

# Minimal Invasive Dynamic Hip Screw Fixation Technique in Patient with Cardiac Complications: A Case Scenario

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## Learning points for the Article:

How to manage a stable inter-trochanteric fracture with constrained operating time and blood loss. Use of new angle guide system with which minimal invasive DHS performed.

## Abstract

**Introduction:** Intertrochanteric fracture comprises nearly half of hip fractures occurring in elderly individuals with osteoporosis. Considering the age group of its population, they are often associated with multiple comorbidities which warrant optimum management with less surgical stress.

**Case Report:** This article reports the case of 56-year-old women with an intertrochanteric fracture associated with the cardiac complication restricting operating duration. Minimal invasive dynamic hip screw (MIDHS) fixation technique with modified instruments was performed which facilitated minimizing the operating time and intraoperative blood loss.

**Conclusion:** MIDHS fixation is an important technique for providing the necessary fixation minimizing soft tissue dissection, operating time, intraoperative blood loss and surgical expense without compromising fixation stability, and rehabilitation protocol.

**Keywords:** Intertrochanteric fracture, comorbid conditions, minimally invasive dynamic hip screw fixation, less surgical stress, cost-effective.

## Introduction

Dynamic hip screw (DHS) fixation has proved successful in treating intertrochanteric fracture. However, DHS fixation method fails to achieve less soft tissue handling [1]. The next option is to select an intramedullary device to achieve less soft tissue handling. The intramedullary device even though stable on comparison with DHS, cost of the quality implant may go up to 4-fold high. To overcome this problem, minimal invasive DHS (MIDHS) technique will be a viable alternative [2]. In this article, we report a unique case of the patient with an intertrochanteric fracture who also has cardiac complication restricting the operative time and multiple blood transfusions. MIDHS were performed in this patient with short operating time and negligible operative blood loss.

## Case Report

A 56-year-old women (weight 62kg; body mass index 24) sustained intertrochanteric fracture right side by self-fall. The patient status post-operative case of coronary artery bypass surgery with an ejection fraction of 42%. On pre-operative evaluation, her hemoglobin level found to have very low (8.1mg/dl) with ASA Grade II. After obtaining cardiac and anesthetist evaluation patient was decided to treat surgically. Her cardiac problems restricted the surgeon on operative time and transfusions. All available options are discussed and narrowed down to use proximal femoral nailing. Unfortunately, the patient's economic status not viable to use quality nail which is 20 folds increase in cost compared to DHS implant. Hence, it's decided to use DHS system with minimal invasive technique.

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## Author's Photo Gallery

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135 degree barrel plate placed exactly over proximal femur in such a way to superimpose over fracture site to locate the place of incision.

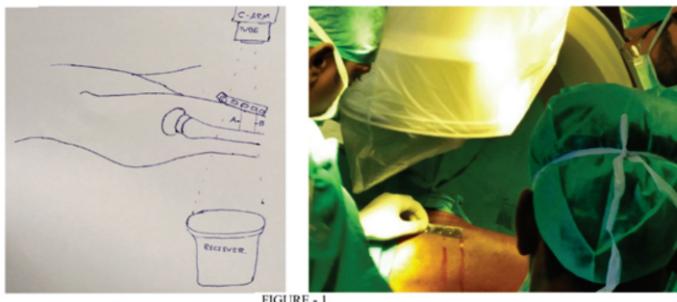


FIGURE - 1

Figure 1: 135° barrel plate placed exactly over proximal femur in such a way to superimpose over fracture site to locate the place of incision.

thereby achieving short operative time with satisfying economic challenge. A 135° short barrel plate system selected. The procedure starts with reducing the fracture in fracture table with C-arm control in both anteroposterior and lateral plane. The level of incision planned using image intensifier guidance. Barrel plate placed exactly over the proximal thigh such a way it superimposes the place where planned placement of the implant. Two vertical lines drew, one from the second and another from the third hole of the implant. A third horizontal line is drawn exactly along the proximal femoral shaft. Skin and the deep incision made along the horizontal line from the intersection of first to second vertical line muscular attachments are erased using periosteal elevator both proximally and distally (Fig. 1). Specially designed 135° angle guide placed over the lateral cortex and guide wire inserted into the center of the neck with anteroposterior and lateral C-Arm view control (Fig. 2). Instead of triple reaming, 8mm and 13mm, separate measures marked reamers are used through 14mm sleeve. Once head screw inserted in place 135° - 4 hole barrel plate slides over the lateral cortex with the barrel facing the surgeon. Then, the plate flipped 180° in longitudinal axis and barrel negotiated over the head screw with reduction instrument. Cortical screws are placed through the plate in a routine fashion providing special precautions to be taken using a long drill bit and bone tap with appropriate sleeves. Whole procedure finished within 20 min

