TREATMENT FOR PAINFUL DIABETIC POLYNEUROPATHY

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Algesiologist & Acupuncturist
Hospital Kuala Lumpur
Polyneuropathy induced by Diabetes Mellitus (DM) is one of the most prevalent forms of neuropathy.

• Estimated value: 246 millions of people worldwide have DM. (4.1% of world population)

• Between 20-30 millions of them are at risk for polyneuropathy (8.1 – 12.2% of DM patients.)

MALAYSIA – Estimated DM patients is around 3 millions (11% of population)

• DM polyneuropathy?

• Simple estimation: Between 240,000 – 360,000 people

National Health Morbidity Survey 2011
1. Around 80% of patients with DM induced polyneuropathy will have distal and symmetrical pain presentation.

2. Inadequate treatment of DM in young people can lead to diabetic polyneuropathy within only a few months*.

1. Direct toxic effect of glucose on nerve cells.

2. Oxydative stress caused by hyperglycemia and other metabolic disorders lead to microvascular dysfunction, which damage the vasa nervorum.

*Wouter pluijms et al- Painful Diabetic Polyneuropathy. EBM of Interventional Pain Medicine, 2009*
1. ‘Distal and symmetrical peripheral neuropathy is the most frequent form of PDN.

**THREE Types** of nerves fibres might damaged:

- Small and unmyelinated C fibres
- Thicker fibres, Aδ and Aβ

Diagnosis of PDN

History

1. Distal, symmetric type of pain

2. Initially symptoms present in the feet and gradually goes up
   - Term as ‘Length dependent diabetic polyneuropathy (LDDP)’

3. Once sensation defect reach the knees, the hands may involved.
Initial symptoms:

1. Sign of diminished sensation, burning feet, tingling and shooting sensation.

2. Symptoms particularly worsen on night and during touch.

Wouter Pluijms et al- Painful Diabetic Polyneuropathy. EBM of Interventional Pain Medicine, 2009
<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Hardly noticed</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Strongly</th>
<th>Very Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Do you suffer from a burning sensation in the marked areas?</td>
<td></td>
<td></td>
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<tr>
<td><strong>2.</strong> Do you have a tingling or pricking of needless sensation or sensation like crawling ants?</td>
<td></td>
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<td></td>
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<tr>
<td><strong>3.</strong> Is light touching (life touch of clothes, blanket) in this area painful?</td>
<td></td>
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<tr>
<td><strong>4.</strong> Do you have sudden pain attacks in the area of your pain like electric shocks?</td>
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<tr>
<td><strong>5.</strong> Is application of cold or heat in this area painful?</td>
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<tr>
<td><strong>6.</strong> Do you suffer from a sensation of numbness in the areas that you marked?</td>
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<tr>
<td><strong>7.</strong> Does slight pressure in this area, (eg. with a finger) trigger or aggravate your pain?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

0 1 2 3 4 5
1. Do you suffer from a burning sensation in the marked areas?

2. Do you have a tingling or pricking of needless sensation or sensation like crawling ants?

3. Is light touching (life touch of clothes, blanket) in this area painful?

4. Do you have sudden pain attacks in the area of your pain like electric shocks?

5. Is application of cold or heat in this area painful?

6. Do you suffer from a sensation of numbness in the areas that you marked?

7. Does slight pressure in this area, (eg. with a finger) trigger or aggravate your pain?

Score: 19/35
Diagnosis mainly depend on history and physical examination

1. **Common somatosensory findings:**
   - Diminished sensitivity to pin prick
   - Reduced temperature sensitivity
   - Reduced pressure/vibration sensation
   - Decrease in proprioception

Van Doorn P, Van Engelen- Polyneuropathy. EBM of Interventional Pain Medicine, 2009
2. Allodynia and hyperpathia can also occur.

3. Reflexes

4. Muscle strength

Findings should be symmetrical

Van Doorn P, Van Engelen- Polyneuropathy. EBM of Interventional Pain Medicine, 2009
1. Electromyogram (EMG)

EMG may show conduction delay but a normal EMG does not exclude Length Dependent Diabetic Polyneuropathy (LDDP) because EMG mainly measures larger fibres.

1. Proper treatment of underlying DM is essential as prevention.

2. Once painful diabetic polyneuropathy developed – spontaneous recovery is rare.

Wouter Pluijms et al - Painful Diabetic Polyneuropathy. EBM of Interventional Pain Medicine, 2009
Painful Diabetic Polyneuropathy

Treatment options:

**Brain**
- Descending Modulation
  - Central α2 agonist
  - TCAs
  - SSNRI
  - Opioid/Tramadol

**Spinal Cord**
- Central Sensitization
  - Opioids/Tramadol
  - Central 2 agonist
  - Glutamate antagonist
  - α2 delta antagonist
  - Paracetamol

**Peripheral Sensitization**
- Anti convulsants
- Local anesthetics
- Opioids/Tramadol

**Nerve Terminal**
- NSAIDS
- Vaniloids

**Small-fiber neuropathy**
- Sensory loss: 0 – + (thermal allodynia)
- Pain: + – +++
- Tendon reflex: N – ↓
- Motor deficit: 0
Painful Diabetic Polyneuropathy

