

# Neurological Pathologies: Multiple Sclerosis & Polio

Neurology  
Lecture 3

## Multiple Sclerosis

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

- Multiple sclerosis (MS) is a chronic neurological disorder that affects the central nervous system (brain and spinal cord).
- The disease process results in inflammation and damage to myelin and other cells within the nervous system.
- Damage to myelin results in impaired nerve signaling and may impair normal sensation, movement, and thinking.
- defined as "multiple white matter lesions, separated in space and time". The lesions of multiple sclerosis (MS) the lesions are scattered in the white matter, but often clustering near the ventricles. They are variable-sized, well-circumscribed plaques of demyelination.
- MS is uncommon in children under the age of ten, and it usually presents before the age of 55. It is slightly more prevalent in women than in men.
- Generally, MS follows one of four courses:
  - a) Relapsing-remitting (RRMS), where symptoms fade and then return off and on for many years.
  - b) Secondary Progressive (SPMS) which at first follows a relapsing-remitting course and then becomes progressive. "Progressive" means it steadily gets worse.
  - c) Primary Progressive (PPMS) where the disease is progressive from the start.
  - d) Progressive relapsing (PRMS) where the symptoms come and go but nerve damage steadily gets worse. an men.

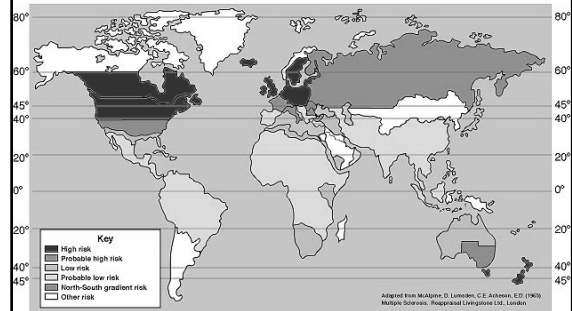
## Symptoms

- Depending on nerves involved.
- Optic nerve commonly involved
- Spinal nerve resulting in spastic hemiparesis or damage to sensory tracts (usually the dorsal columns). In the latter case, paresthesias may be very distressing.
- The cerebellar connections can be affected with incoordination of the limbs, ataxia and dysarthria (scanning speech or "drunken speech"). Tic douloureux (trigeminal neuralgia) sometimes occurs and MS must be a consideration in a young patient with trigeminal neuralgia.

### Aetiology

The exact cause is unknown, but most experts believe MS is an autoimmune disease. Experts don't know why MS happens to some people but not others. There may be a genetic link, because the disease seems to run in families. Where you grew up may also play a role. MS is more common in those who grew up in colder regions that are farther away from the equator.

## World Distribution of Multiple Sclerosis



## Diagnosis

- No one diagnostic test
- MRI important but can mimic other diseases
- Need evidence of two attacks
- The two attacks must be separated in time (by at least one month) and space (indicated by evidence of inflammation and/or damage in different areas of the central nervous system).
- There must be no other explanation for these attacks or the symptoms the person is experiencing.

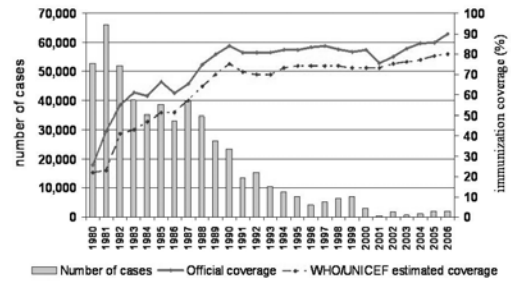
## Management of MS

- Multidisciplinary approach
  - Patient education/counselling
  - OT and Psychotherapy to maintain function
  - Nutrition and rest
  - Corticosteroids
  - Immunomodulating drugs (Interferon, etc.)
  - Immunosuppressives (methotrexate)
  - Symptomatic: Pain (analgesics, balms, antidepressants)
  - Spasticity: muscle relaxants, tranquilisers
  - Bladder dysfunction therapy
  - Physiotherapy
  - Shoe therapy for gait
  - Foot care as needed
- <http://www.youtube.com/watch?v=-BGBSsKBrbl&feature=related>

