



International Journal of Orthopaedics Sciences

ISSN: 2395-1958

IJOS 2019; 5(1): 477-480

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www.orthopaper.com

Received: 03-11-2018

Accepted: 06-12-2018

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Keyhole surgery in intertrochanteric femur fracture of elderly population in rural hospital of central India

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DOI: <https://doi.org/10.22271/ortho.2019.v5.i1i.83>

Abstract

Background: More than 90% of hip fractures in patients after the 5th decade of age are intertrochanteric fractures with 20-30% of these cases experiencing complications and a mortality rate of approximately 17%. Dynamic Hip screw is gold standard for fixation but to minimize intra-operative complications keyhole surgeries are getting popular.

Objective: To evaluate intraoperative and immediate post-operative outcome amongst intertrochanteric fracture patients operated with keyhole surgery.

Material & Methods: Prospective study conducted amongst elderly population with inter-trochanteric femur fracture admitted in rural hospital from central India. Duration of surgery, intra-operative blood loss and healing of wound was noted.

Results: Total 16 patients were operated with male to female ratio of 1.6:1.

Conclusion: Keyhole surgery reduces surgical duration and blood loss due to minimum tissue handling. It can be a procedure of choice in patient with co-morbidities and illness.

Keywords: Keyhole, MIDHS, Inter-trochanteric, blood Loss

Introduction

Intertrochanteric fractures of the femur occur between the greater trochanter, the attachment site to the hip abductor and extensor muscles, and the lesser trochanter, the attachment site of the hip flexor muscle [1]. More than 90% of hip fractures in patients after the 5th decade of age are intertrochanteric fractures with 20-30% of these cases experiencing complications and a mortality rate of approximately 17% [1-3]. In the elderly, these fractures typically result from mild to moderate trauma due to osteoporotic bones while in young adults, these fractures are generally due to high energy trauma, such as road accidents [3]. The incidence of hip fractures is 2-3 times more common in females and the risk of fracture will double, every 10 years after the age of 50 [4]. Operative treatment is the best option in most cases of hip fractures [5]. There are several devices that may be used for fracture fixation. The Dynamic Hip Screw (DHS) is a screw that allows for controlled dynamic sliding of the femoral head and is used to fix both the femoral head and the device to the shaft of the femur. The dynamic compression allows the weight-bearing stresses to stabilize the femur so that it may undergo remodeling and proper fracture healing. After 30 weeks, 75% of the patients had their normal function restored [6]. Although this device is suggested as the gold standard for the treatment of fractures of the proximal femur [1]. The disadvantages of conventional DHS techniques are a large skin incision, more soft tissue dissection, greater haemoglobin drop, higher pain level more total analgesic use and longer hospital stay more operative time.

In key hole surgery smaller skin incision, less blood loss, less soft tissue dissection and less pain and shorter duration of stay in hospital with less operative time.

Till date few studies have been conducted in the country and most of them are in urban area hence in presence of scanty evidences we planned present study with an aim of evaluate intraoperative and immediate post operative outcome amongst intertrochanteric fracture patients operated with keyhole surgery.

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Materials and Methods

This is a prospective randomized study of 16 patients who underwent Keyhole surgery (MIDHS-Minimum invasive DHS) technique for intertrochanteric fracture from 15 July, 2018 to till date in Mahatma Gandhi institute of medical sciences College fulfilling following criteria.

Exclusion criteria

1. Patients with poly-trauma
2. Pathological fracture,
3. Compound fracture and ipsilateral lower limb fractures and
4. Those who were not willing to give consent

Due ethical clearance was taken from Institutional ethical committee. After taking written informed consent from patient and fitness given for anesthesia, all patients were pre-medicate with Tablet Lorazepam 0.5 mg a night before surgery and then Nil per Oral. All patients were operated upon under Spinal Anesthesia in a supine position on a radiolucent traction table. After sensitivity test, a single prophylactic anti-biotic cefuroxime 1gram intravenously was given 15 minutes before skin incision. The skin over the hip was properly painted and draped by placing the towel clips away to prevent superimpose on the fracture on subsequent imaging. The C-arm was also draped separately. A guide wire mounted in 130-degree guide plate was placed over anterior aspect of hip and checked in image intensifier in AP view. Plate was made aligned with the lateral border of femur and guide wire was aligned in lower half of femoral neck and head. Entry point of guide wire was marked in lateral aspect of thigh. Skin incision about 3-4 cm was made. Fascia Lata and Vastus Lateralis were incised by diathermy to minimize blood loss. Guide wire was inserted from lateral border of femur below 2.5 cm from trochanteric flair. Correct placement of guide-wire was checked with image intensifier in AP and lateral views. Another parallel guide pin was inserted to provide temporary stability for unstable fractures, in which the reduction can be lost if the guide pin backs out after reaming After insertion of guide pin, it was measured and advanced 5 mm more into the subchondral bone, reamed adequately and a lag screw was chosen. Hip screw was then inserted. After removal of guide-wire, four -hole barrel plate was inserted facing it laterally through the wound and turned 180 degree introducing over hip screw. Plate was then fixed with femur shaft with four cortical screws. Compression screw was inserted. Fascia and subcutaneous tissues were sutured with absorbable suture and skin was closed with non-absorbable suture.

