TITLE

"MANAGEMENT OF INTERTROCHANTERIC FRACTURES WITH DYNAMIC HIP SCREW"

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CERTIFICATE

I Certify that this Dissertation is the result of six months of study and follow up of my cases during my hony. practice and selfless help by senior orthopedic surgeons at orthopedic center at Ranchi, and prepared in fulfillment to the standards and guidelines set by the University of Seychillis ,American Institute of Medicine (USAIM).and Boolean education for the Mch certification programme in Orhopedic surgery.

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INTRODUCTION

anatomy

The femur or thigh bone is the longest and strongest bone in the body. The upper end of the femur comprises a head, a neck, a greater and a lesser trochanter.

The head of the femur is rather more than half a sphere; it is directed upwards, medially and slightly forwards, to articulate with the acetabulum.

The neck of the femur, which is about 5cms long, connects the head and the shaft, with which it forms an angle of about 125^0

The anterior surface of the neck is flattened and its junction with the shaft is marked by a prominent rough ridge, termed the intertrochanteric line

The posterior surface is convex is convex backwards and upwards in its transverse axis, and concave in its long axis, and its junction with the shaft is marked by a rounded ridge, termed the intertrochanteric crest.

The greater trochanter is a large, quadrangular projection at the upper part of the junction of the neck with the shaft.

Its posterosuperior portion projects upwards and medially so as to overhang the adjoining part of the Posterior surface of the neck;in this situation its medial surface presents a rougned dep[ressed area , the trochanteric fossa.

The gluteus minimus inserted into the rough impression on its anterior surface

The lessor trochanter is a conical eminence , which projects medially and backwards from the shaft at its junction with the lower and the posterior portion of the neck.

The lesser trochanter ,has attached to it psoas major on its summit and on the medial part of its anterior surface.

The intertrochanteric line marks the junction of the anterior surface of the neck with the shaft of the femur.

The intertrochanteric line marks the lateral limit of the capsular ligament of the hip joint.

The highest fibres of the vastus lateralis arise from the upper end of the line , and the highest fibres Of the vastus medialis from its lower end.

The intertrochanteric crest, above the quadrate tubercle , is covered by the gluteus maximus , below the tubercle it is separated from that muscle by the quadratus femoris.

The tubercle itself, and a portion of the bone below, receive the insertion of the quadraus.

The intertrochanteric region of the hip , consisting of the area between the greater and lesser trochanter , represents a zone of the transition from the femoral neck to the femoral shaft.

This area is charecterised primarily by dense trabecular bone that serves to transmit and distribute stress, similar to the cancellous bone of the femoral neck.

The greater &lesser trochanter are the sites of insertion of the major muscles of the gluteal region; the gluteus medius and minimus , the iliopsoas and short external rotators.

The abductors of the gluteal region ,the glutes medius and gluteus minimus , which originate from the outer table of the ileum and insert onto the greater trochanter.

The gluteus medius and gluteus minimus along with tensor fascia lata , are also internal rotators of the hip.

The hip flexors are located in the anterior aspect of the thigh, and include the Sartorius ,pectineus ,iliopsoas , and rectus femoris .

The iliopsoas inserts into the lesser trochanter.

The gracilis and the adductor muscles (longus,brevis , and magnus) are located in the medial aspect of the thigh.

The short external rotators , the piriformis., obturator internus, obturator externus, superior and inferior gamelli, and quadratus femoris, all insert on the posterior aspect of the greater trochanter.

The gluteus maximus serves as an extensor and external rotator of the hip.

The semitendinosus , semimembranous , and biceps femoris which originate from the ischium to from the hamstring muscles of the thigh, are responsible for knee flexion as well as hip extension.

The femur requires a large amount of force to fracture and once a fracture occurs the protective musculature surrounding the bone is usually the cause of displacement .

Hip fractuire are classified as intracapsular or extracapsular depending on the site of fracture in relation to the insertion of the capsule of the hip joint,onto the proximal femur

.Intertrochanteric fractures are by definition , extracapsular.

