Review Of The Results Of V – Nailing Vs Interlocking Nailing For Displaced Fractures Of Tibial Diaphysis In Adults.

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Citation

Abstract
This study was conducted on 50 patients with closed and grade I compounded fractures of tibia who attended department of orthopaedics, Government Medical College Jammu, for a period of 2 years. Out of these, 25 patients were treated with interlocking nail and 25 were treated with primary intramedullary V-nailing. The patients were followed after every three weeks for three months; and six weekly till study was completed. The study shows that there is no significant difference in the results of V-nail and Interlocking nail so it is concluded that V-nail in places where C-arm is not available appeals to be an effective modality of treatment in unstable tibial diaphyseal fractures.

INTRODUCTION
Tibia is one of the largest and strongest bones of the body and one of the main weight bearing bone in the lower extremity. Its fracture may result in prolonged and extensive disability unless treatment is appropriate. This study was conducted on 50 patients with closed and grade I compounded fractures of tibia who attended department of orthopaedics, Government Medical College Jammu, for a period of 2 years. Out of these 25 patients were treated with interlocking nail and 25 were treated with primary intramedullary V-nailing.

AIMS AND OBJECTIVES
To compare the result of V-nailing and interlocking nailing in the treatment of closed and type-1 compound fractures of shaft of tibia.

To evaluate the complications of each modality of treatment.

MATERIALS AND METHODS
This study was conducted on 50 patients with closed and grade I compounded fractures of tibia who attended department of orthopaedics, Government Medical College Jammu, for a period of 2 years. Out of these 25 patients were treated with interlocking nail and 25 were treated with primary intramedullary V-nailing.

CRITERIA FOR SELECTION OF PATIENTS
Age: All the patients in the age group of 16 years and above with fresh fractures of tibial shaft were taken up for study.

Type of fracture:
Simple tibial fractures and type 1 compound fractures were included in the study.

Radiologically all types were taken up.

Fractures at least 3 inches from knee and ankle joint.

CRITERIA FOR EXCLUSION OF PATIENTS
The following fractures were excluded from the study:
Compound fractures – type 2 and 3.

Fractures in children.

Pathological fractures.

The patients after admission in the hospital were provided first aid treatment, splintage of the part and other necessary resuscitative measures. Detailed history, general physical examination, systemic and local examination was recorded.

In case of compound fractures thorough wound debridement and dressing were done and broad spectrum antibiotics started after sending the
material for culture and sensitivity.

**INTERLOCKING**

The interlocking nailing was carried under general or spinal anaesthesia depending upon the choice of anaesthetist. The patient was placed supine on the normal operation table with knee flexed and affected leg hanging vertically down. An image intensifier was used to assess the reduction, to check the position of the guide wire and nail and for locking.

The insertion point is slightly offset medially, slightly proximal to the tibial tuberosity and sufficiently below the tibial intercondylar area to avoid damage to the joint. The 6cm incision was made medial to the patellar ligament and the tendon was retracted 2cm laterally. The awl was used to open the thin cortex at the point of insertion. Guide wire was introduced into the medullary cavity and pushed into the distal fragment. The position of guide wire was confirmed with image intensifier. After reaming the medullary canal the nail was then inserted through the entry portal into medullary canal. Insertion was aided by gentle blows with hammer. Position of nail was checked with image intensifier.

**POSTOPERATIVELY**

Quadriceps exercises, knee bending exercises and ankle movement were started soon after the patients were comfortable. Partial weight bearing and full weight bearing was started according to the tolerance of the patient, fracture pattern, associated injuries and progress of healing fractures. Full weight bearing was started when there were radiological and clinical evidence of healed fractures. Dynamization was done where there was no evidence of callus formation or when there was distraction of fragments after primary static fixation. This was done as early as possible mostly between 6-12 weeks.

**V-NAILING**

For Intramedullary V-Nailing, leg was hanged by the side of operation table and knee was flexed to 90°. Incision in skin and subcutaneous tissue was given one finger breadth medial to the most prominent part of the tibial tuberosity and was extended proximally to the medial side of patella. Tibia was exposed only in the distal 2.5cm of incision and entrance into the knee joint was avoided. With 9.5mm drill bit cortex beside the middle of tibial tuberosity was perforated. At first hole was drilled at right angles to the bone. After the drill entered the medullary canal, drill was depressed and end directed towards tibial crest at the junction of middle and distal third. Guide wire was introduced through the hole and was engaged in the distal fragment. The nail was threaded over the guide wire into tunnel with anterior end pointing forwards. Metal shield was used to avoid maceration of skin and soft tissues. As the nail reached fracture site, rotation and reduction of fragments was checked under direct vision by giving curved incision over the fracture site. Stability of fracture indicated that medullary canal of distal fragment has been entered.

