and slightly hammer the guide pin, DHS screw is then removed Step 3: Confirmed the guide pin position under fluoroscopy guidance in both AP and lateral views. Appropriate size lag screw was inserted followed by insertion of DHS barrel plate which was then fixed to bone with 4.5 cortical screws. A closed suction drain was applied and wound closed in layers (Crenshaw)

RESULTS

100 patients with stable inter-trochantric fracture who underwent DHS procedure in our study, guide pin got erronuseoly removed in 70 patients. Out of these 42 were females and 28 were males with an average age of 65.4 years. The Osteoporosis grade according to Singh index was 3 or less than 3 in 58 patients and greater than 3 in 12 patients. There were 30 patients in which guide pin was not removed, 28 were having Singh index more than 3 and 2 patients having Singh index 3 or less than 3. The repositioning of guide pin exactly in the same position using reverse screw technique was successful in all the patients. The number of fluoroscopy exposures decreased from average of 7 to 2. The operative time was also lessened.

DISCUSSION

John Buchwald in 1923 said that we all come into this world under the brim of pelvis but quite a few of us will leave through the neck of femur. This statement nearly 90 years later is an exaggeration but nevertheless, true as all proximal femoral fracture accounts for 30 percent of hospital admissions with mortality of 15-20 percent worldwide. The fractures of trochantric region are most common in elderly, osteoporotic patients. It usually occurs after 50 years and the incidence double after every 10 years. It is 2 to 3 times more common in females than males. Risk factors include osteoporosis, physical inactivity, low body weight, visual impairment, smoking, excessive alcohol intake and dementia (Endo, 2005). The trochantric fractures are sustained by elderly from trivial strain such as slipping in stairs or stumbling in toilet. Cumming and Nevitt reported four factors that should be present for hip fractures a) Fall should be oriented so that person lands on or near hip. b) Protective reflexes must be inadequate. c) Local shock absorbent (muscle and fat around hip) must be inadequate. d) Bone strength at hip must be insufficient.

The fractures are classified by Evan into stable and unstable fractures and mostly common used in decision making in type of implant used in these fractures. Singh grading index system is most commonly used to grade osteoporosis based on trabecular system in proximal femur. Higher the grade, higher is the bone quality. Grade 3 indicates definite osteoporosis when there is a break in the continuity of primary tensile trabeculae opposite greater trochanter. Below grade 3 there is increasing severity of osteoporosis. Aitken reported that inter-trochantric fractures are more common in severely osteoporotic women and the degree of osteoporosis influence fracture type. Pogrund et al suggested that osteoporotic female patients as result of fall, most likely sustained inter-trochantric fracture. Koval et al had done a retrospective study on 680 elderly patients.

They concluded that patient sustaining trochantric fracture were signifantly older, more likely to limited to home ambulation and more dependent in basic and instrumental activities of daily life. The treatment of trochantric fractures includes non-operative in patients who are non-ambulatory and elderly patients having highest risk of mortality. Internal fixation is appropriate in trochantric fractures and is based on the stability of fracture pattern. Dynamic hip screws are a good option in stable fractures, implant cost being less and technique of screw placement is familiar to most experienced orthopaedic surgeons. Unstable fractures are best treated by intra-medullary implants with theoretical advantage of improved biomechanics, small incision, decreased blood loss and short femoral neck shortening. The osteoporosis is major risk factor for variety of fractures occurring in elderly patients. Due to limited bone stock, there is high chance of implant failure in these patients. The trochantric fractures are probably most common in osteoporotic patients. The technique of internal fixation by dynamic hip screw is based on the principle of

static and dynamic compression. The success of the implant depends upon correct placement of lag screw in the centre-centre position of the femoral head. This placement of lag screw in turn depends upon the guide pin which should be in centre-centre position in both views. More often than not, the guide pin gets inadvertently removed while reaming or tapping in osteoporotic patients (Haentjens, 2005; Lorich, 2004; Moroni, 2005) We studied 100 patients with stable trochantric fractures who were to be operated with DHS. There were 60 patients whose Singh Index grading was 3 o less than 3 while 40 patients were having Singh Index greater than 3. The guide pin got erroneously removed in 70 patients out of these 58 patients were having Singh index3 or less than 3 while 12 patients having Singh index greater than 3. The proper replacement of guide pin is a must to proper placement of lag screw. Reverse screw technique is good alternative to multiple fluoroscopic exposures to ensure central placement of guide pin in old, osteoporotic patients with patients having inadvertent guide pin removal.

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