Cervical Ossified Posterior Longitudinal Ligament

Kunal Shah¹, Manish Kothari¹, Abhay Nene¹

Introduction

Cervical ossified posterior longitudinal ligament is a common cause of myelopathy. It is frequently encountered in busy spine clinic with varied presentation; however there are lots of controversies in this topic. Etiopathogenesis and natural history is unknown and progression is unpredictable. Timing of surgery and type of approach is also controversial and many factors should be taken into account for surgical planning.

Nature, natural course and progression of ossified posterior longitudinal ligament (OPLL)

There are two types of ossification present. Endochondral ossification is always seen whereas intramembranous ossification is seen in few. Histologically OPLL represents normal bone; hence it’s less likely to dissolve on its own (1). The natural course of OPLL is not clearly defined. Various studies were undertaken to find factors affecting risk of progression. Age and family history were studied but were not found to affect progression (2). Mixed type of OPLL appeared to be progressive in one of the study; however the results of the study were variable (1). However, progression of OPLL (more than 2 mm in thickness and length) was seen in 60% of patients who underwent laminoplasty (3). OPLL masses that are contiguous with the vertebral body and have trabecular formation are useful findings for contiguous with the vertebral body and have trabecular formation are useful findings for progression (4).

Factors affecting development of myelopathy

Development of myelopathy in patients with OPLL depends on static and dynamic factors. Presence of thickened ossified ligament is denoted by occupancy ratio (thickness of the ossified lesion divided by the anteroposterior diameter of the spinal canal) and space available for cord (SAC). Occupancy ratio within the range of 30-60% has been found critical in several studies for development of myelopathy (5). SAC in a range of 6-9 mm is an indicator for myelopathy (6). Therefore occupancy ratio and SAC help in deciding surgical management in patients with mild symptoms. In patients with myelopathy having reasonably less thickened OPLL, dynamic factors play a major role in development of myelopathy (7). In patient with thickened OPLL with mild or no symptoms, the mechanism by which compressed cord mask the symptoms are unknown.

Management

Surgical treatment in ossified posterior longitudinal ligament is controversial and there are two schools of thoughts towards approaching this issue. Surgery is clearly indicated in patients with severe myelopathic signs and/or severe cord compression. In case of mild symptoms, some surgeons advocate prophylactic surgery since better surgical techniques have evolved and OPLL is not known to regress on its own. On the other hand certain surgeons oppose prophylactic surgery in view of inherent risk of neurodeficit in these surgeries and lack of literature supporting prophylactic surgery.

Conservative treatment

Skull traction, immobilization with collar, steroids and prostaglandin E1 has been described as conservative management. However their efficacy is not proven. There is no role of conservative management in patients where surgery is indicated (8).

Surgical management

Prognosis: The prognosis of recovery after surgery depends on age at surgery, duration of symptoms before surgery, severity of myelopathy prior to surgery, history of trauma etc (9).

Early versus late surgery: Prophylactic surgery helps as the surgical results depends on extent of myelopathy. However chance of progression is well documented after posterior surgery and at inoperable levels after anterior surgery. Also posterior surgery does not address OPLL physically. Prophylactic surgery is not advised based on current literature (1). Authors believe that aggressive management in early myelopathy gives better chance of recovery and decreases surgery related complications.

Anterior versus posterior surgery: Anterior surgery provides direct decompression while posterior surgery (laminectomy or laminoplasty) gives indirect decompression allowing the spinal cord to fall back. Studies have shown that occupancy ratio of more than 60% and hill shaped lesion, anterior surgery should be performed and posterior surgery gives poor result. Also posterior surgery does not always create adequate space in cases with locally protruded OPLL (10). Authors prefer posterior laminectomy in multilevel pathology and anterior surgery in focal compression with significant canal

¹Department of Spine Surgery, Wockhardt Hospital and Medical Research Centre Agripada, Dr Anand Rao Nair Road, Mumbai Central, Mumbai, India – 400008

Address of Correspondence

Dr. Abhay Nene
Department of Spine Surgery, Wockhardt Hospital and Medical Research Centre Agripada, Dr Anand Rao Nair Road, Mumbai Central, Mumbai, India – 400008
Email: abhaynene@yahoo.com
compromise. We believe that posterior surgery is surgically safer and quick with less cord handling and hence less chance of intraoperative complications. Anterior surgery although directly addresses OPLL and theoretically advisable, it is surgically challenging at times and one should be very careful of adhered dura with ossified mass. Figure 1 shows cervical myelopathy with significant focal compression and canal compromise operated with anterior surgery. Figure 2 shows diffuse OPLL operated with posterior decompression and lateral mass fixation.

Cervical spine alignment

Preoperative cervical spine alignment also plays a role in deciding type of approach. Anterior surgery is indicated in presence of focal kyphosis. Suda et al showed poor results with laminoplasty in presence of kyphotic alignment and suggested anterior surgery or posterior correction of kyphosis along with laminoplasty in such situation. Progression of kyphosis is seen at long term follow up with posterior surgery (11). Sakai et al and Iwasaki et al showed progression of kyphosis after laminoplasty procedure. This change in alignment is proven to be the cause of late neurological deterioration in some cases (12). Authors advise posterior laminectomy in lordotic spine and anterior surgery in kyphotic spine.

