Chronic Pain Management
Current Perspectives

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Pain: Major cause for suffering
Chronic Pain is a Disease State

The Relief of Pain should be a Human Right
Key Issues in Chronic Pain Management

- Concept on Pain as a Continuum (Acute to Chronic Pain)
- Need for Specialised Pain Management Clinics for management of Acute and Chronic pain
- Advances in Spinal Pain Management
- Neuropathic Pain Syndromes (Challenges in Management)
- Advanced Interventional Pain Management
Learning Objectives of the Fellowship

1. An overview of current perspectives on pain management
2. How to assess and evaluate Pain and diagnosis of the cause of chronic pain
3. How to plan your treatment
4. Overview on Advanced Interventions in chronic pain management
5. Live demonstration of common regional blocks and pain management procedures. Hands On Experience
Concept of Pain

IASP Definition of Pain (1984) “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such a damage”

- Types Of Pain
- Acute vs Chronic Pain
Pain can be divided into two broad categories, neuropathic and nociceptive.

<table>
<thead>
<tr>
<th>Neuropathic pain</th>
<th>Nociceptive pain</th>
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<tbody>
<tr>
<td>A ‘burning’ ‘shooting’ and ‘tingling’ pain</td>
<td>A ‘dull’, ‘sharp’ and/or ‘aching’ pain</td>
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<td>Primary lesion or dysfunction in the nervous system:</td>
<td>Visceral pathology or damage to joints or muscles:</td>
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<tr>
<td>• sympathetically maintained pain</td>
<td>• trauma</td>
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<tr>
<td>• complex regional pain</td>
<td>• inflammation</td>
</tr>
<tr>
<td>• spinal cord injury</td>
<td>• visceral distension</td>
</tr>
<tr>
<td><strong>Diagnosis</strong>: clinical characteristics,</td>
<td>• neoplastic infiltration</td>
</tr>
<tr>
<td>X-rays, computed tomography, MRI, myelograms</td>
<td><strong>Diagnosis</strong>: clinical characteristics,</td>
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<tr>
<td></td>
<td>neurological evaluation, quantitative sensory test,</td>
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<td>nerve-conduction studies</td>
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Acute Vs Chronic Pain

- Two different entities?
- Duration of Pain has no relevance
- Concept of a Continuum
Concept of Pain as Continuum

- Concept of Pain as a *continuum* - Progression from Acute to Chronic Pain is very swift

There is enough evidence that:

- Biological and psychological foundation for long term persistent pain is in place within hours of injury
Concept of Pain

**Continuum**

- “Acute Pain” Swiftly becomes “Chronic”.

- CNS plasticity, reorganisation can occur within minutes.

- Neuropathic pain can develop within 24 hrs. of nerve injury surgery/trauma.
Progression from Acute to Chronic Pain

Figure 1
Activation of NMDA receptors

- Persistent release of Glutamate as seen in untreated acute pain activates AMPA receptors and dislodges Mg++ and activates NMDA receptors.
NMDA receptor activation causes nociceptors to release **Substance P** which binds to NK-I receptors, leading to amplification of pain signals and production of **C-fos** oncogene signalling. **Onset of Chronic Pain**
Can We Prevent Chronic Pain?

As treatment of Chronic Pain is so difficult and expensive, can we prevent occurrence of Chronic Pain?

Yes, We Can by treating Acute Pain aggressively.
Steps in Production of Pain

Nociception

Perception

Expression of pain

Treatment

Specificity (Somatic nerves)

Intensity (Autonomic Nerves)

(inhibiting pathways,
Endorphins)

(Beliefs, cultural, social

cognitive status, somatization)
Taking History of a Pain patient

“Healing begins with history”

- Cornerstone of accurate Pain diagnosis is relevant medical history.
- No expensive investigation can substitute the role of history.
Pain Management: Role of History taking

1. Patients description of Pain (Visceral, neuralgia, myofacial)
2. History of trauma, surgery or medical illness
3. Continuous pain or daily variations
4. Findings of earlier investigations
5. Medical, Psychiatric, social, employment/family history
Multidimensional Assessment of Pain

- Cause (pathological or not)
- Intensity (VAS, verbal)
- Cognitive functions (MMSQ)
- Mechanism (neuropathic or nociceptive)
- Psychosocial distress
- Other related symptoms
Pain Scales For Pain Assessment

Characterization Of Pain

Pain Intensity (VAS)