As with femoral neck fractures , they are common in elderly,osteoporotic people

Most of the patients are women in the eighth decade .Commonly fractures occur between 60-76 years of age

Intertrochanteric fractures have been estimated to occur in iver 20000 patients each year in the US.

Trochanteric fractures constitute about 8-10% of all fractures.

High mortality in these fractures are attributed to old age of the patients,greater blood loss , and prolonged blood loss , and prolonged operative treatment as compared to

Intracapsular fractures.

Some of the factors associated with a patient sustaining an intertrochanteric rather

than a fracture neck fracture include advancing age , increased number of co morbities , increased dependency in activities of daily living ,and a history of other osteoporosis related fractures.Overall , one year mortality after hip fracture is high at around 30% , though only one third of that is directly attributable to the fracture.

Despite significant improvement in both surgery and rehabilitation in recent decades , hip fracture remains for patients and attendents , a much feared injury.

Hip fractures , as a common and costly injury with a complex journey of care and outcomes , is thus an important but challenging topic for a clinical guidelines.

Comminuted complex fractures of the trochanteric region of the femur pose a difficult situation to the surgeons in the management.

Mechanism of injury- The fracture is caused either by a fall directly onto the greater trochanter or by an indirect twisting injury .

The crack run up between the lesser and greater trochanter .

Fracture distal to the base of the neck of femur are known as extra capsular fractures of proximal femur and are subdivided into the groups , trochanteric fractures down to the level of lesser trochanteric from the lesser trochanter to 2-3 inches below.

Intertrochanteric fractures are divided into stable and unstable varieties .

Unstable fractures are those where there is poor contact between the fracture fragments , as in 4-part intertrochanteric type,or where the fracture pattern is such that weight bearing forces tend to displace the fracture further , as in reverse oblique types .

Instability may also arise if the posteromedial cortex is shattered , displacing a large fragment that includes the lesser trochanter; these are particularly difficult to hold with internal fixation.

Bone quality also influences post fixation stability and hence the risk of implant failure.

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Classification of fractures in trochanteric region (based on evans classifications)

In 1949,Evans made an important contribution in understanding intertrochanteric hipfractures with his classification system based on the stability of the fracture pattern and potential to convert an unstable fracture pattern to a stable reduction

The most often used classification system for intertrochanteric fracture is based on

The stability of the fracture pattern and

- The ease in achieving a stable reduction

The Evans classification accurately differentiate stable fractures (standard oblique fracture pattern) from unstable fractures (reverse oblique fracture pattern)

Type1 fracture ;line running from superolateral to inferomedial directions

In stable fracture patternthe posteromedial cortex remains intact or has minimal comminution ,making it possible to obtain a stable reduction

TypeII – fracture line running from superomedial to inferolateral direction direction – always unstable.

KYLE   classification

Type 1 (stable)

Two part fracture that is undisplaced.

Type2 (stable)

Fractures that are displaced into varus with a smaller lesser trochanteric fragments, but with an essentially intact posteromedial cortex.

Type 3 (unstable)

4 part fractures that are displaced into varus with postero-medial cortical comminution and a greater trochanteric fragment.

Type -4 (unstable)

Type 3 fracture with subtrochanteric extension

AO CLASSIFICATION

In the orthopedic Trauma association (ota) alpha numeric fracture classification, intertrohanteric hip[fracture comprise Type 31 A.

These fractures are divided into three groups , and each group is further divided into subgroups based on obliquity of the fractute line and degree of comminution.

AO group has classified the trochanteric fractures into stable and unstable types

TYPE A1:

Pertrochanteric simple (the typical oblique fracture line extending from the greater trochanter to the medial cortex ; the lateral cortex of the greater trochanter remains intact-two fragments

A 1.1 ; along the intertrochanteric line

A 1.2: though the greater trochanter

A 1.3: below the lesser trochanter

TYPE A2;

Pertrochanteric multifragmentary (the typical oblique fracture line extending from the greater trochanter to the medial cortex: the lateral cortex of the greater trochanter remains intact- separate postero-medial fragment).

