e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14 (12); 672-676

Original Research Article

Treating Hip Fractures with the Novel DHS Fixation Technique without the Use of Traction Table

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Received: 25-10-2022 / Revised: 25-11-2022 / Accepted: 30-12-2022
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Conflict of interest: Nil

Abstract

Aim: To assess a novel method of traction-free Dynamic Hip Screw (DHS) fixation.

Method: 100 patients who had manual traction for DHS fixation between July 2020 and July 2021 had their results in terms of tip apex distance (TAD), fracture reduction quality, length of the procedure, and preoperative preparation time assessed.

Result: Good to moderate decrease was possible in 96% of instances. The average screw cutout frequency was only 0.90%, the mean TAD was 19.1 millimetres, and the average operating time was 35 minutes.

Conclusion: This method is very helpful for polytrauma patients who require multiple surgeries because it is simple, repeatable, affordable, and doesn't lose reduction alignment or screw position.

Keywords: Hip Fractures; Dynamic Hip Screw; Polytrauma; Traction Table

Introduction

The Dynamic Hip Screw (DHS), which is used to treat intertrochanteric fractures, is regarded as the gold standard [1,2]. To ensure bone-on-bone stability, the DHS implant is made to permit a controlled collapse of the proximal fragment on the distal one. This is typically accomplished with the aid of a traction table, which is made to reduce the fracture to a suitable level and keep it there before DHS fixing. A traction table must first be set up before surgery, which takes some time. Additionally, using a traction table while performing many procedures on a patient in the same location is difficult. The use of traction tables has not been connected with many reports of complications during DHS fixation, but excessive traction or direct pressure during femoral nailing in patients has been linked to complications such pudendal, sciatic, or femoral nerve injury [3]. A traction table might not even be offered in facilities with inadequate resources. In order to avoid the requirement for a traction table, we developed a manual traction approach that places the patient supine on a radiolucent table. Although there have not been many reports of difficulties related to using a traction table for DHS fixation, excessive traction or direct pressure during femoral nailing in individuals has been linked to issues such as pudendal, sciatic, or femoral nerve injury [3,4,5]. Moreover, hospitals with low resources might not have access to traction tables. In order to avoid the requirement for a traction table, we developed a manual traction approach that

places the patient supine on a radiolucent table. The simplicity of setup, the flexibility to do several processes with an one positioning and draping, and the removal of morbidities related to traction table use are some of the reasons given for not utilising a traction table. In the research, we assessed intertrochanteric fracture patients receiving manual traction fixation with DHS.

Method:

The study comprised all patients having DHS fixation utilising manual traction technique without the use of a traction table from July 2020 to July 2021 who had intertrochanteric fractures grade A1, A2.1 (AO/OTA classification). Patients who underwent incomplete follow-up or passed away in the first 2 months following surgery were excluded.

Sex, age at surgery, length of operation, kind of implant, and death date were among the clinical information obtained. Digital anteroposterior and lateral radiographs taken both pre- and postoperatively were used to classify the fracture, assess the quality of the fracture reduction, determine the screw's location, and measure the distance between the tip and apex. The photo archiving and communication system was evaluated according to all specifications (PACS). The PACS is suitable for measuring the tip apex distance, according to a previous study [6].

After the operation, the study's participants were monitored for three months. According to earlier research [7], we anticipated screw cut-out to take place two months following the operation, which is in line with the time frame for fracture healing. We minimised the possibility of missing a patient with a screw cut-out by making sure every patient was monitored for at least three months.

The three-grade classification system devised by Baumgaertner et al. defined the postoperative quality of fracture reduction as good, acceptable, or poor (7). On the anteroposterior radiograph, a satisfactory reduction was defined as normal or minor valgus alignment, 21 degrees of angulation on the lateral radiograph, and 2 mm of displacement of any fragment. The requirements for a decent reduction have to be met for either the alignment or the displacement, not both, for an acceptable reduction to be considered. Poor reductions didn't fit any of the requirements. Additionally, the tip apex distance measurement suggested by Baumgaertner et al. [7] was carried out.

The screw cutting out of the femoral head is protected by a tip apex distance of less than 25 mm [7]. The tip apex distance was measured using the initial postoperative radiographs. Tip apex distance measurements were made by one impartial observer who was a consultant trauma surgeon. They also identified the screw location and fracture reduction. Of course, the positioning of the patient on the radiolucent operating table is the most crucial aspect of the surgical approach. How to see the injured hip in the image intensifier when the patient is supine is the most frequent issue the surgeon encounters.

