

# Chronic Neuropathic Painful Condition: Cervical Radiculopathy, Nerve Root Avulsion, Stinger and Burners, Cervical Epidural Steroid Injection

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## Neuropathic Pain Syndrome

### Two Types of Pain

- Nociceptive : Somatic, Visceral
- Neuropathic

### Neuropathic Pain (International Asso. for the Study of Pain)

- Pain initiated or caused by a primary lesion or dysfunction in the nervous system

### Common Neuropathic Pain Syndromes (NPS)

- Peripheral NPS
  - ✓ Polyneuropathy : DM, HIV, Chemotherapy
  - ✓ Mononeuropathy : Traumatic, Causalgia, Plexus avulsion, Neuroma
- Central NPS
  - ✓ Central poststroke pain
  - ✓ Multiple sclerosis pain
  - ✓ Parkinson disease pain
  - ✓ Spinal cord injury pain

### Characteristics of Pain Suffering from Neuropathic Pain

- Describing Pain
  - ✓ Electricity, Squeezing, Deep aching, Jabbing, Broken glass, Cramping
  - ✓ Spasm, Like a sunburn
- Words Indicating Temperature to Describe the Pain
  - ✓ Burning, Icy cold, Frostbite
- Abnormal Sensations Pain (Paresthesia, Dysesthesia)
  - ✓ Tingling, Pricking, Itching

## Chronic Neuropathic Painful Conditions

### A. Cervical Radiculopathy

#### Pathology

- Cervical Spondylosis
- Disc Herniation

#### Generation

- Acute
- Subacute or Insidious

#### Cervical Radiculopathy in Athletes

- Burner or Stinger
  - ✓ Injury caused by either traction or compressive forces to the brachial plexus or cervical nerve roots

#### Incidence

- C7 : 60%
- C6 : 25%

#### Main Complaint

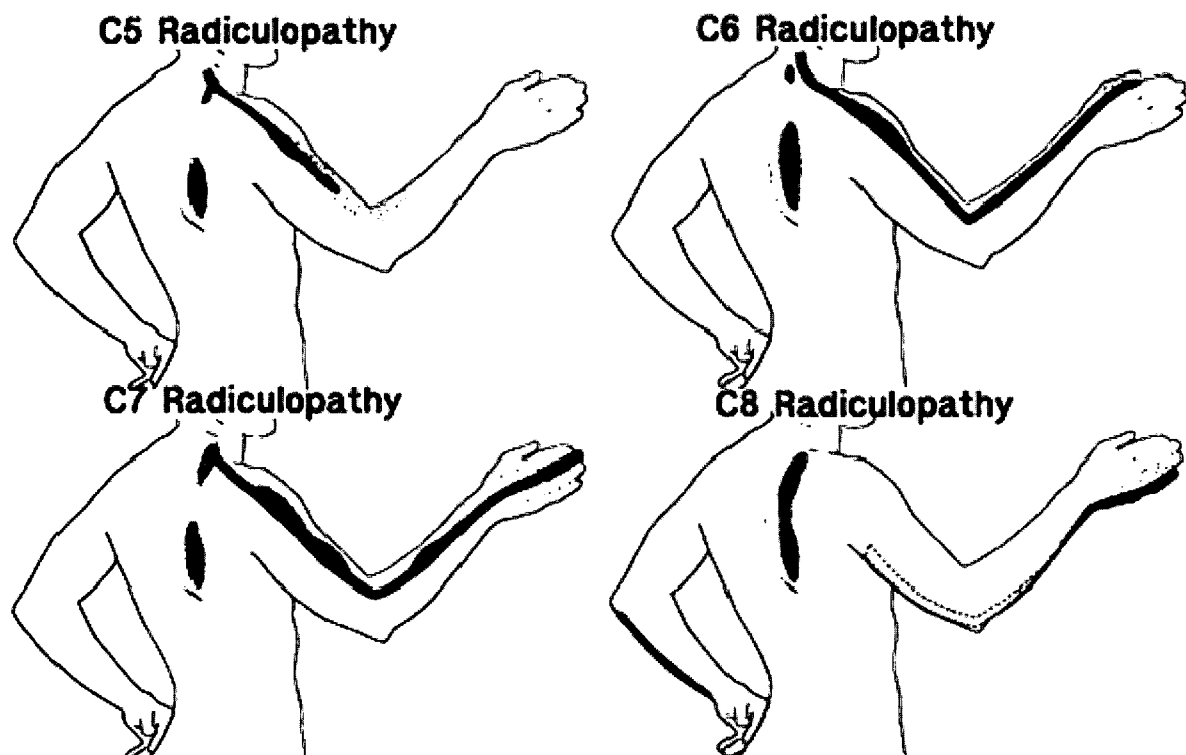
- Pain
- Numbness
- Weakness

#### Characteristics of Symptom

- Increase or decrease of pain according to the activities and head position
- Insidious onset of neck and arm discomfort
- Discomfort: from dull ache to severe burning pain
- Radiating Pattern
  - ✓ Referred pain to the medial scapula
  - ✓ Radiating pain to upper arm and into the hand
  - ✓ Depending on the involved nerve root