Fractures in this group are generally unstable, depending on the size of the medial fragment

A2.1:with one intermediate fragment

A2.2; with several intermediate fragments

A2.3; extending more than 1 cm below the lesser trochanter.

TYPE A3:

Intertrochanteric fracture line extends across both the medial and lateral cortices; this group includes the reverse obliquity pattern

A3.1: simple oblique (reverse obliquity pattern)

A3.2: simple transverse

A3.3 ; multifragmentary

Clinically the diagnosis is made , as in case of Intracapsular fracture , by combionation of external rotation and shortning of the leg , tenderness over the fracture , and the patients inability to raise the leg from the examination couch.

In trochanteric fracture the leg tends to be more externally rotated than in fractures through the neck

There may be tenderness to palpation in area of greater trochanter .

Ecchymosis may be present. Range of motion testing of the hip is usually painful and should be avoided.

Intertrochanteric fracture in younger patients are usually the result of a high energy injury,such as motorvehicle accident ,or fall from height.

Hwang et al reported a series of 66 intertrochanteric fractures in adults younger than 40 yrs of age.

The mechanism was a simple fall in 11, MVA in 36, and fall from height in 19 patients.32 patients had associated injuries;the most common was head injury (8) , pelvic fracture (9) and femoral shaft fracture (10)

Standard X ray examination of the hip includes an AP view of the pelvis and an AP and crosstable lateral view of the involved proximal femur.

An internal rotation view of the injured hip may be helpful to further clarify the fracture pattern.

Internally rotating the involved femur 10-15 degrees offsets the anteversion of the femoral neck and provides a true AP of the proximal femur

BIOMECHANICS

Extra capsular fractures primarily involve cortical and compact cancellous bone . because of this complex stress configuration in this region and its non homogenous osseous structure and geometry , fractures occur along the path of least resistance through the proximal femur.

The amount of energy absorbed by the bone determines whether the fracture is a simple (two part0 fracture or is characterized by a more extensive comminuted pattern.

Bone is stronger in compression than in tension .

Cyclic or repititive loading of bone at loads lower than its tensile strength can cause a fatigue fracture.

Muscle forces play a major role in the biomechanics of the hip joint.

During gait or stance , bending moments are applied to the femoral neck by the weight of the body , resulting in tensile stress and strain on the superior cortex.

The contraction of the gluteus medius , however, generate s an axial compressive stress and strain in the femoral neck that acts as counterbalance to the tensile stress and strain.

When the gluteus medius is fatigued , unopposed tensile stress arises in the femoral neck.

Stress fractures are usually sustained as a result of continuous streous physical activity that causes the muscles gradually to fatigue and lose their ability to contract and neutralize stress on the bone.

MATERIAL AND METHODS

In our study 20 cases of Intertrochanteric fractures were treated by Dynamic Hip screw Implant

Age distribution

Age	No of patients
< 60	2(10%)
60-70	15(75%)
70-80	3(15%)

Majority of patient were in the 8th decade of life

Preoperatively ,one or more medical problems requiring treatment were present in 3 patients (15%)

The most common problems included cardiovascular diseases,diabetes,and renal and neurological.

Mode of violence	18 (90%)
Trivial violence	2 (10%)

Sex distribution

Male	5 (25%)
Female	15 (75%)

HARRIS HIP SCORE

Pain(44points maximum)

None or ignores it -- 44

Slight , occasional , no compromise in activity --- 40

Mild pain , no effect on average activities, rarely moderate pain with unusual activity ; uses aspirin – 30

Moderate pain , tolerable but makes concessions to pain ;--20

Some limitation of ordinary activities or work , may reuire occasional pain medicine stronger than aspirin ---- 20

Marked pain, serious limitation of activities – 10

Totally Disabled , crippled , pain in bed , bed ridden ---0

Function(47points maximum)