## Polio/Post-polio

- **Poliomyelitis**, often called **polio** or **infantile paralysis**, is an acute viral disease spread from person to person, primarily via the faecal-oral route.
- Infection by RNA virus of the enterovirus group. Now an insignificant disease in Western countries – last major outbreaks in 1940's and 1950's due to development of Sabin and Salk vaccines
- In fewer than 1% of cases the virus enters the CNS preferentially infecting and destroying motor neurons leading to muscle weakness and acute flaccid. Different types of paralysis may occur, depending on the nerves involved. Spinal polio is the most common form, characterized by asymmetric paralysis that most often involves the legs
- Global immunisation has reduced cases

## Poliomyelitis global annual reported incidence and Pol3 coverage, 1980-2006



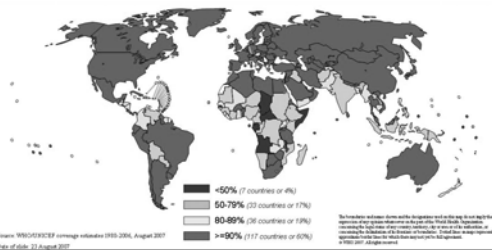
Source: WHO/EPI database, 2007

199-2006/Number/Time/Date of publication

Date of slide: 03 September 2007



## Immunization coverage with 3<sup>rd</sup> dose of polio vaccines in infants, 2006



Source: WHO/UNICEF coverage indicator 1980-2006, August 2007

Date of slide: 03 August 2007



35 | Global and Regional Immunization Coverage, 1980-2006, October 5, 2007

## Post Polio Syndrome

**Post-polio syndrome (PPS)** is a condition that affects survivors of Poliomyelitis.

Typically the symptoms appear 20-40 years after the original infection, at an age of 35 to 60.

Symptoms include

-muscle weakness, muscle pain and fatigue.

The cause is unknown. The precise mechanism that causes post-polio syndrome is unknown.

Treatment is primarily limited to adequate rest, conservation of available energy, and to supportive measures, such as leg braces and energy-saving devices such as powered wheelchairs, plus pain relievers, sleep aids, etc.

Shoe therapy and orthotics can be helpful in providing support in those who are ambulatory.

## PPS: 2 Clinical Subtypes

- 1) **Musculoskeletal post-polio syndrome (MPPS)** – develop new musculoskeletal symptoms; thought to be due to normal wear and tear process of ageing and the increased demands placed on the musculoskeletal system from the residual effects of the polio
- 2) **Post-polio progressive muscular atrophy (PPMA)** – develop new muscular weakness; thought to be due to deterioration of the newer nerve terminals that re-innervated muscle fibres after the initial acute poliomyelitis – considered that the nerve is no longer able to continue meeting the demands of the extra muscle fibre that it innervates as part of the original compensation process for initial damage --> these collateral sprouts degenerate --> loss of strength of motor unit (this is most popular theory)

## PPS: Clinical Features

- **General fatigue** (most common); reduced endurance; pains in joints and muscles; asymmetric progressive muscle weakness and atrophy (especially quadriceps and calf muscles); worsening of joint deformities; progressive respiratory problems (sleep apnoea; difficulty breathing and speaking); intolerance to cold (due to weakness/atrophy of vascular smooth muscles) --> discolouration of extremities; increased need for sleep. **Usually affects muscles that were originally affected** – occasionally effects muscles that were spared

## PPS: Criteria for Dx

- prior episode of poliomyelitis with residual motor neuron loss
- a period of neurological and functional stability after recovery of acute illness
- the gradual or abrupt onset of new weakness or abnormal muscle fatigue, muscle atrophy, or generalised fatigue
- exclusion of other conditions
- Differential diagnosis – osteoarthritis; fibromyalgia; radiculopathy; motor neuron disease; multiple sclerosis; chronic fatigue syndrome; entrapment neuropathy.

## PPS: Treatment

- Lifestyle modifications – especially to cope with fatigue (eg. taking more rest breaks to conserve energy; pacing of activities; motorised scooters)
- Need to decrease muscle load (eg. braces/splints; weight loss)
- Nonfatiguing exercise (eg. stretching and gentle progressive strengthening exercises; water exercise)
- **Regular assessment/review of foot/leg orthoses**
- Speech therapy for dysphagia #

VID