**POSTOPERATIVELY**

Above knee Plaster of Paris slab was given till the soft tissues were healed. Quadriceps exercises were started as soon as the patients were allowed to walk at the earliest with the help of crutches. After removal of stitches usually 2 weeks patellar tendon bearing least was applied and patient was allowed to bear weight with crutches. Full weight bearing was allowed depending upon the radiographic and clinical signs of union.

**FOLLOW UP**

The patients were followed after every three weeks for three months; and six weekly till study was completed. At each follow up following points were recorded:

A) Clinical
1. Infection
2. Union
3. Alignment
4. pain
5. Complications
6. Loss of motion of joints
7. Shortening
8. Neurovascular status

B) Radiological

The X-ray of leg, both AP and lateral views were taken to note signs of union i.e. callus formation and loss of reduction.

**EVALUATION OF RESULTS**

The final evaluation of result was done according to criteria laid by Johner and Wroh’s.
OBSERVATIONS

This study was conducted on 50 patients with closed and grade I compounded fractures of tibia who attended department of orthopaedics, Government Medical College Jammu, for a period of 2 years. Out of these 25 patients were treated with interlocking nail and 25 were treated with primary intramedullary V-nailing.

In interlocking group, the fractures of the tibial shaft were most common in adults between 21-40 yrs (76%). In V-nailing group also the fractures of the tibial shaft were most common in adults between 21-40 yrs of age (60%) (Table 1).

Figure 1
Table 1 - Age Incidence

Road traffic accidents were the most common mode of injury in both interlocking and V-nail group. Majority of the victims of RTA in both groups were motorcycle or scooter riders (Table 2). Oblique anatomy was the most frequent (40%) occurring fracture pattern type in both interlocking and V-nail group followed closely by transverse type (36%). Number of patients under each fracture anatomy were approximately the same in the both the groups. In our study about 22 patients (88%) had closed fractures and 3(12%) had Gustillo Grade I compound fractures in interlocking group as compared to the V-nail group who had 20(80%) closed and 5(20%) Grade 1 compound fractures (Table3).

Figure 2
Table 2 - Nature of Trauma

In interlocking nail group, hospital stay in majority of patients was up to 7 days. In V-nailing group >60% of patients had hospital stay of 10 days (Table 4). Average time to union was 20.45 weeks for interlocking group and was 22.00 weeks for V-nailing group. 48% of fractures treated with interlocking nail united in less than 20 weeks, whereas only 32% of fractures treated with V-nail did so. The shortest time to union was 14 weeks in interlocking group and 16 weeks in V-nail group. The fractures which did not unite radiologically for 26 weeks were classified as delayed union and a non-union was defined as absence of radiographic union by 39 weeks (Gregory and Sandress). There was no statistically significant difference in the average union time when both the groups were compared (Table 5). Average time to return to work was 18.3 weeks for interlocking nail as compared to 25.7 weeks for V-nail group (which is
statically significant difference - p<0.01) .60% of patients with interlocking nail could return to their previous work in less than 20 weeks as compared to only 32% in V-nail group.

**Figure 4**
Table 4 - Hospital stay After Surgery

<table>
<thead>
<tr>
<th>Duration (in days)</th>
<th>Interlocking Nail</th>
<th>V-Nail</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>% Age</td>
<td>No.</td>
</tr>
<tr>
<td>1-5</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>6-10</td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>&gt;11</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

**Figure 5**
Table 5 - Time To Union

<table>
<thead>
<tr>
<th>Time to unions (weeks)</th>
<th>Interlocking Nail</th>
<th>V-Nail</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>% Age</td>
<td>No.</td>
</tr>
<tr>
<td>10-19</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>20-29</td>
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<td>40</td>
</tr>
<tr>
<td>30-39</td>
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<td>8</td>
</tr>
<tr>
<td>&gt; 39</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Mean</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

There was no statistically difference in the range of knee mobility (Full range in 76% in I/L group and 64% in V-nail group) when the both groups were compared.

There was a statistically significant difference in the range of ankle movements (28% full range in I/L group and 12 % in V-nail group). There was no statistically significant difference in the final functional outcome of patients in both groups (Table 7).
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**Figure 8**
Fig: 1a. Preop X ray

**Figure 9**
Fig: 1b. Post op X ray after interlocking nailing
CONCLUSION

The study shows that there is no significant difference in the results of V-nail and Interlocking nail so it is concluded that V-nail in places where C-arm is not available appeals to be an effective modality of treatment in unstable tibial diaphyseal fractures owing to:

- Easy insertion
- Low cost
- Small incision
- Easy extraction
- And no special expertise is needed.

It is a good alternative where C-arm facility is not available especially in peripheral centres in developing countries.

References

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