Gait (walking maximum distance) (33points maximum)

Limp

None –11

Slight -8

Moderate -5

Unable to walk – 0

Support

None -11

Came for long walks -7

Cane most of the time -5

One crutch -3

Two canes -2

Two crutches 0

Not able to walk -0

Distance walked

Unlimited -11

Six blocks --8

Two or three blocks – 5

Indoors only - 2

Bed and chair -0

Absence of deformity

1. Fixed adduction < 10% ---- 4
2. Fixed internal rotation in extension < 10%-0
3. Leg length discrepancy 11/4 “
4. Pelvic flexion contracture < 30

Range of motion (5 points maximum)

Permanent flexion

A. Flexion to

0-45 1.0

45-90 0.6

90-120 0.3

120-140 0.0

B.Abduction to

0-15 0.8

15-30 0.3

30-60 0.0

C.Adduction to

0-15 0.2

15-60 0.0

D.External rotation in

Extension to(0-30) 0.4

(30-60) 0.0

E.Internal rotation in extension

0-60 0.0

Index value = range x index factor
Total index value (A+B+C+D+E)
Total range of motion points
(multiply total index value x 0.05)
Harris Hip Score (HHS)
Excellent –90-100
Good -- 80-89
Satisfactory 60-79
Unsatisfactory <60
Based on the above criterion the results of our study were as follows
Excellent ; 13 (65%)
Good ; 4 (20%)
Fair ; 2 (10%)
Poor ; 1 (5%)

The techniques of operative fixation have changed dramatically since 1960s , and problems associated with early fixation devices have largely been overcome .
The goal of surgical treatment is to internally fix a stable , reduced fracture .
Kaufer , Matthews , and Senstegard have listed the following variables that determine the
Strength of fracture fragment- implant assembly: 1) bone quality 2) fragment geometry 3)reduction , 4) implant design , and 5) implant placement.
The surgeon has in his control only the quality of reduction , implant choice and placement.
Preoperatively ,prophylactic antibiotic.
Prophylactic anticoagulation(LMWH)

Anesthesia- epidural or spinal anaesthesia in all the cases
Positioning -- Supine position ; push the patient to the edge of the X ray permeable operating table with both legs on extension rails. Ensure that no excessive pressure or traction is exerted on any part of the body.

Usually ,closed reduction by manipulation should be initially attempted .Traction is probably the most important element in reducing intertrochanteric fractures.

Fracture is reduced by gentle traction and abduction in moderate external rotation followed by gentle but firm internal rotation.

The hip should be in neutral flexion and extension. After the gentle manipulation as described , fasten both extremities to the foot plate and apply enough traction to restore length and the normal neck angle . Abduct the affected hip to only 15 or 20 degrees , abduction beyond this

Will cause angulation at the fracture .Depending on the fracture type , a position of neutral to slight external rotation is required . Usually ,the more comminuted fractures , especially when the lesser trochanter is a large displaced fragment,require more external rotation to close the posterior defect.

Draping; -- Prepare the the skin over the hip, and after disinfecting the skin drape the patient with adhesive U film following the manufacturers instructions.

The adhesive U film allows free movement of the image intensifier and guarantees sterility through out the entire operation.

Exposure;- Make an incision overv the lateral side of the thigh beginning at the distal edge of the greater trochanter This straight lateral skin incision is about 15 cms long beginning two finger breadth above the tip of greater trochanter.

Dissect down through a posterior to the Tensor fascia latae and expose the vastus lateralis muscle.

Incise longitudinally the fascia overlying the vastus lateralis.

Free the fascia from the muscle posteriorly almost to the linea aspera

Now split longitudinally the vastus lateralis 1 cm lateral to the linea aspera .

Attempt to identify and clamp the perforating vessels before they are cut.

Now reflect the vastus lateralis anteriorly to expose the trochanter and proximal part of the femoral shaft.

