Un-united Fractures of Femoral Neck Treatment Modalities in Young Adults: A Hospital Based Study in Udaipur

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ABSTRACT

Background: Neglected, femur neck fractures are a common problem seen in the developing countries like India where medical facilities are still in developing stage especially in rural area, where illiteracy and poverty is predominant. The study was undertaken to evaluate the results of close reduction, cancellous screw fixation and fibular graft in ununited fractures of femoral neck in young adults with regards to achievement of fracture union, effect of this procedure on pre-existing AVN and establishment of relatively easy new surgical technique.

Material & Methods: This study was conducted in Department of Orthopaedics, Pacific Medical College and Hospital, Udaipur, Rajasthan. This prospective study included 20 cases during 3 months study period (March 2016 and May 2016) treated by close reduction, cancellous screw fixation and fibular strut graft who have non-united fracture. The patients are systemically interrogated for personal details, mode of injury, time elapsed after injury, complaints, any other associated injury, any previous treatment taken and other systemic illness. Grading of fracture (Garden's classification) resorption of neck and avascular necrosis changes are based on roentgen graphic findings.

Results: Our study showed that the mean age of patients was 38.78 years and maximum patients were seen in 21-35 and 36-50 years of age (72%). Average union time in our series was 20 weeks. In present series good to excellent results found in 92% of cases; in only one case (8%) results was poor that was because of failure of procedure.

Conclusion: We concluded that the cancellous screws fixed in closed reduced fracture and supplemented with fibular strut graft is one of the excellent method as far as union and functional results are concerned in ununited fractures of femoral neck.

Key words: Ununited, Femoral neck fracture, Fibular graft, close reduction.

INTRODUCTION

Ununited, femur neck fractures are a common problem in the developing countries like India where medical facilities are already deficient and ignorant, illiteracy and poverty further delay the patients in seeking proper treatment. They initially visit the traditional bone setters or quacks and occasionally lend up with more complications.\(^1\)

Despite a plethora of technical advances and a better appreciation of what is necessary to achieve union the problem of Dickson's termed" The Unsolved Fracture" is still with us, unsolved. In past this fracture has tested the ingenuity of the treating surgeon to its utmost. It is therefore not surprising that several methods and procedures were encountered while scanning the literature. A fracture neck femur if not treated within 90 days is called a nonunion (Meyer’s)\(^2\), however fractures untreated beyond three weeks (King)\(^1\) and 6 weeks (Reich)\(^3\) are called as ununited fractures.

Many types of osteotomies, various methods of fixation, several modes of bone grafting and muscle pedicle grafts are advocated in literature. For young active adults hip replacement arthroplasty is not justified without an attempt to preserve their own hip joint initially and where preservation of femoral head and neck is desirable treatment by osteosynthesis is advocated.

Open reduction is an extensive procedure and it disturbs the blood supply which is already compromised. Wescott and Johnson reported that comparable results could be...
obtained by close reduction and fixation without arthrotomy.\textsuperscript{[4]}

Cancellous screw provides a reasonably good fixation and occupies less space than a nail in femoral neck. Osteosynthesis with the aid of bone graft is an ideal way to deal with ununited fractures of femoral neck. The graft from fibula is easy to obtain and does not leave behind any cosmetic or functional problem. Fibular graft provides mechanical and biological fixation besides later getting incorporated in to the surrounding bone.

So far many innovative procedures have been tried, described and reported for its management with variable results. The struggle to find the best treatment continues as relentlessly as it did half a century ago. The study was undertaken to evaluate the results of close reduction, cancellous screw fixation and fibular graft in ununited fractures of femoral neck in young adults with regards to achievement of fracture union, effect of this procedure on pre-existing AVN and establishment of relatively easy new surgical technique.

METHODS

This study was conducted in in Department of Orthopaedics, Pacific Medical College and Hospital, Udaipur, Rajasthan during 3 months study period (March 2016 and May 2016). It includes 20 cases treated by close reduction, cancellous screw fixation and fibular strut graft who have nonunited fracture.

The patients are systemically interrogated for personal details, mode of injury, time elapsed after injury, complaints, any other associated injury, any previous treatment taken and other systemic illness. Grading of fracture (Garden’s classification) resorption of neck and avascular necrosis changes are based on roentgen graphic findings.

Operative procedure:
Under adequate anaesthesia, usually spinal anaesthesia (in two cases general anaesthesia used) the procedure carried on standard orthopodc fracture table.

Under C-arm image intensifier control the fracture reduced by close gentle manipulation technique, and limb tied in internal rotation which also provided easy access for fibula. We were not very keen to obtain 100% accurate reduction which is very difficult also in old fracture, rather we accepted the reduction which gives maximum contact of fracture fragments. That maintain good neck length and minimum rotation, which was checked in anteroposterior and lateral view.

After achievement of reduction, with all surgical aseptic precautions, fracture was fixed with two cancellous screws (6.5 mm thick, 16 mm threaded screw used) at superior and inferior aspect of neck to leave space in between for the fibular graft. The D.C.S. triple reamer used to make channel for the fibular graft.

Preferable by another team about 4” long fibular shaft obtained from middle 1/3\textsuperscript{rd} of ipsilateral leg leaving behind the periosteum. Graft thus obtained was prepared by chiseling and petalling with the help of oscillating saw and osteotome. Intraosseous border blunted and one end tapered. The graft then inserted through previously made tunnel and hammered into place.

