

**Medications for
MULTIPLE SCLEROSIS
Student Version**

DEH 2300

Valencia Community College

Summer: 2006-14
Sandra C. Pendergraft

DEFINITION / PATHOPHYSIOLOGY

- Chronic, frequently progressive disease of CNS
- Characterized by small patches of **demyelination** in the brain, brain stem & spinal cord
- Patches are called plaques.
- Plaques become sclerosed & interrupt the flow of nerve impulses.
- MS lesions may occur in 2 stages
 - Sequential development of small inflammatory lesions.
 - Lesions extend & consolidate.

CLINICAL MANIFESTATIONS

- **Variable** depending on which nerves are damaged & extent of demyelination
- Characterized by **remissions & exacerbations**
- Occasionally an MS client will have steady decline.
- MS can be mistaken for neurosis, peripheral neuropathy or spinal lesions.

EARLY MANIFESTATIONS

- Fatigue
- Weakness &/or paresthesia
 - Most common symptom
 - Usually starts in lower extremities
- Total or partial loss of vision in 1 eye
- Unsteady gait
- Muscle spasticity
- Diplopia
- Dizziness

EARLY MANIFESTATIONS (cont.)

- Blurred vision
- Nystagmus
- Nausea / vomiting
- Signs of facial & trigeminal nerve involvement
- Bladder dysfunction
 - Retention &/or incontinence
- ↓ or absence of touch sensation

- Clients tend to get disgusted early in the disease process if no diagnosis is made. This frequently results in:
 - Depression
 - Irritability
 - Emotional instability
 - Hyperexcitability

POSSIBLE MENTAL CHANGES

- Early
 - Apathy
 - Euphoria
 - Inattentiveness
- Late
 - Depression
 - Confusion
 - Disorientation
 - Memory defects
 - Impaired judgment

MANIFESTATIONS (cont.) AFTER SEVERAL YEARS

- Signs / symptoms probably more severe
- Most patients develop **Charcot's Triad**:
 - Nystagmus
 - Intention tremors
 - Scanning speech
- **Lhermitte's Sign**
 - Electric sensation down the spine upon passive flexion of the neck.
 - "Zipper Effect"
- ↓ or absence of proprioception

MANIFESTATIONS (cont.) AFTER SEVERAL YEARS

- **Reflex Findings**
 - Exaggerated tendon reflexes
 - ↓ or absence of skin reflexes
 - Babinski Sign
 - Hoffmann's Sign

MANIFESTATIONS (cont.) AFTER SEVERAL YEARS

Nystagmus

<http://www.youtube.com/watch?v=TbfclGGKZzU>
<http://www.youtube.com/watch?v=NaB7OJRLVQ4>

Intention Tremors

<http://www.youtube.com/watch?v=gICUe2708W4>

LATE MANIFESTATIONS

- Partial or total paralysis of lower extremities
- Use of upper extremities may be severely limited
- Small percent have gross loss of memory
- Crippling joint contractures
- Muscle atrophy

ASSESSMENT

- **Client History:** Be alert for:
 - Signs / symptoms of MS
 - Info regarding timing of initial, as well as recurring S/Sx's
 - Factors which may have triggered initial S/Sx's or periods of exacerbation

ASSESSMENT (cont.)

- Lab Findings / Diagnostic Procedures
 - In addition to diagnostic procedures presented earlier . . .
 - EMG may be grossly abnormal in advanced MS
 - Tests to measure visual, auditory and brain stem function may be grossly abnormal.

MEDICATIONS

- **BMR's** (biological response modifiers)
 - Definition
 - Substances that stimulate the body's response to infection and disease
 - **Examples**
 - Avonex® / Rebif® (interferon beta-1a)
 - Betaseron® (interferon beta-1b)
 - Copaxone® (glatiramer acetate)
 - All are injectable meds (SubCut or IM)

MEDICATIONS: BMR's (cont.)