Before inserting the guide pin , determine by image fluoroscopy if the normal angle between the neck and shaft has been restored and , and as seen in the lateral view,if the head,neck, and trochanter lie in a horizontal or nearly horizontal plane with the fracture reduced.

An assistant at the foot of the table may easily tell whether the drill and guidepin are parallel with the floor.

If the guide pin is inserted midway between the anterior and posterior cortices of the femur and parallel with the floor in the lateral view ,it should be in the ceter of the neck and head .

Select a point on the lateral side of the shaft of the femur midway between the anterior and posterior cortices and 1.5 to 2 cms distal to the bony ridge of the greater trochanter from which the vastus lateralis muscle arises.

This point of entry should be opposite the level of the lesser trochanter.

With a 4.8 mm drill make a hole at this point , beginning at a right angle to the shaft and gradually directing the drill proximally to an angle of about 45 with the shaft of the femur and in a horizontal plane or parallel with the floor or exactly horizontal.

. If on the lateral fluoroscopy views a slight anterior or posterior inclination of the head and neck is present,adjust the angle of insertion of the guidepin from the horizontal as necessary,aiming

Slightly up if the head and neck are slightly anterior or aiming slightly down if the head and neck are slightly anterior or aiming slightly down if the head and neck are slightly posterior , so as to center the pin in the neck and head until the tip of the drill touches the guide.

The guide pin ideally should be centered midway between the superior and inferior cortices of the neck on the anteroposterior view and midway between the anterior and postrerior cortices of the neck on the lateral view.

If a variation from the exact center is accepted , it is better to accept a position that is inferior and posterior rather superiorand anterior .

Determine the length of the nail by measuring the length of the guide pin outside the bone.

Standard guide pin are 22.8 cms long; therefore if the guide pin extends 13.3 cms outside the

Bone , 9.5cms is the length of the pin in the head and neck.

As the nail is driven into place ,hold its plate exactly parallel with the femoral shaft.

When the nail is properly seated ,its plate should be flush and in exact contact with the shaft.

Now fix the plate of the nail to the shaft with four or more screws.

The sliding nail plate devices gave rise to sliding hip screw .

Sliding hip screw side plate angles are available in 5 degree increments from 130 to 150degree. The 135degree plate is most commonly utilized;this angle is easier to insert in the desired central position of the femoral head and neck than higher angle devices and creates less of a stress riser in the subtrochanteric region. In the past ,biomechanical studies have shown no advantage of four screws over two to stabilize the sideplate.

Variations on the sliding hip screw ‘s basic design include the variable angle hip screw(vhs),the talon compression hip screw , greater trochanteric stabilizing plates,the Medoff plate and the percutaneous plate(PCCP)
The VHS is a sliding hip device that allows angular adjustment of the sideplate barrel to conform to different neck shaft anglkes.
It also allows for compression and valgus reduction of fractures after fixation is achieved by permitting changes in the sideplate barrel angle

Check the final position of the nail and plate with AP and lateral Xrays.

DHS fixation is one of the most common orthopaedic surgical procedures.

TAD (Tip apex distance) is a well recognized method of evaluating the screw position of the DHS.
TAD is defined as sum of the distance ,in mm,from the tip of the lag screw to the apex of the femoral head, as measured on AP radiograph and lateral radiograph

Tip apex distance of 25 mm or less is considered as good, 26-30 mm is acceptable , 31-35 mm as poor and more than 35 mm as unacceptable.

Generally , osteoporotic bones do not require tapping,but in young patients ,tapping is indicated and to minimize the risk of inadvertent malrotation of the femoral head fragment during final seating of the screw

TAD=(Xap x Dtrue/Dap) x (Xlatx Dtrue/Dlat)

TAD = Tip apex distance.

XapxXlat – distance between the tip of screw to the apex of femoral headin AP and lateral radiographs respectively

Dtrue -- Known diameter of the shaft of the screw as measured on the AP radiograph.

Dlat-- diameter of the shaft of the screw as measured on lateral radiograph

Screw position in femoral head has been considered the most important predictive factor for mechanical failure in intertrochanteric and is assisted by fluoroscopic control.

