Treatment of femur pertrochanteric fractures with external fixation in patients over 60 years-old.

Experience at Hospital Domingo Guzman Lander.
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Abstract

External fixation can be an alternative option in the treatment of pertrochanteric fractures in patients with high surgical risk. The purpose of this work was to evaluate the clinical results of 45 patients over 60 years-old, with high surgical risk, treated with external fixation for pertrochanteric femur fractures.

Regarding the anesthetic risk, 57.7% of them were classified as ASA III. The procedure was performed at an average time of 19.5 minutes and postoperative hospitalisation in the present series was 1.3 days. The most frequent complications were superficial infection (31%) followed by shortening and varus of the fracture. One case showed delayed union, and 22% showed refracture. 2 deaths occurred but were not considered to be related to the surgical procedure.

As a conclusion, this series show that external fixation in patients with high surgical risk is a valuable option, and can provide good results.

Keywords

Pertrochanteric fracture, external fixation, surgical risk, complications.

Introduction

Proximal femoral fractures in elderly patients present a high incidence, most of them in patients over 64 years of age, increasing with each decade of life until reaching an incidence of more than 1898 cases per 100,000 inhabitants over 85 years of age (1).

Hospital morbidity and mortality ranges from 5% to 30% 12 months after the fracture, which causes a high cost for the health system. Some statistics report in the United States 20 trillion dollars in expenses attributed to this cause (1-4).

The delay of the surgical treatment of these fractures carries severe consequences and patients with high surgical risk demand an optimal stabilisation of their medical conditions in order to minimise intra and postoperative complications during internal fixation surgery (4-7).

The objectives of this study was to evaluate whether external fixation of the pertrochanteric fractures of the femur, could reduce the pre and postoperative hospital length of stay, with low complications and mortality and with satisfactory results to achieve rehabilitation and incorporation into the daily life.

Patients and Methods

The following work was done in a population of 45 patients over 60 years old who attended the emergency of the "Domingo Guzmán Lander" Hospital of Barcelona, during the years 2014 to 2016, in addition to those referred by other centers in the country, the Region Capital, Bolivar State, etc.

Those patients were diagnosed with a pertrochanteric fracture of the femur. All preoperative assessments by cardiology and pneumonology were performed as required and preoperatively assessed by anaesthesiologists and graded according to the ASA
scale (Classification of the American Society of Anaesthesiologists) (Fig.1).

All patients were given a combined deep sedation anaesthesia plus anaesthetic block by infiltration of the external guardian pin entry points. For the external fixation, it was necessary to use in the majority of external fasteners type AO, bar of 250 or 300 millimetres, 5 pins and 5 pins, of which 2 of them of 5.0 millimetres of diameter, fluffy thread and of 200 millimetres Long for proximal fixation. In other cases Baumer type external guard with bar and pins of equal length were used. In all patients the use of image intensifier equipment was mandatory.

For the collection of data, a questionnaire was used in which the following parameters were taken into account: age of the patient, cause of the fracture, type of fracture using the Evans classification, (which divides them into Stable and Unstable according to the stroke), pathologies associated, preoperative anaesthetic surgical risk according to the ASA Scale, surgical time, and days of hospitalisation.

After discharge, patients were checked every 3 to 4 weeks with control radiology and evaluating the onset of gait with walker and cane use. in addition Quality of life and incorporation into normal daily activities through the use of the Harris Hip Scale were assessed.

Radiographic and anthropomorphic measurements were taken to record the results concerning the complications of the reduction and clinical complications such as soft tissue infections, pain, and mood were also noted.

Surgical Technique

With the patient in the supine position in a radiolucent table and under skin traction, the cushion is placed on the side to be intervened to increase and correct pin entry angle.

Under image intensifier the upper border of the greater trochanter of the femur is located, and proceed to initiate the insertion with a 200 millimetre pin of 5.0 millimetre of flange diameter and parallel to the upper edge of the femoral neck at an average inclination of 20 degrees, with respect to the axis of the bed plane, once the insertion path has been established until leaving 5 millimetres of the subchondral edge of the femoral head always careful to maintain parallelism in all planes.
The fracture is then fixed with a second pin parallel to the first and taking care of its trajectory.

Once the fracture is stabilised proximally (depending on the type whether it is stable or unstable), the third pin placement is started at the subtrochanteric level, the knee is then positioned in 90 degree flexion to contract the fascia lata and the next 2 pins are inserted.