- **Indications:**
 - relapsing MS to . . .
 - Slow accumulation of physical disability and . . .
 - Decrease the frequency of exacerbations.
- **Drug Interactions**
 - No formal studies have been done but . .
- **Results of many lab studies are known to be altered by BMRs.**

MEDICATIONS

- BMR's (biological response modifiers) – cont.
 - **Side Effects/Adverse Reactions**
 - **headache**
 - **flu-like symptoms** such as chills, fever, muscle aches, weakness, loss of appetite, nausea, vomiting
 - myalgia
 - diarrhea
 - rash and/or swelling at injection site
 - pain at injection site
 - risk of bleeding
 - bruise easily
 - depression and suicidal tendency

MEDICATIONS

- **Ampyra® (dalfampridine)** FDA approved 01/2010
 - a potassium channel blocker
- **INDICATION**
 - To improve walking in MS patients
- **ACTION - unknown**
- **ROUTE**
 - PO (by mouth)
- **ADVERSE REACTIONS**
 - Urinary tract infection
 - Insomnia

MEDICATIONS – Ampyra (cont.)

- **ADVERSE REACTIONS (cont.)**
- **Dizziness**
- **Headache**
- **Nausea**
- **Asthenia**
- **Back pain**
- **Balance disorder**
- **MS relapse**
- **Paraesthesia**
- **Nasopharyngitis**
- **Dyspepsia**

MEDICATIONS – Ampyra (cont.)

- **CONTRAINDICATIONS**
 - Moderate to severe renal disease
 - Seizures
 - Allergy

MEDICATIONS – (cont.)

Gilenya® (fingolimod)

- FDA approved: Sept. 2010
- **INDICATION**
 - Reduces relapses and delay the progression of debilitating symptoms in patients with relapsing forms of MS.
- **ROUTE**
 - PO (by mouth)
- **SERIOUS ADVERSE REACTIONS**
 - Bradyarrhythmia and atrioventricular blocks

MEDICATIONS – (cont.)

Gilenya® (fingolimod)

- **SERIOUS ADVERSE REACTIONS (cont.)**
 - Infections
 - Macular edema
 - Respiratory problems
 - Hepatic effects

MEDICATIONS – (cont.)

Tecfidera® (dimethyl fumarate)

- Approved by FDA in March, 2013, specifically for relapsing MS
- Mechanism of action is unknown

MEDICATIONS – (cont.)

Aubagio® (teriflunomide)

- Approved by the FDA in Sept., 2012, specifically for relapsing MS
- is an immunomodulatory agent with anti-inflammatory properties. The exact mechanism by which teriflunomide exerts its therapeutic effect in multiple sclerosis is unknown but may involve a reduction in the number of activated lymphocytes in CNS.

MEDICATIONS

- **Corticosteroids and ACTH**
 - Used during exacerbations to ↓ inflammation of demyelinated areas.
 - Solu-Medrol® / Depo-Medrol® (methylprednisolone) – given IV
 - Deltasone® (prednisone) – oral med
 - Delta-Cortef® (prednisolone) – given IV
 - Medrol® / Decadron® (dexamethasone) - oral
 - ACTH (adrenocorticotrophic hormone)

MEDICATIONS (cont.)

- **Immunosuppressive Therapy**
 - A combination of Cytoxan® (cyclophosphamide) and Solumedrol® (methylprednisolone) may be used to stabilize the disease process.
- **Adjunctive Drug Therapy**
 - Muscle relaxants to decrease spasticity
 - Symmetrel® (amantadine hydrochloride) for fatigue
 - Inderal® (propranolol hydrochloride) for ataxia
 - Klonopin® (clonazepam) for ataxia
 - Ditropan® (oxybutynin chloride) for bladder problems
 - Urispas® (flavoxate HCl) for bladder problems

- What are some examples of alternative therapies used to treat MS?

http://www.medicinenet.com/alternative_therapy_for_multiple_sclerosis/article.htm

<http://www.apitherapy.org/>