Mutidimensional Assessment
Visual Analogue Score (VAS)
Assessment of Pain

Performance Scales

- Activities of Daily score
- Quality of life (QOL) scores (SF36)
- Eastern co-operating oncology group and karnofsky rating
- WHO QOL score
Behavioural Signs indicative of Pain in children

<table>
<thead>
<tr>
<th>Behavioural Signs</th>
<th>Duration of Pain</th>
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<tbody>
<tr>
<td></td>
<td>Brief</td>
</tr>
<tr>
<td>Crying</td>
<td>+</td>
</tr>
<tr>
<td>Distressed facial expression</td>
<td>+</td>
</tr>
<tr>
<td>Lack of interest</td>
<td></td>
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<tr>
<td>Sleeping difficulties</td>
<td>+</td>
</tr>
<tr>
<td>Decreased ability to concentrate</td>
<td>+</td>
</tr>
<tr>
<td>Motor disturbances</td>
<td>+</td>
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Need for Pain Management Clinics?

- Pain Medicine is now a superspeciality.
- Tremendous scope for basic research, clinical research and trial of newer pharmacological agents.
- Interventions are the cornerstones in Acute & Chronic Pain Management.
- Comprehensive care provided to patients with chronic Pain.
Types of Chronic Pain Syndromes seen in Pain Management Clinics

A) **Neuropathic Pain Syndromes (30%)**
   (Neurogenic and sympathetically mediated pain, CRPS Post herpetic, trigeminal, peripheral neuropathies)

B) **Musculoskeletal Pain (60%)**
   (Low back Pain, Failed back, Polyarthralgia, Fibromyalgia)

C) **Vascular Pain**
   (Peripheral vascular disease, headaches, Raynauds)

D) **Central Pain**  (Phantom Pain, thalamic pain

E) **Cancer Pain**
Advances in Diagnostic modalities of Pain

Newer Diagnostic modalities available for pain assessment

- Thermography
- Doppler - flow studies
- Sensory Evoked Potentials
- Nerve Conduction Velocities
- PET Scans
- Epiduroscopy, epidurography
Epiduroscopy
Interventional Modalities for Pain Management

**Expanding Pain Management Modalities**

1. Interventions for Back Pain
2. Neurolytic blocks (CT & Fluroscope Guided)
3. Continuous epidural / spinals
4. Radiofrequency lesioning
5. Spinal Cord Stimulation
6. Intrathecal drug delivery Systems implanted pumps
Interventional pain management

Minimally invasive
- Sympathetic nerve block(s)
- IV regional block(s)
- Somatic nerve block(s)

Inadequate or partial response

More invasive
- Epidural and plexus catheter blocks
- Neurostimulation
- Intrathecal drug therapy (e.g. Baclofen)

Inadequate or partial response

Surgical or experimental therapies
- Sympathectomy
- Motor cortex stimulation

Progress
Failure to progress in rehab
Role Of Pain Management Clinics
Aetiology of Low Back and/or Leg Pain

Spondylolysis/spondylolisthesis

Degenerative changes in intravertebral joints

Fracture (traumatic or osteoporotic)

Static abnormalities e.g. scoliosis

Spinal stenosis

Chronic rheumatoid inflammation of the spinal cord

Many of these conditions may require surgery, which may result in FBSS
Failed Back Surgery Syndrome (FBSS)

- FBSS is persistent or recurrent pain, mainly in the region of the lower back and legs, even after technically, anatomically successful lumbosacral spine surgeries.

- Post-operative ‘chronic back and leg pain (CBLP) syndrome’ is sometimes used to refer to FBSS.

- Pain can be predominantly in the back or the leg or both.
Causes and Symptoms of FBSS

FBSS can be caused by:

- irreversible nerve injury
- surgical complications
- psychosocial problems
- inappropriate selection of patients for surgery
- recurrent herniation
- wrong level of operation
Even after a clinically successful surgery the patient can still have pain.
Managing Back Pain with Epidural Injections

- AP
- lateral
- Myelogram

- MRI
- T2-weighted
Why Interventions?

