

# Multiple sclerosis

**Multiple sclerosis** (MS, *sclerosis multiplex*, *encephalomyelitis disseminata*) is autoimmune disease of the white matter of the CNS that leads to loss of myelin in inflammatory foci and diffuse loss of axons. It most often begins **between the ages of 20 and 30**, but may appear as early as childhood. It affects both men and women in a 1: 2 ratio, which is explained by the hormonal effects on the immune system. The number of cases in the Czech Republic is around 25,000.

## The course of disease

1. in 85% of cases, initially remittive course (alternation of attacks and remissions) and after depletion of the nervous system reserves, **chronic-progressive** course (attack decreases, disability increases);
2. in 15% of cases a **primarily progressive** course;
3. rarely **relapsing - progressing** course (more malignant variant).

## Clinical picture

- **Visual disorders:** visual disturbance, pain of bulbs during movement, color cell disorder (optic / retrobulbar neuritis = inflammation of the optic nerve), sometimes central scotoma.
- **Sensitivity disorders** anywhere on the body: hypoesthesia, paresthesia, hyperesthesia, which do not follow the distribution of nerve roots or peripheral nerves.
- **Motor disorders:** paresis of the central type, spasticity - impairment of motor pyramidal pathways.
- **Cerebellar symptoms:** neocerebellar syndrome (intentional tremor, ataxia, saccaded speech), paleocerebellar syndrome (standing and walking disorders).
- Bowel and bladder disorders: imperative micturition, urinary retention, decreased bladder capacity, incontinence,
- Sexual disorders,
- **Symptoms of brainstem** (trigeminal neuralgia, Bell's palsy, oculomotor nerve palsy, dissociated nystagmus - damage to part of the *medial longitudinal fasciculus*).
- **Neuropsychiatric symptoms** such as fatigue (slowed conduction by demyelinated nerves), depression, euphoria, cognition disorders.

## Specific symptoms

- **Uhthoff's phenomenon:** transient worsening of neurological symptoms due to elevated temperature (exercise). These are past optical neuritis, which temporarily worsens, ie. their vision deteriorates temporarily after physical activity.
- **Lhermitte sign:** after the head is tilted, the action of the chin to the sternum, the patient states "as if an electric current had passed through his spine".

## Diagnosis

- Neurological examination: spasticity, hyperreflexion, positive irritant and extinction phenomena
- MRI: hypersignal deposits in the white matter of the brain, **periventricular** localization, and spinal cord on T2-weighted images and hyposignal deposits on T1-weighted images (amount correlates with disease severity);

The T1 hypodense bearing reflects the old bearing

T2 hyperdense bearing

FLAIR hyperdense bearings with cerebrospinal fluid signal suppression. In the sagittal section we can find hyperdense deposits perpendicular to the corpus callosum, the so-called **Dawson's fingers**.

T1 + Gadolinium "white" annular deposits

- examination of cerebrospinal fluid: intrathecal IgG, synthesis, the presence of at least 2 oligoclonal bands in the alkaline part of the spectrum not present in the serum, attenuation: pleiocytosis of mononuclear cells (up to 100/3) and predominance of lymphocytes;
- examination of evoked potentials (visual and somatosensory): prolongation of wave latency;
- ophthalmological examination (in retrobulbar neuritis): papillary edema in the acute stage, later its temporal pallor (manifestation of atrophy)

## Differential diagnosis

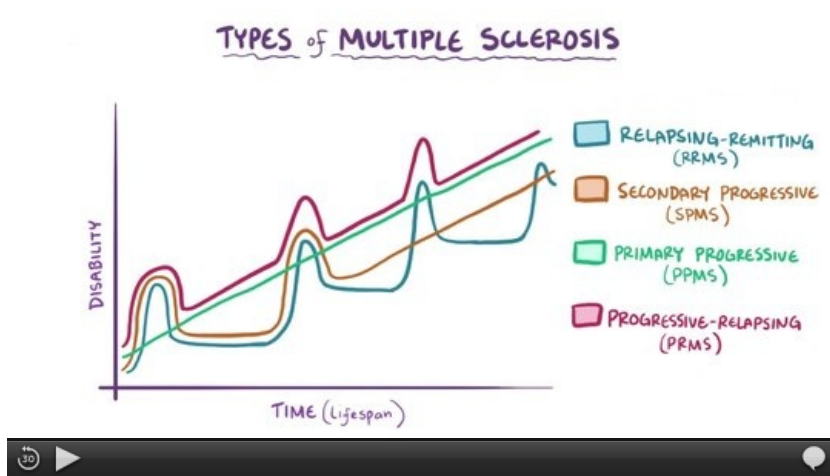
- Surgically resolvable lesions (tumors, intervertebral disc herniations, vascular malformations).
- Other chronic inflammations and autoimmunities (CNS vasculitis, systemic lupus erythematosus, Lyme borreliosis).
- Metabolic and degenerative diseases of the CNS (spinocerebellar ataxia, adult form of adrenoleukodystrophy,

Wilson's disease).

## Treatment

- **Acute attack:** high doses of **corticoids** i. v. (methylprednisolone), usually 1 g for 5 days.
- **Prevention of attacks and progression in remission:** interferon beta, glatiramer acetate, azathioprine, natalizumab, possibly immunoglobulins i. v. in immunosuppressive doses.
- **Chronic progression:** corticoids with cyclophosphamide or mitoxantrone.
- **Symptomatic treatment:**
  - spasticity – central muscle relaxants (*baclofen*, *tinazidine*, *tetrazepam*),
  - sphincter problems – anticholinergics,
  - pain and paresthesia – (*gabapentin*, *pregabalin*, *carbamazepine*),
  - depression – SSRI,
  - fatigue - regular exercise, vitamin therapy,
  - cerebellar symptoms – *physostigmine*,
  - intentional tremor – *clonazepam*,
  - imperative urination – *imipramine*, *oxybutinin*.

## Video



Definition, pathogenesis, symptoms, complication, threatement.

## Links

### Related articles

- Multiple sclerosis/PGS
- Multiple sclerosis/PGS (VPL)

### External links

- Multiple sclerosis (<https://mefanet.lfp.cuni.cz/clanky.php?aid=223>)

### Bibliography

- NEVŠÍMALOVÁ, Soňa, Evžen RŮŽIČKA a Jiří TICHÝ, et al. *Neurologie*. 1. vydání. Praha: Galén, 2002. 368 s. s. 211-216. ISBN 80-7262-160-2.
- AMBLER, Zdeněk. *Základy neurologie*. 6. vydání. Praha: Galén, 2006. 351 s. s. 221-225. ISBN 80-7262-433-4.