

Imaging diagnosis

Case 399

4. Aging glymphatic flow delay or 5. Multiple sclerosis

【Progress】

A letter with imaging diagnosis was sent to the reference doctor for him.

【Discussion】

There are several cells supporting brain nerve cells. A brain nerve cell is composed of a nerve cell itself with an axon and dendrites: an axon passes an electric signal emerged by a nerve cell itself and dendrites accept electric signals from other nerve cells. Myeline adheres to axon for speedy convey of electric signals. Myeline is supported by oligodendrocytes for nutrients and restoration. Brain nerves get nutrients and restoration by glia cells (astrocytes). Glia cells not only assist nerve cells but also accommodate fluid flowing among nerve cells called glymphatic system by opening and closing aquaporin 4 gate of communication pore from vessels. Microglia like macrophage dwells in brain parenchyma for prevention from pathogens and foreign bodies.

Multiple sclerosis (MS) occurs by damage to oligodendrocytes. The etiology is considered based on experimental autoimmune encephalopathy as that viral infection such as EB virus, first occurs (1-4). Then, a killer T cell accumulation and excrete viral infection in a healthy process. When viral infects to some killer T cells, called specific T cells, they fall in apoptosis during a healthy process. But for MS onset, specific T cells survive, acquire potency to attack antigen common to oligodendrocyte or myeline, and invade to brain parenchyma, inducing damages to myeline and/or oligodendrocytes, leading onset of multiple sclerosis (2-4). Microglia repairs damage to oligodendrocytes and myeline. The momentum of myeline damage and repair repeats.

As MS-related disease, Myelin Oligodendrocyte Glycoprotein Antibody-Associated Disease (MOGAD) is listed (1). MODAG is similar MS in respective of damages of myeline. Myeline is connected to oligodendrocytes and composed of layers of glycoprotein. MOGAD arises from the damages to myeline by antibody-adherence to myeline glycoprotein. Meanwhile, neuromyelitis optica spectrum disease (NMOSD) onsets by damages to glia cells, implying more damage to brain or severe symptoms than MS or MOGAD.

MS occurs in brain and/or spinal cord with myeline. MS neural symptoms are various such as weakness of grasping, walking disturbance, recto-urinal incontinence, visual disturbances. The symptoms of MS recurrent relapse and remission. MS occurs in cold areas rather than warm areas. The onset incidence of MS in north Europe, north USA, Canada and the south Australia (30-80/100000) is 3-5 folds higher than Japan (14/100000) (1). The first onset ages are 30-50 and females are more susceptible than males (1). Antibody EB virus is usually positively detected in whole blood but not in spinal fluids, indicative of not infection but supportive of EB virus causing immune disease (2-4).

MRI with FLAIR and T2WI are useful for presence for MS lesions. Patch high signal intensity perpendicular to lateral ventricle and/or at subcortical white matter are one of the characteristic MRI findings of MS (5, 6). Tumefactive MS like tumor is associated with open-ring sign (5, 6). In clinical reality, oligoclonal bands in CSF is positive with more than 90% on MS (1).

In our case, FLAIRMRI depicted patchy signal intensity perpendicular to lateral ventricles and patchy shadow at U fiber, suspicious of MS.

【Summary】

We presented a seventy-one-year-old male with spinal disorders. High signal patchy opacities were depicted on MRIFLAIR, suspicious of multiple sclerosis. It is borne in mind that there are three neuromyelitis diseases in central nerve system: multiple sclerosis (MS), neuromyelitis optica spectrum disease (NMOSD), myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD). MS onsets by injury to oligodendrocytes, NMOSD onsets by injury of glial cell (astrocyte) and MOGAD onsets by antibody to glycoprotein of myeline. Patchy signal intensity perpendicular to lateral ventricles, patchy shadow at U fiber (subcortical white matter) and tumefactive patchy signal intensity with open ring sign like brain tumor in deep white matter are characteristic of multiple sclerosis.

【References】

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back

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