In this position, it has to be remembered at each fixation point, the application of infiltrative local anaesthesia.

Finally the stability of the fixation under fluoroscopic vision is verified, the dressings and bandage are placed plus anti-embolic socks.

**Results**

The analysis of the results showed that in relation to the most affected gender, it was the female with a total of 32 and 13 males.

The average age of 73.3 years with a range of 60 to 95 years. The predominant aetiology was by fall during walking with 97.72%.

The average pre-operative hospitalisation time of 10 days. As for the preoperative risk according to the ASA Scale, 31.1% had ASA II, 57.8% ASA III Risk and 11.1% ASA IV. See chart 1. The mean surgical time was 19.5 minutes. Postoperative hospitalisation time was 1.3 days with a range of 1 to 4 days (see chart no. 3). It was obtained that the average shortening of the operated lower limb was 1.67 cm (range of 0.7 - 2.8 cm) in stable fractures and of 2.32 (range of 1.6 - 2.9 cm) in the unstable. With respect to the femoral varus, we calculated an average of 14.2º (range 5-22º) in stable fractures and 15.5º (range 0-20º) in unstable fractures (Table 1).

Among the most frequent complications observed were soft tissue infections in the entrance pathway of the pins with 31.1% of the total of the patients, 28.9% reported pain tolerable and manageable with oral analgesic, 22% presented refracture and 4.44% death associated to causes other than fractures (Table 2). The onset of gait was observed with the use of walker in 26.1 days on average in stable fractures and 34.1 days in patients who had unstable fractures.

**Discussion**

The traditional methods of synthesis for pertrochanteric fractures include the DHS or LCP Plates, the use of endomedullary nails or even hemiartroplasties. This procedures require more surgical time than external fixation. As an example, Mendez-Gil et al (8) showed that the time required to complete a conventional dynamic hip screw technique was 78.8 minutes in average, and that the mini-invasive DHS technique allowed to diminish this time to 49.3 minutes. The time required to implant the external fixation in the present series was 19.5 minutes. Okaya et al. required 37 minutes on average to perform the external fixation on pertrochanteric fractures (9), still less time than the traditional methods of synthesis.

Internal fixation has several potential disadvantages: it requires high patient preparation and is related to a higher surgical risk both during and after surgery, by potentially bleeding, by soft tissue manipulation, and by patient positioning and fracture reduction by using the traction table (10).

Also, several complications are also described related to intramedullary implants, including malalignment, cutout, infection, false drilling, wrong lag screw length and drill bit breakage during the interlocking procedure, external or internal malrotation (≥20º) of the femoral diaphysis, elongation of the femur (up to 2 cm), impaired bone healing, periprosthetic fracture distal to the tip of the nail, fracture collapse, implant failure, lag screw intra hip migration, neurovascular injury, secondary varus deviation, complications after implant removal, trochanteric pain, and refracture (11).

External fixation can be an option for high risk patients, since the optimal medical optimisation is not always feasible, and also since the cost can be unaffordable depending on the health system.

The main drawbacks related to external fixation are the tendency to superficial pin tract infection, limb shortening, and healing in varus.

However, this procedure implies less surgical time, allowing to stabilize the fracture with acceptable results as shown in the present series and in several previous published works (9,12-13); interestingly, in one of those studies, it proved to be superior to internal fixation (14).
Table 2.- Post-operative complications.

<table>
<thead>
<tr>
<th></th>
<th>Number of cases</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>13</td>
<td>28.8</td>
</tr>
<tr>
<td>Infection</td>
<td>14</td>
<td>31.1</td>
</tr>
<tr>
<td>Delayed union or nonunion</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Death</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Varus</td>
<td>22</td>
<td>48.8</td>
</tr>
<tr>
<td>Shortening</td>
<td>23</td>
<td>51.1</td>
</tr>
</tbody>
</table>

Conclusion

External fixation is a reliable method for high surgical risk patients with pertrochanteric fractures, who can not undergo other techniques, providing satisfactory results and allowing the incorporation of the patient to daily life routines, and also decreasing the hospital costs in supplies.

References


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The authors certify that they have no affiliations with or involvement in any organisation or entity with any financial interest, or non-financial interest in the subject matter or materials discussed in this manuscript.

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