Root Level	Disc Level	Fundings	DDx
C5	C4-C5	Radiation to lateral elbow Weakness of deltoid, biceps, RC muscle Decreased biceps reflex	RC arthropathy Suprascapular neuropathy Axillary neuropathy Lateral epicondylitis
C6	C5-C6	Radiation to medial scapula and/or along lateral arm to the thumb Weakness of biceps and wrist extensors Decreased biceps, brachioradialis reflex	Median or radial sensory neuropathy DeQuervain's tenosynovitis
C7	C6-C7	Radiation to medial scapula and /or along lateral arm to the middle finger Weakness of the triceps and pronator Decreased triceps and pronator reflexes	Median neuropathy
C8	C7-C8	Radiation along medial arm to small finger Weakness of finger extension and abduction and ulnar deviation of the wrist Normal reflexes	Ulnar neuropathy Thoracic outlet syndrome

- Location of Pain and paresthesia



## **Examination**

- Observation
  - ✓ ROM of the neck and shoulder
  - ✓ Scapulothoracic dysrhythmia
- Palpation
  - ✓ Tenderness
  - ✓ Hypertonicity or spasm
- Motor
  - ✓ Weakness of shoulder abduction : C5
  - ✓ Weakness of elbow flex. and wrist ext. : C6
  - ✓ Weakness of elbow ext. and wrist flex : C7
  - ✓ Weakness of thumb ext. and ulnar deviation of wrist : C8
- Sensory
- Deep Tendon Reflex
- Provocative Test
  - ✓ Spurling test
  - ✓ Manual cervical distraction test
  - ✓ L'hermitte's sign
  - ✓ Shoulder abduction relief sign

## **Diagnostic Test**

- Plain Radiograph
- Computed Tomography
- MRI
- Electrodiagnostic Study

## **Brachial Plexopathies**

### **(1) Stretch, Compression and Other Traumatic Injury**

#### **Susceptibility to Injury**

- Superficial Location
- Mobility of the Shoulder and Neck
- Its Close Proximity to Many Bony Structures

#### **Injury Mechanism**

- Stretch Injury
- Compressed Injury

- Fracture and Dislocation of the Shoulder

#### **Complicating Matters**

- Cervical Nerve Root Avulsion
- Injury to the Spinal Cord
- Damage to Individual Nerve from the Plexus

#### **Site of Lesion (Prognostic Factor)**

- Lesion Proximal to the Dorsal Root Ganglion  
: Preganglions or Root avulsion
- Lesion Distal to the Dorsal Root Ganglion  
: Postganglionic

### **(2) Nerve Root Avulsion**

#### **Definition**

- Tearing of the dorsal and ventral roots of one or more spinal nerves
- Particularly serious result of stretch injuries to the brachial plexus

#### **Involving Site**

- Lower Cervical Root : most often

#### **Clinical Manifestation**

- Pain  
√ Hot, Burning, Electric shock, Pressure sensation
- Paresthesia
- Paralyzed Musculature

#### **Topographic Distribution of Pain**

- C5 : Shoulder pain
- C6 -T1 : Hand and forearm pain

#### **Diagnosis**

- Careful Physical Examination
- CT Myelography, Myelography  
√ 85% accuracy, Pseudomeningocele
- MRI  
√ 52% accuracy , Less satisfactory
- EMG  
√ Sensory action potential  
√ Somatosensory evoked potential

#### **Differential Diagnosis (If, Bilateral Multiple Avulsion)**

- Central Cervical Spinal Cord Injury
- Bilateral Brachial Plexus Injury
- Conversion Disorder

### **Prognosis**

- Spontaneous Recovery from Neuropraxia  
: 3-4 months after injury
- Consideration of Surgical Exploration
  - ✓ If no nerve regeneration is present after 4 months
  - ✓ If EMG study show evidence of severe axonal degeneration

## **(3) Stinger or Burner Syndrome**

### **Definition**

- Stretch or compression injury of the cervical roots or brachial plexus
- Colloquial terms used by athletes and trainers to describe a set of symptoms that involve pain, burning and tingling down an arm

### **History**

- Clancy et al , 1977 (AJSM)  
✓ Cervical nerve pinch syndrome
- Sallis et al , 1992 (Phy Sports Med)
- Levitz et al , 1997 (AJSM)  
✓ Chronic burner syndrome

### **Occurrence**

- Usually seen in football player and wrestler
- Collision sports
- Common symptomatic upper extremity nerve injury in athletes

### **Injury Mechanism**

- Traction on the Brachial Plexus
- Nerve Root Impingement or Compression in the Neural Foramen
- Direct Blow to the Brachial plexus