Position of the Patients:

Since the patient is supine, the image intensifier produces overlapping images of both hips, which makes the surgeon's job extremely challenging. In order to address this issue, we place the patient with a bolster under the hip that is injured, rotating them by about 10 degrees in the direction of the healthy hip. This makes sure that in the image intensifier, the image of the affected hip does not superimpose over the image of the normal hip. The surgeon attempts closed reduction of the fracture by providing manual traction to the injured side after assuring themselves that the patient's position is satisfactory. We verify the reduction while using the picture intensifier.

Steps of Surgery:

Trochanteric fractures are fixed using the standard lateral technique. A guidewire is inserted under the image intensifier and its location is examined in both the anteroposterior (AP) and lateral (LAT) views while an assistance maintains the reduction by manual traction. A derotation wire is implanted in the neck of the femur parallel to the primary guidewire if the position of the guidewire is suitable. A partly threaded cancellous screw is then introduced into the femur as the derotation screw. Using a triple reamer and typical DHS instrumentation, the bone is reamed above the guidewire.

Results:

There were 100 patients with intertrochanteric fractures found; however, 26 did not match the inclusion criteria, 19 had incomplete follow-up, and 4 had died within two months of their operation. This left 48 patients with fractures who were eligible for our study. In our study, there were 15 men (29%) and 33 women (71%) overall. The average age (together with the standard deviation) was 68.1± 11.8 (Table 1).

Table 1: Summary of the observations

Parameters	Mean ± SD
Gender	
Male	15 (29%)
Female	33 (71%)
Age	68.1 ± 11.8
Duration of hospitalization (days)	4 ±3.4
Operation time (minutes)	36 ± 21
Tip Apex Distance (mm)	19.6 ± 6.0
Pre-operative operation time after anesthesia	12.2± 7.3
Re-operation due to failed fixation	0.89%
Fracture reduction	
Good	64.5%
Mild	32.2%
Poor	2.1%
AO Category	
A1	53%
A 2.1	47%

Three patients (0.8%) in total suffered failed fixation as a result of screw cutting. Seven patients wounds took longer to heal because of a subsurface infection. Four individuals with symptomatic DVT received effective treatment.

Discussion:

There has been a lot of discussion about nailing for femur fractures without employing a traction table in the literature [8, 9]. But only a few number of trials utilising DHS fixation for intertrochanteric femoral fractures without the use of a fracture table have been published to date [10]. We think that an orthopaedic surgeon must be proficient in the reduction of femoral intertrochanteric fractures without the use of a traction table. Getting a good reduction in both AP and lateral views when inserting the guide wire is one of the major hurdles in DHS instrumentation.

Both views can be easily obtained using the traditional method and a fracture table. The contralateral lower limb must be in a lithotomic position in order to obtain the peripheral view. In the manual traction technique, the contralateral hip superimposes over the fracture site in the

supine position, making it extremely challenging for the surgeon to place the guide wire in the right place. To get around this issue, some authors have recommended adopting a frog leg lateral view [10]. However, there are a number of issues with this method. The authors advise running numerous guide wires or 2 mm Steinman pins across the fracture site to maintain the reduction and prevent it from shifting. They noticed that the pins would frequently bend while still holding the frog leg posture, endangering the reduction. Additionally, they advise against inserting the guide wire in the frog leg position, which would prevent the surgeon from seeing a real-time radiological image. Additionally, a hip or knee with advanced arthritis and decreased range of motion might not be a good candidate for this approach since it might be difficult to get a good frog-leg image.

We don't run into any of the aforementioned issues because when the patient is supine on the operating table and is slightly tilted (by placing a bolster under the affected hip) toward the opposite side, it is possible to see the affected side from the side without being obstructed by the healthy hip. In this position, we can also insert a guide wire with the help of a fluoroscope to obtain a real-time radiological image. The manual traction technique has the drawback of requiring an additional assistance to maintain reasonably constant traction in order to prevent displacement of the reduction. The amount of time needed for preoperative preparation is significantly reduced when reduction is achieved via manual traction [10].

The preoperative setup took 12.3 7.2 minutes, which is less time than the typical procedure (31 minutes documented in some early trials) (10, where more time is spent setting up the traction table and accomplishing reduction under fluoroscopic guidance). As a result, the patient receives the least amount of anaesthesia possible, which lowers the risk of intraoperative and postoperative anaesthesia issues. The average TAD in our series was 19.5 mm, indicating a similar level of method efficacy [11]. In our series, the postoperative cut-out rate was 0.8%, which was comparable to the traction table approach in terms of results. [12] The postoperative cut-out rate of conventional techniques ranges from 1 to 6% [13,14,15,16].

Conclusion:

The DHS fixation method for treating intertrochanteric fractures without the use of a traction table is quick, easy, repeatable, and inexpensive. It is especially useful when a traction table is not accessible or when many operations are required for polytrauma patients.

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