All the patients were allowed to flex the knee from 2nd post operative day and physical ambulation was started on 8th postoperative day on an average.

All the patients were covered with appropriate antibiotics.

All the patients were checked both clinically and radiologically fot the first 6 weeks partial weight bearing was allowed with the help of the walker.

All patients were received at 3 months both clinically and radiological assessment were done for placement of implant , compression at the fracture site, examined for range of movements , tenderness and shortning.

All patients were advised to weight bear with the help of walker.,without weight bearing between postoperative days 6and 10, to walk with partial weight bearing between postoperative weeks 4and 6,and to walk with full weight bearing and under radiological surveillance between postoperative weeks 8 and 12.

At 6 months both radiological and clinical assessment were done,check Xray is taken to see whether fracture has healed

All patients were advised to walk with full weight bearing.

Postoperative supportive care includes physiothertapy and multidisciplinary rehabilitation programme for post operative morbibity.

Analgesics can be delivered with patient controlled analgesia or prescription of routine opiods.

Co-ordinated multidisciplinary rehabilitation programme may result in an increased percentage of patient returning home and remaining there following a hip fracture.

Weight bearing and range of motion activities are usually at discretion of surgeon.

Some surgeons recommend that mobilization of hip fracture patients out of bed and ambulation training can be initiated on postoperative day 1.

Furthermore,any patient who has been surgically treated for an intertrochanteric fracture shoul be allowed to weight bear as tolerated.

Restricted weight bearing after hip fracture has little biomechanical justification ,because activities such as moving around in bed and use of a bed pan generate forces across the hip approaching those resulting from unsupported ambulation .

Several studies have demonstrated that unrestricted weight bearing does not increase complication rates following fixation of intertrochanteric fractures.

Ecker et al (77) reported on a series of 62 intertrochanteric fracture stabilized with a sliding hip screwe;22 patients were allowed early weight bearing, 33 patients remained nonweightbearing for at least 6 wks, and ambulation was not attempted in 7 patients.pt.follow up averaged 15 months.three # (4.8%) required revision surgery secondary to non union; all these occurred in unstable fractures.

There was no effect of weight bearing on the need for revision surgery.

ANALYSIS

This is a prospective study of 20 patients with Intertrochanteric fractures.

Patients were followed up for an average period of 6 months and results were analyzed using the Harris hip scoring system

Metaanalysis suggest that early surgery was associated with 29% risk reduction in mortality as well as significant reduction in hospital pneumonia (relative risk reduction 41% 0 and pressure sores (relative risk reduction 52%)DHS osteosynthesis in intertrochanteric fractures and good preoperative planning is an effective method of fixation .

Patients with unstable fracture types showed an inequality of femoral lengths,whereas in patients with stable fracture ,femoral shortning was found in 20%.Thus the degree of shortning was mainly influenced by stability of fracture.

SCUSSIONS AND OUTCOMES

Extracapsular hip fractures should be treated surgically unless there are medical contra indications .

The standard treatment of extracapsular # are operative. The operative treatment of extracapsular # is

Almost always by reduction and internal fixation.

The alternative , conservative treatment with prolonged bed rest result in various complications.

Most of the # occur in the elderly , and in this age group ,prolonged bed rest would frequently result in Bed sores,pneumonia,venous thrombosis,pulmonary embolism and death. Hence in this age group the fracture is invariably fixed internally so that the patient need not stay in bed.

Internal fixation is accomplished by using implants that are either extramedullary (e.g. sliding screw &plate) and intramedullary(e.g gamma nail)

The evidence support the use of sliding hip screw for the vast majority of patient with extracapsular hip fracture.

There is some evidence that sliding hip screws are easier to use and reduce the duration of surgery..

Sliding hip screws are recommended for the fixation of extra capsular hip fractures ,except in certain circumstances e.g; reverse oblique, transverse or subtrochanteric fracture.

Multiple guidelines suggest that early surgery following a medical assessment is the recommended approach.