### **Clinical Manifestation**

- Shock like sensation of pain
- Last only a few minutes
- Numbness radiating into the arm
- Typically purely sensory involve in nature
- Most common involved muscle : deltoid, biceps, supraspinatus, infraspinatus

### **Characteristics**

- Always unilateral
- Never involve the lower extremities
- Self limited
- Predominantly neurapraxic in nature
- May represent a cervical radiculopathy

### **Assessment**

- Careful History Taking & P/E
- MRI
- EMG

## **Cervical Epidural Steroid Injection (CESI)**

### **Introduction**

- Diagnostic Purpose
- Therapeutic Purpose
  - ✓ Significant pain relief
  - ✓ Improve blood supply
  - ✓ Muscle relaxation

### **History**

- 1952 Robecchi Administration of steroid in epidural space
- 1984 Catchlove Use of cervical epidural nerve block
- 1986 Purkis, Shulman, Rowlingson CESI
- 2000 Field Complication following CESI

### **Use**

- Patients with radicular symptom and sign
- Not response to medication, traction and physical therapy

### **Indication**

- Acute Cervical Pain, Cervical Radicular Pain  
(When surgery is not indicated)
- Acute Episodes of Chronic Cervical Pain
- Treatment-resistant Cervicobrachial Pain
- After Cervical IVD Surgery
- Compressive Nerve Root Lesion (Burner Syndrome)
- Spinal Stenosis

**Contraindication**

- Absolute : Anticoagulopathy
- Relative : Allergy to contrast medium, DM

**Contraindication of translaminar epidural injection**

- Central Canal Stenosis from Bony Eburnation
- Central Disc Herniation
- Congenital Shortening of Pedicle

**Choosing the Injection Site**

- Interspace appropriate for dermatomal distribution of pain
- Routinely, CT-T1

**Approach**

- Median Approach
- Paramedian Approach

**Procedure**

- Equipment
  - ✓ Skin anesthetic : 1% lidocaine, 25G needle
  - ✓ Epidural injection needle : 22G Tuohy needle or Weiss needle
  - ✓ 1.5-2 ml (80 mg) triamcinolone acetonide or methylprednisolone acetate
  - ✓ 2 ml 1% mepivacaine
  - ✓ 6 ml isotonic saline
  - ✓ 5 ml glass syringe
  - ✓ Plastic IV tube
  - ✓ Fluoroscopy
  - ✓ O<sub>2</sub> inhalation & Emergency kit
- Patient Positioning
  - ✓ Sitting with neck flexed or
  - ✓ Decubitus position
- Skin Prep & Local Infiltration of Local Anesthetic
- Identifying the Epidural Space
  - ✓ Loss of resistance technique
  - ✓ Hanging drop technique
- Confirmation of Position (Under Fluoroscopy)
  - ✓ Contrast agent
- Local Infiltration of the Puncture site
  - ✓ Test dose of 1-2 ml of 1% lidocaine



- Injection solution
  - ✓ 10 ml total volume : 1.5-2 ml (80 mg) triamcinolone
  - 2 ml 1% mepivacaine
  - 6 ml isotonic saline
- After the Injection
  - ✓ Lying down for about one hour
  - ✓ Monitoring BP, ECG

#### **Indication for a Repeat CESI**

- Significant relief of symptoms with a return a symptoms after a few weeks

#### **Prognostic Indicator of Outcome (Gordin, 2001)**

- Initial pain relief at 24 to 48 hours

#### **Complications**

- Dural Puncture
- Transient Paresthesia
- Severe Pain Consistent with Nerve Injury
- Spinal Cord Injury
- Bacterial Meningitis
- Epidural Abscess
- Epidural Hematoma
- Anaphylactic Reaction

#### **Results**

- Rowlingson and Kirschenbaum (Anesth Analg, 1986)
  - ✓ 50 mg of triamcinolone diacetate
  - ✓ 24% : excellent pain relief
  - ✓ 40% : good (Over 75% pain relief)
- Shulman (Reg Anesth, 1986)
  - ✓ 80-160mg of methylprednisolone
  - ✓ 41% : at least 50% over pain relief
- Cicala et al (J Pain Symptom Manage, 1989)
  - ✓ 1 mg/kg of methylprednisolone acetate
  - ✓ 41% : at least 90% pain relief
  - ✓ 29% : at least 50% pain relief
  - ✓ 29% : no more than 50%
- Mangar and Thomas (Reg Anesth, 1991)
  - ✓ 80 mg of methylprednisolone acetate

- √ 38% : greater than 70% relief
- √ 7% : 50-70% pain relief
- Klein et al. (Am J Anesth, 2000)
  - √ 80mg of methylprednisolone
  - √ 71% : satisfactory
  - √ 29% : failed (required surgery)
- Overall, Success Rate (in the literature) : 40-75%

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