Original article

Comparative study of fracture lower 1/3rd femur fixed by dynamic condylar screw and locking condylar plate

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Abstract:
Supracondylar fracture of femur is quite frequently seen injury by Orthopaedic surgeons. It is caused by high velocity trauma such as vehicular accidents. The fixation of the fracture has to be done once the initial trauma gets stabilised. There is increased incidence of infection, injury to popliteal vessels, increased morbidity in this type of injury. Invariably the ROM of knee is restricted. The modalities of fixation are i) Condylar blade plate, ii) Dynamic condylar screw with plate (DCS) and iii) Locking compression plate.

The techniques discussed here have almost similar results but DCS / blade plate requires absolute precision with no scope for some adjustment on table. While LCP is more user friendly technique. If there is intercondylar extension of fracture then LCP is the treatment of choice.

Keywords: Supra condylar fracture, Inter condylar extension, Condylar blade plate (L plate), Locking compression plate (LCP), Dynamic condylar screw (DCS)

Introduction:
This is one of the common injuries encountered in orthopaedics practice. Due to increase in incidence of high velocity trauma, the fracture and the fracture geometry pose difficult challenges to choose the modalities of fixation. The available modalities of fixation are-

• ‘L’ blade plate (Condylar blade plate)
• Dynamic condylar screw with plate (DCS plate)
• Locking compression plate (LCP)
• Intramedullary devices

‘L’ blade plate was the technique and in old days, very rarely now one sees this technique being adapted. It gives a good rigid fixation but technique require very high degree of precision also there is no or very minimal scope for on table adjustment, third thing is that it is not user friendly technique. [1,2]

DCS Plate: This is relatively user friendly technique. This technique also requires high degree of precision but the advantage in this technique is that there is scope for minimal adjustment on table. In this technique after reducing the fracture the condylar screw is placed over guide wire and is fixed to lateral aspect of shaft of femur with 95 degree barrel and plate. In supracondylar fracture / lower 1/3rd fracture of femur this technique provides rigid fixation. But if the fracture extends in the intercondylar region then the problem increased significantly to have good rigid fixation. [3,4]

LCP: This is the latest innovation in implants. This also provided good and stable internal fixation. This can be easily used in fracture with...
intercondylar extension where in the intercondylar fracture fixed with cannulated cancellous screw and over which the plate can be fixed. This is a very good and user friendly technique.\cite{3,5}

Intramedullary devices: intramedullary supracondylar nail \cite{6,7} is now a days discarded technique. The reasons were - Nail had to be placed from / within the knee joint, through the intercondylar notch; Increased incidence of secondary osteoarthritis knee / stiffness; Removal of implant was equally cumbersome; In case failure / migration of nail, the knee joint function was grossly deranged.

Also the interlocking nail of femur was tried in this fracture but it can’t give rigid and stable internal fixation because Medullary canal in lower 1/3rd femur is wide; Adequate bone-implant(nail) contact can’t be achieved; Stress is entirely on the interlocking bolts and Incidence of implant failure is increased. Amongst all modalities, the most commonly used modalities appear to be LCP and DCS with 95-degree barrel plate.

**Materials and Methods:**
A retrospective hospital based study was carried out during the period of February 2014 to February 2016 in Orthopaedics department of Rural Medical College, Loni, Maharashtra. A total 25 cases of fracture lower 1/3rd femur were collected and 23 cases were fixed with LCP, while 2 cases were fixed with DCS. The results were analysed and reported in observation and results.

**Inclusion criteria:**
- Age between 25 to 60 years
- Simple fracture
- High velocity trauma / RTA

**Exclusion criteria:**
- Pathological fracture
- Fracture in patients above 60 years
- Fracture in children

**Sample Size:**
A total of 25 cases operated and followed up in orthopaedics department of rural medical college, Loni, Maharashtra.

**Results:**

**Table 1: Showing parameters which was measured in this study**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>LCP</th>
<th>DCS with 95-degree barrel</th>
</tr>
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<tbody>
<tr>
<td>Surgery duration</td>
<td>1.5-2 hours</td>
<td>2 hours</td>
</tr>
<tr>
<td>Average blood loss</td>
<td>250 ml</td>
<td>250-300 ml</td>
</tr>
<tr>
<td>Average hospital stay</td>
<td>15 days</td>
<td>15-20 days</td>
</tr>
<tr>
<td>Non weight bearing walking</td>
<td>6-8 weeks</td>
<td>6-8 weeks</td>
</tr>
<tr>
<td>Quadriceps mobilisation</td>
<td>After 1 week</td>
<td>After 1 week</td>
</tr>
<tr>
<td>Hanging leg</td>
<td>After 1 month</td>
<td>After 1 month</td>
</tr>
<tr>
<td>Partial weight bearing walking</td>
<td>9th week onwards</td>
<td>9th week onwards</td>
</tr>
<tr>
<td>Full weight bearing walking</td>
<td>12th week</td>
<td>12th week</td>
</tr>
<tr>
<td>Average time for clinical union</td>
<td>12-16 weeks</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Average time for radiological union</td>
<td>24-28 weeks</td>
<td>24 weeks</td>
</tr>
</tbody>
</table>
Fig 1: Shows fracture supracondylar femur

Fig. 2: Shows fracture supracondylar femur treated with LCP

Fig. 3: Shows fracture supracondylar femur
Fig. 4: Shows fracture supracondylar femur treated with DCS

Chart 1: Showing total number of cases

Discussion:
The techniques mentioned above, require more or less same surgical exposure, but in DCS / Blade plate almost precision is required. Slight variation in implant placement can disturb reduction.[6,7,8] Some amount of adjustment is possible in DCS with 95-degee barrel. If there is intercondyilar extension of fracture, then blade plate or DCS have more problems while fixing the fracture. 2 cases operated for LCP had superficial infection while 1 case had chronic osteomyelitis in which revision surgery had done. Joint stiffness presented only in 3 cases in which range of movement was below 90 degrees. LCP is very much user friendly technique. This is ideal implant when Fracture lower 1/3rd femur has an intercondyilar extension.[9,10] Stiffness of knee is more or less equally seen in both the technique. Post-operative Range of motion is
around 0-90 degree. There is no significant difference in achieving clinical union. Post-operative infection / chronic osteomyelitis can entirely spoil the result of surgery. Both techniques provide rigid fixation of fracture.

**Conclusion:**
The Parameters with which the two techniques are compared in this study revealed most similar result and outcome. But since LCP is easy to fixed and a user-friendly technique; most of the surgeon prefer to use LCP than 95-degree DCS.

**References:**