Progression of OPLL

Postoperative progression of OPLL is seen in some cases. Many authors have concluded that progression of OPLL after surgery is more after posterior surgery than anterior surgery. This causes late neurological deterioration in few (3). Recently few studies have shown posterior surgery with fixation prevents progression of OPLL (13). We believe that stable spine might prevent progression of OPLL, but majority of patients are elderly and osteoporotic, thus implant related complications are also high. Hence pros and cons of fixation should be weighed well before surgical planning.

Neurological outcome

Long term favorable neurological outcome is seen with anterior surgery than posterior surgery. This is because loss of lordosis and progression of OPLL is seen more often with posterior surgery and causes late neurological deterioration. Also creating a stable environment around the spinal cord by stabilization prevents progression of OPLL and improves alignment (12).

Complications of surgery

Anterior surgery has complications related to graft /implants, CSF leaks and has long learning curve. Commonly ossified dura is encountered increasing chance of CSF leak and neuro-deterioration (14). Hence some authors have described floating method in which some part of ossified lesion is left after decompressing the cord (15). Therefore posterior surgery is supposed to be comparatively safer procedure. Posterior cervical surgery is associated with complications of arm pain and loss of (10).

References

7) Matsunaga S, Nakamura K, Seichi A, Yokoyama T, Toh S, Ichimura S,


Conflict of Interest: NIL
Source of Support: NIL

How to Cite this Article

Spine Trauma Registry is one of the most ambitious projects of Indian Orthopaedic Research group. This is a very simple and Beautiful mobile app where data regarding Orthopaedic Trauma can be uploaded

Key Features:
1. Simple upload process - One patient’s data entry does not take more than 30 Sec
2. Direct OCR reading in the App that can fill in the data fields
3. Cloud sync of the data
4. All contributors to be acknowledged in the Research Publications

The Main aim of Trauma Registry® is to study the fracture patterns and configurations. In trauma registry the basic data that is required in age and gender of the patient along with preoperative X rays. We will be conducting epidemiological studies on the various fractures patterns and publishing the manuscript. Everyone who contributes cases in the app will get an acknowledgement in the research Publication. This will help us understand the fracture variations across the country and also the primary treatment modality. Currently we are starting with Five Projects - Spine Fracture Registry, Hip Registry, Proximal Tibia Registry, Wrist Registry and Paediatric Supracondylar Registry. You can contribute any trauma case but when you are filling data for any of the above five, simply mention the name of the study in the ‘Name of the Bone’ tab in the app

We believe together we can create history by having largest number of data regarding fracture patterns. Please Download the app by typing “Trauma Registry” in Google playstore or ios Appstore

Our Motto

“Research is excellence”

RESEARCH
EDUCATE
PUBLISH

How to Join IORG?

The Indian Orthopaedic Research Group is been developing new project over the years. This was not possible without support of our members. Our members are our strength. We urge you to join IORG as associate members and help us create something valuable for Indian Orthopaedics. Members have benefits of receiving a print of volume of their favourite Journal, access to online forums and portals like Orthopaedic Fellowships and Ortho-TV

To join IORG please visit www.iorg.co.in or scan the QR code

Join IORG and Get a List of 120 orthopaedics and related Journal links that provide Free Articles
# Journal Subscription Form

The Online Version of the Journal is OPEN ACCESS for perpetuity.

Subscription is for Print Issues

<table>
<thead>
<tr>
<th></th>
<th>Individual / Institutional (India)</th>
<th>Individual / Institutional (Other Countries)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Year</td>
<td>2 Year</td>
</tr>
<tr>
<td>Institutional</td>
<td>□ 2500 INR</td>
<td>□ 4500 INR</td>
</tr>
<tr>
<td>Individual</td>
<td>□ 2000 INR</td>
<td>□ 3500 INR</td>
</tr>
</tbody>
</table>

Please enter full address details (BLOCK CAPITALS)

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>Initials</td>
<td></td>
</tr>
<tr>
<td>Surname</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Country/State</td>
<td></td>
</tr>
<tr>
<td>Pin/Zip</td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td></td>
</tr>
<tr>
<td>Fax M</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td></td>
</tr>
</tbody>
</table>

The information you provide may be kept on a database. If you do not wish to receive further information from us, please tick here □

Enclosed is the Crossed Cheque*/DD No. _________________________ dated _____________ drawn on_________________________ favoring “Orthopaedic Research Group” for _________________ payable at Mumbai.

Online Payment facility available using Credit/debit card. Please fill the form and email soft copy of the receipt with form

Please intimate any address change to editorial Office. For any queries please contact the editorial office

International Journal of Spine

Editorial office, IORG House, A-203, Manthan Apts, Shreesh CHS, Hajuri Road, Thane [W]
Maharashtra, India. Pin 400604
Tel- 02225834545 (office time 10-5 pm, Mon-Fri)
Customer care: write to us at editor.ijspine@gmail.com for any subscription related inquiry

Please fill the form and send along with payment details to editor.ijspine@gmail.com, drashokshyam@gmail.com, poonamsaroj86@gmail.com (To all three email ID’s)

Online Subscription is available using online payment options
Visit www.ijsonline.com for more information

An Orthopaedic Research Group Initiative
Indian Orthopaedic Research Group ● International Orthopaedic Research Group

ResearchOne Publishing House