Undergoing surgery <48 hrs after admission may be associated with lower morbidity and may decrease hospital stay.

With full weight bearing DHS ensures constant bony contact of fracture fragments by means of sliding mechanism.

The advantages of DHS are
!) relatively simple surgical technique

2) low rate of complication

3)early mobilization without danger of complication, resulting from the implant.

Surgical key points for insertion of sliding hip screw

Ascertain that there is no impingement of the labia or scrotum from the fracture table

Assess the fracture reduction before propping the patient and ensure that non obstructive biplane radiographic visualization of the entire proximal femur including the hip joint , is obtainable.

Check for residual varus angulation , posterior sag , or malrotation prior to starting the procedure.

Use a 135 angle guide to insert the guide pin.

Position the guide pin in the centre of the femoral head and neck on both the AP and lateral planes within 1 cm of the sub chondral bone.

Ream the femoral neck and head under image intensification to detect guide pin advancement.

Tap the entire screw path to prevent femoral head rotation during lag screw insertion.

Confirm a minimum of 20 mm available for lag screw /barrel slide.

Impact the fracture before insertion of the plate holding screws.

Use a compression screw if the lag screw can not be visualized within the plate barrel.

Pitfalls with use of a Sliding Hip srew

a)Misinterpretation of the fracture pattern . This pitfall can be avoided by obtaining both AP and Crosstable lateral Xrays.

b)Use a sliding screw for the reverse obliquity type pattern c)Place the lag screw away from the center –center position and farther than 1 cm from the subchondral bone

d)Bending the guide pin during reaming.

e)Bending the guide pin within the reamer resulting in intraarticular or intrapelvic penetration

f)Loss of reduction during lag screw insertion. During reaming or lag screw rotation of the proximal fragment with loss of fracture reduction can occur.

Improper lag screw plate barrel relationship . When a sliding hip screw loses its capacity to slide, it behaves as a fixed angle device &is at risk for multiple complication.

Complications which generally occur are

a)Loss of fixation – fixation failure with Sliding hip screw is most commonly characterized by varus collapse of the proximal fragment with cut out of the lag screw from the femoral head.

The incidence of fixation failure is reported to be as high as 20% in unstable fracture patterns , rarely it is reported to be less than 4%.

b)Lag screw cut out from the femoral head generally occurs within 3 months of surgery and is usually due to a) eccentric placement of the lag screw within the femoral head ,

c)Improper reaming that creates a second channel,

d) excessive fracture collapse such that the sliding capacity of the device is exceeded or

e) severe osteopenia

f)Hematoma and seroma (incidence 4%)

g) thrombophlebitis,embolism

h)pseudoarthrosis

Achieving a stable reduction with proper insertion of the sliding Hip screw remains the best way of preventing post operative loss of fixation.

Non union; - following surgical treatment of Intertrochanteric fracture occurs in less than 2% of patients; its rare occurance is largely due to the fact that the fracture occurs through well vascularized cancellous bone.

Most Intertrochanteric non union follow unsuccessful operative stabilization , with subsequent varus collapse and screw cut out through the femoral head.

Another possible etiology for Intertrochanteric non union is an osseous gap secondary to inadequate fracture impaction.

Intertrochanteric non union should be suspected in patients with persaistant hip pain that have Xrays

Revealing a persistant radiolucency at the fracture site 4 to 7 months after fracture fixation.

Progressive loss of alignment strongly suggests non union .

Abundant callus formation may be present , making the diagnosis of non union difficult to confirm.

Malrotation Deformity

The usual cause of malrotation deformity after Intertrochanteric fracture fixation is internal rotation of the distal fragments at surgery.

Bannister et al , in a prospective randomized study of 155 intertrochanteric frctures stabilized using sliding hip screw and Jewett nail, found that fractures that stabilized with sliding hip screw has a significantly lower risk of mechanical failure and a lower incidence of revision surgery.

In our study , there were no cut through the head and neck of femur.