- Longer the duration of nerve root irritation pain, more the incidence of Neuropathic component of Pain.
- Constant inflammation and irritation of the root can initiate the process of Central sensitisation.
- Disabling pain, paresthesia can deteriorate the Quality of Life significantly resulting in a SPINAL CRIPPLE.
Interventions for Management

- Targetted Epidural injection and diagnostic Epidurography
- Root Sleeve Injections for assessing lateral recess and placement of drugs
- Transforaminal Epidural Adhesiolysis
- Catheter placement in central canal foramina/lateral recess for Adhesiolysis
Translaminar Epidural Block
Transforaminal Epidural Interventions

- Preferred in Radicular Pain
- Instillation of Drug at the site of inflammation
- Can be used for adhesiolysis in canal/recess stenosis too.
- Lesser dose of drugs required by this approach
Transforaminal/Root sleeve Injection: Why?
Needle Position in Transforaminal Epidural

Needle position for transforaminal epidural injection or selective nerve root injection.
Transforaminal Catheter placement for Epidural Adhesiolysis
Percutaneous Epidural Adhesiolysis In FBSS

- Stainless steel, fluoropolymer coated, spiral tipped catheter (Racz catheter) with a 15° bend
- Specially designed epidural needle (16G), bevel faces the ventrolateral aspect of caudal canal.
Percutaneous Nucleoplasty

- Selection Criteria for Nucleoplasty
- Radicular/Axial Pain
  - Leg pain > back pain
  - MRI evidence of contained Herniated NP
- Failure of 6 weeks of conservative therapy
- Axial Pain
  - Discography positive of concordant pain
Contraindications

- Severe degenerative disc disease with loss of >33% disc height
- Disc extrusion/sequestration
- Moderate to severe spinal stenosis
- Tumor, infection, fracture
Neuropathic Pain and challenges in its Management
Neuropathic Pain
Issues and Challenges

• Common, often distressing, sometimes disabling and even fatal.
• 25 - 50 % of all pain clinic visits
• Underassessed and undertreated
• Patients not believed
Neuropathic Pain Prevalence

- HIV associated Pain
- Post Stroke Pain
- Phantom Pain
- Cancer Related Spinal Cord Injury
- Trigeminal Neuralgia
- Causalgia, CRPS Type I
- Lumbosacral Radiculitis
- Post herpetic Neuralgia
- Diabetic Neuropathy

Prevalence values:
- 0.1
- 0.2
- 0.3
- 0.4
- 0.5
- 0.6
- 0.7
Unified Hypothesis of pathophysiology of all neuropathic pain states is still not possible.
Neuropathic Pain Symptoms

Different from `normal' pain!“
3 Groups of Symptoms :

- spontaneous continuous pain
  - "burning, cramping"
- spontaneous paroxysmal pain
  - "electric shock like, shooting"
- spontaneous dysaesthetic sensations
  - "itching; tingling; "
Typical Neuropathic Pain Syndromes

- **peripheral neuropathies**
  - metabolic: diabetic,
  - toxic: alcohol, chemotherapy
  - postinfectious: Post Herpetic
- **posttraumatic**
  - sciatica
  - nerve entrapment
  - phantom limb pain
  - CRPS (Complex Regional Pain Syndrome [RSD])
- **spinal cord injury**
- **post-stroke pain**
Postulated Mechanisms of Neuropathic Pain

Brain
- Cerebral reorganisation
- Molecular changes

Spinal cord
- Spinal cord anatomical reorganisation
- Dorsal horn denervation hypersensitivity
- Molecular changes

Peripheral nerve fibers

Sympathetic Fibers

Ephaptic crosstalk
- Ectopic discharges
- Mechanosensitivity
- Nociceptive sensitization
Our Protocol of Treatment of Neuropathic Pain

Neuropathic pain

- Tricyclic antidepressants—Amitriptyline/Duloxetine
- Gabapentin/Pregabalin

Sympathetic nervous System contribution

Sympathetic plexus block

± Topical medication
± TENS
± Psychological Management
± Botulinum Toxin A
Current Therapies for Neuropathic Pain

- Antidepressants
  - TCAs (Amitryptiline)
  - SSRIs / SNRIs (Duloxetine)

- Anticonvulsants
  - First generation - Carbamazepine
  - Second & third generation - Pregabalin

- Antiarrhythmics

- Topical agents (Capsaicin)

- Opiate and atypical opiate analgesics
Aggressive Multimodal Regimen
Continuous Stellate Ganglion Block
+ Pregabalin
Impending Gangrene due to vasculitis (pre-block)
Continuous Cervical Sympathetic plexus Block
Gangrene & Amputation averted by Plexus Block
Signs and Symptoms of CRPS
Signs and Symptoms of CRPS
Managing CRPS