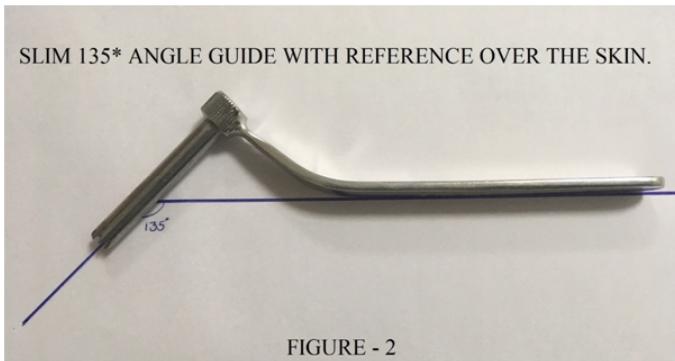


FIGURE - 2

Figure 2: Slim 135° angle guide with reference over the skin.

IMMEDIATE POST-OPERATIVE WOUND.



Figure 3: Immediate post-operative wound.

with <50 ml of blood loss. Post-operative wound size measures to be 2.5 cm (Fig. 3). The need of electrocautery was never raised throughout the procedure. Next day post-operative X-ray reduction and fixation found to be satisfactory (Fig. 4). Patient discharged on the 5th post-operative day and started full weight bearing on the 6th week of surgery. On 8 weeks follow-up patient can sit with cross leg and stand with full weight bearing (Fig. 5).

## Discussion

Open reduction and internal fixation have become a standard of care for intertrochanteric fracture fixation. On doing so, the surgeon has trouble in selecting the suitable implant for stable intertrochanteric fracture. Most of the surgeons prefer intramedullary device in view of reducing the operative time, and tissue damage as conventional DHS (CDHS) requires a greater amount of soft tissue handling than intramedullary device [3]. But Peyseret al., statsintramedullary procedures involve considerable tissue trauma (reaming and violation of the medullary canal) and relatively high bleeding and transfusion rates [4]. Hence, these implant cannot be considered true minimally invasive. As because of the short learning curve, low in complication rate and cost DHS

PRE-OPERATIVE AND IMMEDIATE POST-OPERATIVE X-RAY.



Figure 4: Pre-operative and immediate post-operative X-ray.

EIGHT WEEKS POST OPERATIVE PERIOD PATIENT CAN SIT WITH CROSS LEG AND DO FULL WEIGHT BEARING.



Figure 5: Eight weeks post-operative period patient can sit with cross leg and full weight bearing.

considered to be effective in treating the stable intertrochanteric fracture [5]. Even both MIDHS and CDHS fixation technique yield reliable results, MIDHS fixation technique is superior in operating time, blood loss, post-operative pain, and length of hospital stay [6]. Yianet al. in his study describe the use of 3-hole side plate is as good as 4 holes in sharing tensile force [7]. A biomechanical study by McLoughlin et al. demonstrated that the 2-hole DHS is as stable as the 4-hole DHS in cyclic and failure loads [8]. Although recent studies suggest the use of 2 holes in view of achieving minimal incision length, the length of the side plate used in this case is 4 hole with purchase totally of 8 cortices which found to be safer on osteoporotic bone [2]. Another major pre-operative complication encountered in MIDHS is the injury to the perforator vessel. If so, it's so difficult to achieve hemostasis through such a small wound. To avoid such situation, no sharp instruments used proximal to incision site, and moreover an angiographic study revealed that the transverse branch of the

lateral circumflex artery was at sufficient distance from the surgical site, which allows surgeons to safely perform mini-incisions during surgery without fear of uncontrolled bleeding [9]. Apart from specially designed 135° angle guide used to minimize the initial surgical dissection fixation achieved by the routine instrument used for DHS fixation with which the operating team is familiar and confident, with no need to purchase new instruments.

### Conclusion

As none of the literature reports much about angle guide used in MIDHS we presume this is the first case report using specially designed 2mm × 135° sleeve for angle guide (Fig. 2). This considerably reduces the proximal surgical dissection and maintain safe surgical zone while fixation. This case report demonstrates that MIDHS technique even not superior but will be a viable alternative in an elderly patient with comorbidity requiring minimal operative time. MIDHS technique helps orthopedic surgeon and hospital facing the challenge in providing health-care advantageous to patients with hip trauma in most cost-effective way.

### Clinical Message

Proximal femoral surgeries always have a potential complication of profuse perforator bleeding if proper meticulous dissection not carried out, and henceforth increasing the operating time. To address situations demands including restricted operative time, minimal blood loss MIDHS will be a viable alternative. Specialized instrument sets which carry higher cost are not always required to execute successful MIDHS. Adding few specialized instruments to routine armamentarium facilitates us to perform MIDHS in cost-effective way. Limitation of this technique is obese patient, expertise in image intensifier utilization and steep learning curve.

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