After wound closure limb immobilized in hip spica cast. The sutures were removed through window after 2 weeks and antibiotics were continued for same period.

\textbf{Follow up}

Regular short term and long term follow up done according to attached proforma, patients were asked for any complaints, thorough general and local examination and search for complications done. The criteria for functional end results were those used by Dr. D. Mishra in I.J.O. Jan,1988 and are as follows:

- Excellent: Able to walk without support, sit in chair, 50-60% painless movement.
- Good: Able to walk without support, sit in chair, 40% movement possible with minimum pain.
- Fair: Able to walk with crutch, not able to sit in chair with hip flexed and 30% movement painful.

RESULTS

Our study showed that the mean age of patients was 38.78 years and maximum patients were seen in 21-35 and 36-50 years of age (72%), male patients dominate over female patients, because of more exposure of male, to trauma. Left side in this series was more involved as compared to right side and over three fourth cases admitted for treatment, originate from rural background, because of neglect of fracture in rural background can be attributed to illiteracy, ignorance and poverty (Table 1). Patients were previously operated and their fracture were fixed with various means (Table 2).

Sound osseous union achieved in 24 cases (96%). In one failure, reason was fibular graft fracture leading to AVN, ultimately Girdlestone procedure was done. Average union time in our series was 20 weeks. Union achieved late was in those cases who reported very late and the reduction was not good (Table 3).

All complication were managed successfully by conservative means (Table 4). In present series good to excellent results found in 96% of cases; in only one case (4%) results was poor that was because of failure of procedure (Table 5).

\begin{table}[h]
\centering
\caption{Table 1: Demographic profile of patients}
\begin{tabular}{|l|l|l|}
\hline
Demographic profile & No. of cases & Percentage \\
\hline Age (yrs) & & \\
21-35 yrs & 7 & 36\% \\
36-50 yrs & 9 & 36\% \\
51-65 yrs & 3 & 24\% \\
>60 yrs & 1 & 4\% \\
Total & 20 & 100\% \\
\hline Side & & \\
Left & 11 & 56\% \\
Right & 9 & 44\% \\
\hline Residence & & \\
Rural & 18 & 80\% \\
Urban & 2 & 20\% \\
\hline
\end{tabular}
\end{table}
DISCUSSION

Treatment of femoral neck fracture still remains a problem. It is a well-established procedure for elderly patients having fracture neck of femur to go for replacement arthroplasty and for children and adolescent patients to go for Moore's pin fixation for satisfactory result. Other than the above are problematic. For young adult patients, who have long, active productive life ahead, replacement arthroplasty is not justified without an initial attempt to preserve their own hip.

Now in a days of technical era, anatomical reduction is desired by patient and surgeon both. To achieve this may be simple in fresh case but it becomes more and more difficult as time passes; the present series consists of these old cases only. There is strong opposition of open reduction because the open reduction is an extensive procedure, increases tissue trauma & surgical complications, further disturbs already compromised vascularity, open the joint capsule hence the joint itself, space availability was extremely limited for manipulation of fragments and results are similar to close reduction. Supported our results with S. Pande (1971).[5] Vascular fibular graft is highly technical demanding operation and only few cases are reported in literature. Necessity of strict immobilization for union in femoral neck fracture were emphasized by several authors from time to time (Whitman[6], senn[7]).

Union rate in fibular graft with internal fixation by cancellous srew (Nagi)[8] or Asnis screw (Mishra)[9] with closed reduction (present series) or open reduction (Nagi[8], Mishra[9]) are almost same. Overall results of fibular graft is quite satisfactory as compared to osteotomy or muscle pedicle bone grafting procedure.

CONCLUSION

We concluded that the cancellous screws fixed in closed reduced fracture and supplemented with fibular strut graft is one of the good methods as far as union and functional results are concerned in ununited fractures of femoral neck.

REFERENCES


Table 2: Previous operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Not Treated</td>
<td>14</td>
<td>68</td>
</tr>
<tr>
<td>Cancellous screws</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>DHS</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Kassel Plate</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100</td>
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Table 3: Osseous union and union time

<table>
<thead>
<tr>
<th>Osseous Union No. of cases</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Union achieved</td>
<td>19</td>
</tr>
<tr>
<td>Not achieved</td>
<td>1</td>
</tr>
<tr>
<td>Union time</td>
<td></td>
</tr>
<tr>
<td>12-16 weeks</td>
<td>5</td>
</tr>
<tr>
<td>16-20 weeks</td>
<td>8</td>
</tr>
<tr>
<td>20-24 weeks</td>
<td>5</td>
</tr>
<tr>
<td>24-30 weeks</td>
<td>2</td>
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Table 4: Complications

<table>
<thead>
<tr>
<th>Complications</th>
<th>No. of cases</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Shortening</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>Infection (Superficial)</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Joint Stiffness</td>
<td>10</td>
<td>52%</td>
</tr>
<tr>
<td>Edema leg &amp; foot</td>
<td>13</td>
<td>60%</td>
</tr>
<tr>
<td>Screw extrusion</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>AVN</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Death</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 5: Functional end results

<table>
<thead>
<tr>
<th>Functional end results No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>14</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
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<tr>
<td>Fair</td>
<td>0</td>
</tr>
<tr>
<td>Poor</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
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