Jacobs et al , reported on a series of 173 intertrochanteric fractures treated with internal fixation , 72 with a Jewett nail and 101 with a Sliding hip screw.

Treatment failure –defined as either loss of fixation,symptomatic joint penetration,osteonecrosis,malunionor non union-occurred in 25% of fractures stabilizedwith a Jewett nail and 6% of fractures stabilized using a Sliding hip screw. using a sliding hip screw

In our study failure rate was 4% by using sliding hip screw

Leung et al. reported on a prospective series of 186 peritrochanteric fractures stabilized with either a gamma nailor sliding hip screw.

A higher number of intraoperative complications occurred in fractures stabilized with a gamma nail.

In our study there was no intraoperative complications using sliding hip screw.

Anne et al, reported on a series of 378 intertrochanteric fractures prospectively randomized to treatment with either a gamma nail(177fractures) or a sliding hip screw(201fractures).

At an average follow up of 17 months,15 patients needed revision surgery 13 in the gamma nail group and 2 in the sliding hip screw group.

In our study there were no revision surgery due to implant cut through.

Butt et al. reported on a prospective , randomized controlled trial that compared results in 95 consecutive patients who sustained a pertrochanteric fracture of the femur and were treated using a sliding hip screw (no=48ora Gamma nail(no=47) whereas clinical and radiological outcomes were similar ,

the Gamma nail was associated with a higher incidence of complications-in particular ,femur distal to the implant. In our study implant cut thru wasnot seen and arthritis in 1 case

Hardy et al performed a prospective ,randomized study comparing use of a sliding hip screw to use of an intramedullary hip screw (IMPHS) for stabilization of 100 intertrochanteric fractures.

In patients age 60 yrsor older.Based on the available literature Sliding hip screw is the implant of choice in Intertrochanteric fracture.

SUMMARY AND CONCLUSION

Current best evidence suggests that DYNAMIC HIP SCREW (DHS) are the preferred method of treatment for Intertrochanteric fracture s, with a decreased complication rate.

DHS yields better long term result in trochanteric fractures than by providing earlier mobilization of the patient ,better stability , and earlier union

Thus from this study we conclude that Dynamic Hip screw is gold standard for fixation of Intertrochanteric fractures.

Numerous series have reported excellent results with the sliding hip screw for Intertrochanteric fracture fixation .

The sliding hip screw is the most widely used implant for stabilization of both stable and unstable intertrochanteric fracture

The concept of Dynamic hip screw is to provide a controlled collapse at the fracture site after the implant is secured to femoral head and shaft.

REFERANCES

BIBLIOGRAPHY

1) Rockwood &Greens ; Fractures in adults , vol. 11; 1796-1813

2) A.o ; orthopedic trauma association committee for coding and classification <u>fracture and dislocation compendium;</u>

   J orthop trauma 1996; 10 (10 ;30-35

3) Anne et al ; Gamma nails compression screw for trochanteric femoral fracture ;act orthopscand1994;65;127-130

4) clawsonDK,Intertrochanteric fractures of the hip,AmJ Surg.1957;93:580-7

5) Harris WH ; bone joint surg51;737-55,1969

6) Butt etal ,bryand ;Treatment of unstable trochanteric fracture ; Jbjs 1991;73-A

7) Harris hip score ; Harris WH; JBJS 1969;51:1

8) Evans E ; The treatment of trochanteric fractures of Femur.JBJS 1998;80-A;618-30

9) MillerCW,survival and ambulation following hip fracture.J.BoneJointsurgAm1978;60;930-4

10) MullhollandRC;GunnDRscrew plate fixation of the intertrochanteric femoral fractures.J Trauma1972;12;581-91

11) Roche JJ,WennRT,Sahota O,MoranG;effect of comorbities and postoperative complications on mortality after hip fracture in elderly people; prospective observationational cohort study . BMJ2005;331;1374

12)Jewet et al ;one piece angle nail for trochanteric fractures JBJS 1941;23,803