- Aggressive Multimodal regimen
- Sympathetic Blocks with LA: Repeated Stellate Ganglion Blocks/Lumbar sympathetic blocks
- Vasodilator drugs
- Third generation anticonvulsants e.g. pregabalin
- Physiotherapy
Management of Fibromyalgia Syndrome
Fibromyalgia Syndrome

- Syndrome of unknown etiology and poorly understood cause of pain
- Widespread joint and muscle pain
- Presence of multiple tender points
- Diagnostic criteria standardized (ACR 1990)
Fibromyalgia
Thermographic Mapping of Pain

Upper Back Pain

Lower Back Pain
Fibromyalgia Syndrome
18 Tender Points
Understanding of the scientific basis of pain is crucial for an effective treatment regimen.

Fibromyalgia is a central pain state involving disturbances of neurochemical pathways (central sensitisation).

Disordered sensory processing.
Diabetic Neuropathy

This neuropathic disorder includes manifestations in the somatic and/or autonomic parts of the peripheral nervous system.

San Antonio Consensus statement 1988
30% of diabetics have painful neuropathies

Good glycemic control is the key to prevent and treat diabetic neuropathy

Pregabalin and tricyclics/Duloxitine are first line therapeutic agents

Early intervention is mandatory

Opioids may be administered in refractory painful diabetic neuropathy
Advanced Interventions in Pain Management

- Neuromodulation Therapy
- Spinal Cord (Dorsal Column Stimulation)
- Intrathecal Drug Delivery systems
- Radiofrequency Neurotomy (Pulsed Radiofrequency)
What is Neuromodulation Pain Therapy?

- Segmental blockade of neural transmission
- Activation of Neurotransmitters and neuromodulators
- Activation of central inhibitory mechanisms influencing sympathetic efferents
- Direct action on Opiate receptors
What is Neurostimulation and how does it work?

- Neurostimulation uses a small implanted system to send precisely controlled mild electrical impulses to the nervous system.

- The patient feels the Neurostimulation as a pleasant tingling sensation, also known as “paraesthesias”.

- Neurostimulation is divided:
  - Spinal cord stimulation (SCS)
  - Peripheral nerve stimulation (PNS)
Spinal Cord Stimulator Implantation

Indications

- Failed Back Pain Unresponsive to conservative & interventional management
- Severe Arachnoiditis & neuropathic pain
- Vascular Pain
- Complex Regional Pain Syndrome (CRPS)
Radiographic confirmation of Lead Placement
Permanent Implant Of Stimulating Device
Spinal Cord Stimulator Implant

**Results:**
- Pain reduction varying from 40-75%
- Significant improvement in quality of life
- 27 out of 34 patients have regained mobility
  /normal activities of daily living
Intrathecal Drug delivery systems for Chronic Pain Management

When all else fails........
Trial system
Upper extremity - Between C2 & C5

Foot - Between T11 & L1

Lower extremity - At T9-10 level

Low back - Between T8 & T10

Chest - At T1-2 level

Occipital neuralgia - At C1-2 levels

Pelvic pain - At S2-S4 levels
Pain Syndromes responsive to Intraspinal Drugs

* Nociceptive Pain (opioid responsive)
* Neuropathic Pain (may require higher doses of opioids than nociceptive pain).

Use of adjuncts such as clonidine, midazolam etc. intrathecally potentiates analgesia in neuropathic pain
Implantable Externally Programmable Systems
Radiofrequency Lesioning in Pain Management
Radiofrequency Ablation/Lesioning

RF Ablation is a common modality for chronic pain management

- Lumbar sympathectomy
- Facet Joints (Thoracic/lumbar/cervical)
- Trigeminal neurectomy
- Stellate Ganglion/superior Hypogastric plexus
- Dorsal Rhizotomy
Radiofrequency Lesioning of Lumbar/Cervicothoracic Plexus

- Peripheral vascular Disease / CRPS → Prevalence is very high
- Day-care procedure
- Excellent results
- Limb saving
Pain Management: Newer Paradigms

Key Issues:

- A step ladder approach or following a Pain continuum is the ideal approach
- Multimodal Therapy is the most effective treatment concept for chronic pain syndromes
- Advanced Interventions are mandatory when all conventional modalities fail
- Emphasis on the Quality of Life than just pain relief
A smiling face....

It is really our privilege to treat pain - for surely
‘Pain relief is a basic human right’
Thank You