First Line treatment

Brain

Descending Modulation

TCAs
SSNRIs

Spinal Cord

Central Sensitization

Anti convulsants

Glutamate antagonist
α2delta antagonist

Peripheral Sensitization

Jensen et al – New Perspective on the management of DM Peripheral Neuropathy. Diab Vasc Dis 2006
## Painful Diabetic Polyneuropathy

**First Line treatment**

<table>
<thead>
<tr>
<th></th>
<th>Medicine</th>
<th>Dosage and side effects</th>
<th>Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCA</td>
<td>Amitryptillin</td>
<td>10-25mg ON Can increase up to 150mg ON Dry mouth, drowsiness urinary retention</td>
<td>Contra indicated in IHD and old patients</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Anti convulsant, Glutamate antagonist, α2 delta antagonist</td>
<td>Gabapentin</td>
<td>300mg Nocte – 900mg TDS Dizziness, sedation, mild peripheral oedema</td>
<td>Need to adjust dose in CRF</td>
</tr>
<tr>
<td></td>
<td>Pregabalin</td>
<td>75mg nocte – 300mg BD</td>
<td></td>
</tr>
<tr>
<td>SSNRI</td>
<td>Duloxetine</td>
<td>30 mg BD - 60mg BD Dry mouth, constipation, tiredness</td>
<td></td>
</tr>
</tbody>
</table>

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Jensen et al – New Perspective on the management of DM Peripheral Neuropathy. Diab Vasc Dis 2006
Painful Diabetic Polyneuropathy

Second Line treatment

1. **AMITRIPTYLINE + GABAPENTIN**

2. **AMITRIPTYLINE + PREGABALIN**

Jensen et al – New Perspective on the management of DM Peripheral Neuropathy.

*Diab Vasc Dis 2006*
Painful Diabetic Polyneuropathy

Third line treatment

AMITRIPTYLINE + GABAPENTIN/PREGABALIN + TRAMADOL + TOPICAL 5% LIDOCAINE

Brain

Descending Modulation

Opioid/Tramadol

Spinal Cord

Central Sensitization

Opioids/Tramadol

Peripheral Sensitization

Local anesthetics Opioids/Tramadol

Jensen et al – New Perspective on the management of DM Peripheral Neuropathy. Diab Vasc Dis 2006
Painful peripheral vascular pathology such as Raynaud’s disease, Buerger’s disease and Frost bite with neuropathic component of pain generally follow similar technique of pharmacological treatment.
Painful Diabetic Polyneuropathy
Refractory Cases

Need referral to Pain Physicians:

Intravenous lidocaine 4-5mg/kg over 4-6H 4weekly for 3-4 times can be tried.

Viola V et al, - Treatment of intractable painful diabetic neuropathy with intravenous lidocaine; J diabetes complications 2006

Similar technique can be used for painful peripheral vascular pathology
Painful Diabetic Polyneuropathy

Refractory Cases

Trial of lumbar sympathetic block:
Trial of lumbar sympathetic block: 
Case Report

Sympathetic Blocks Provided Sustained Pain Relief in a Patient with Refractory Painful Diabetic Neuropathy

Jianguo Cheng, 1 Anuj Daftari, 2 and Lan Zhou 3

1Department of Pain Management, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195, USA
2Department of Physical Medicine and Rehabilitation, Metrohealth Medical Center, 2500 Metrohealth Drive, Cleveland, OH 44109, USA
3Department of Neurology, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195, USA

A Patient with Acute Painful Diabetic Neuropathy Successfully Treated by Lumbar Sympathetic Ganglion Block.

Accession number; 02A0917510
Title; A Patient with Acute Painful Diabetic Neuropathy Successfully Treated by Lumbar Sympathetic Ganglion Block.

Author; NIGUMA TAKAE (Himejisekijujibyoin Masuika) MATSUMOTO MUTSUKO (Himejisekijujibyoin Masuika) Yaida Yutaka (Himejisekijujibyoin Masuika) OKAWA MASAHIRO (Himejisekijujibyoin Masuika) SATO KENJI (Himejisekijujibyoin Masuika) KURODA SANAE (Himejisekijujibyoin Masuika)

Journal Title; Journal of Japan Society for Clinical Anesthesia
Painful Diabetic Polyneuropathy

Refractory Cases

Trial of spinal cord stimulator:
Painful Diabetic Polyneuropathy

Refractory Cases

Spinal cord stimulator:

Level of evidence 2C+
4 observational studies have been published.
Long term follow up shows >50% pain relieve in
60% of patients at 2.5 years

Similar technique can be used for painful peripheral vascular pathology such as arteriosclerotic vascular disease, Buerger’s disease, Raynaud’s phenomenon and disease, reconstructive vascular surgery after arterial embolic occlusion, and frostbite.

-Prof Dr Peter Teddy
Consultant neurosurgeon &
Fellow, Royal Melbourne
Painful Diabetic Polyneuropathy

Other methods

Psychological approaches:
- Pacing
- Breathing and relaxation
- Distracting & focusing

Physiotherapy

Acupuncture
Painful Diabetic Polyneuropathy

OUR FINAL TARGET

Diagnosis

- Treat underlying condition/symptomatic treatment

Reduce pain

- Improve physical functioning
- Reduce psychological distress
- Improve overall quality of life

Prevention (if applicable)

Small-fiber neuropathy

Sensory loss: 0 – +
(thermal allodynia)
Pain: + – +++
Tendon reflex: N – ↓
Motor deficit: 0
Thank You