Duration of surgery was noted. Intra operative blood loss was measured. Hemoglobin level was checked on the first postoperative day. Post-operative radiography was reviewed for evaluation of fracture reduction and screw position Date entered and analyzed with Epi Info (2000) software.

Results

Present study was conducted amongst patients admitted with inter-trochanteric fracture and operated with minimum invasive procedure. Total 16 patients were operated out which male were 10 (62.5%) and female were 06 (37.5%). Male to female ratio was 1.6:1. Mean age was 68 (± 4.6) years. Whereas amongst males mean age was 72 (± 5.2) years and amongst female mean age was 65(± 4.1) years. Age –sex wise distribution is shown in Table 1.

Table 1: Age- Sex Distribution of study participants

Age (In Years)	Male	Female
50-60	4	1
60-70	3	3
70-80	1	2
80-90	2	0
Total	10	06

Mean duration of surgery was 39 min (± 12.2) and total range was within 31-54 min. Majority of the patients 10(62.6%) were operated within 40-50 min followed by 3(18.7%) each in 30-40 min and 50-60 min period as shown in Table 2.

Table 2: Duration of Surgery

Duration of Surgery (In Minutes)	Frequency	Percentage
30 – 40	3	18.7
40 – 50	10	63.6
50 – 60	3	18.7
Total	16	100

Mean blood loss amongst operated patients was 31.5ml (± 6.8). Mean Hemoglobin drop post-operatively was found to be 0.2gm (± 0.02). Most of the patients 8(50%) had blood loss within 25-30 ml. No patient received blood transfusion in post-operative period (Table 3).

Table 3: Intra-operative blood Loss

Amount of blood loss (In ML)	Frequency	Percentage (%)
25-30 ML	8	50
30-35 ML	3	18.7
35-40 ML	3	18.7
40-45 ML	1	6.3
45-50 ML	1	6.3
Total	16	100

Mean skin incision size was noted as 3.6 cm (± 1.1) and range was within 2.9-3.9 cm. Half of the patients had skin incision size within 3-3.5 cm whereas 4(25%) each were in 2.5-3 and 3.5-4 cm size as shown in Table 4.

Table 4: Skin Incision

Incision Size (in cm)	Frequency	Percentage (%)
2.5 – 3	4	25
3 – 3.5	8	50
3.5 – 4	4	25
Total	16	100

Discussion

Open reduction and internal fixation has been a standard of care for inter-trochanteric femur fracture. The disadvantages of conventional DHS techniques are a large skin incision, more soft tissue dissection, greater haemoglobin drop, higher pain level more total analgesic use and longer hospital stay. More operative time [7]. Hence most of the surgeons prefer intra-medullary device to reduce operating time, tissue damage. But peyser *et al.* showed that intra-medullary device too has involved considerable tissue damage (reaming and violation of medullary canal) and relatively high bleeding and transfusion rates [8]. Hence, key hole surgery (MIDHS) is being preferred.

16 patients with inter-trochanteric femur fracture were operated with key hole (MIDHS) surgery. In which male outnumbered females with ratio of 1.6:1 and mean age amongst study participants was found to be 68 (± 4.6) years. This finding was consistent with Kandel *et al.* where he

observed male dominance and mean age of 69.1 years. This may be due to male are routinely engaged in outdoor activities ^[9].

In the present study mean operating time was found to be 39 (± 12.2) minutes with a range of 31-54 minutes. This was consistent with Ho *et al.* observation ^[10]. Kendel *et al.* demonstrated mean operating time of 43 minutes ^[9]. Whereas, other studies have demonstrated time duration exceeding 55 minutes ^[11-12].

We observed mean intra-operative blood loss 31.5ml (± 6.8). Kandel *et al.* observed 122.2 ml mean blood loss ^[9]. This may be due to effective use of thermo-coagulation and minimum tissue handling. We observed mean Haemoglobin drop of 0.2gm(± 0.02) and no patient received intra or post operative blood transfusion.

We did not observed any major complication amongst study participants except mild to moderate pain at operative site.



Intra op Incision size



Post op X-rays

Conclusion

Key hole surgery (MIDHS) is novel technique of intertrochanteric femur fracture fixation. It reduces both intra-operative surgery duration and blood loss due to minimum tissue handling. We observed no significant post-operative complication which signifies use of this technique in patients with significant co-morbidities and illnesses.

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