We report a 37-year-old female patient presented initially with typical radiological and clinical manifestations of multiple sclerosis (MS). She was found to have blurred vision and paresthesia. Later, she suffered from lower limbs weakness, general fatigue, difficulty swallowing, intentional tremor and urinary retention. At the same period, the patient was also found to have hyperhidrosis, which was not a typical sign of MS. After MR imaging revealed that there was a high signal lesion on T2WI at right hypothalamus which eventually involved the contralateral side of hypothalamus, the previous diagnosis became controversial. MS is a progressive demyelination disease, the most frequent affected sites in brain are periventricular white matter, corpus callosum or centrum semiovale. It was thought MS plaque was rarely found in hypothalamus. By reviewing articles in English literature, we found similar cases of multiple sclerosis involving hypothalamus and one of them was presented as hyperhidrosis.

**Key words:** multiple sclerosis; hypothalamus, hyperhidrosis

Multiple sclerosis (MS) is a slowly progressive neurological disease characterized by disseminated plaques of demyelination within the white matter of the brain and spinal cord. The prevalence in Asia is not as high as that in North America or Europe. It often involves subependymal periventricular region and corpus callosum, while internal capsule, centrum semiovale, corona radiata, optic nerve, chiasm, brain stem and cerebellum are also frequently involved. The initial presentation of the case we presented here is typical for multiple sclerosis both clinically and radiologically, while hypothalamus was involved as the disease progressed, which is rarely involved.

**CASE REPORT**

A 37-year-old woman suffered from sudden onset of blurred vision and paresthesia below mid thoracic level. She then developed lower limbs weakness, general fatigue, swallowing difficulty, intentional tremor, double vision and urinary retention. She received a series of studies including MRI and lumbar puncture for CSF biochemistry. MRI T2WI of C-spine in sagittal view shows increased signal intensity in central cord from lower medulla down to C-5 level (Fig.1a) and spinal cord atrophy at C6-7 level. This concurred with an elevation of CSF protein. Steroid treatment was given after the diagnosed of multiple sclerosis was given according to both clinical course, biochemistry result and image studies. Six days later, another MRI study of C-spine revealed remarkable improvement (Fig.1b) and her muscle power was strengthened under the use of steroid. Half an year later, she experienced a transient episode of hypothermia (body temperature about 35°C) and subsequent paroxysmal elevation in body temperature accompanied with hyperhidrosis occurred. Neurological examination revealed no abnormalities in the sudomotor function, which suggested that the hyperhidrosis is
caused by lesion in the central or preganglionic sympathetic nervous system. Axial T2WI study of brain MRI showed increased signal intensity in optic nerves and right side hypothalamus (Fig.2). The same observations also found in diffusion weighted (T2 shine through) and FLAIR images. Injection of single dose of gadolinium showed no significant enhancement. Another half an year later, the patient complained aggravation of sweating and hot sensation, which corresponded with the MR finding of increased signal intensity on left hypothalamus (Fig.3). The disease was a progressive type and was associated with several relapsing periods during follow-up.

DISCUSSION

In this case, the initial clinical manifestations included acute optic neuritis and myelitis. The patient then suffered further neurological deterioration. Her symptoms were temporarily relieved between relapsing periods. According to the diagnostic criteria from Schumacher Committee for Multiple Sclerosis [1], there are five out of the six features that compatible with the diagnosis. A typical MS finding on C-spine MRI was also obtained. However, the diagnosis became controversial when there were signal changes that occurred on right hypothalamus (Fig.2) and eventually involved the contralateral side (Fig.3). At the same time, there was an inexplicable clinical picture of hyperhidrosis and unstable body temperature, which were rarely reported in multiple sclerosis cases. These confusing radiological and clinical manifestations led us to suspect other possible hypothalamic diseases such as glioma, hematoma, Langerhan’s cell histiocytosis, viral infection and SLE. After reviewing the English literatures, we found five published papers mentioning MS with hypothalamus involvement [2-5, 11]. Among them, one mentioned about hyperhidrosis [3]. As we know, medial preoptic area of anterior hypothalamus plays an important role in autonomous control of thermoregulation [6]. It contains heat-sensitive neurons which is responsible for signals sent from peripheral thermoreceptors. Signals of cold or hot temperature are integrated and past to the posterior hypothalamus, which then regulate body temperature through following mechanisms: (1) controls heat loss by blood flow: vasoconstriction with hyperthermia or vasodilation with hypothermia; (2) promotion or inhibition of sympathetic system to control sweating; (3) behavioral response such as shivering; (4) endogenous pyrogen released from hypothalamus to raise the setting point of body temperature and induce fever. Causes such as trauma, infarction or demyelination involving the preoptic area of hypothalamus could result in abnormal thermoregulation such as hyperhidrosis and hyperthermia. The first and second brain MRI T2WI studies of our patient revealed increased signal intensity of both anterior and posterior hypothalami on right and then left side respectively and the involvement of bilateral medial pre-optic nuclei is
identified [7]. The hypothalamic lesions in our case did not show any contrast enhancement. Since gadolinium enhancement of MS is highly variable, probably transient in nature [8], and sometimes triple dose of gadolinium is needed to obtain good enhancement [9], lack of contrast enhancement do not exclude the diagnosis of MS. Based on these reviews, the original diagnosis of MS was sustained. Other symptoms related to MS involving hypothalamus include profound hypothermia [10], weight loss [11], amenorrhea [2] and various hormonal disturbances [11].

**REFERENCE**

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Multiple sclerosis involving hypothalamus


多發性硬化症侵犯下視丘，疑是引起多汗症：個案報告

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一位三十七歲女性患者因為視力減弱和肢體麻痺求醫，隨後慢慢惡化成下肢動彈困難、顫抖、吞嚥困難、有神經性膀胱瀦尿現象，病勢忽輕忽重。經頸椎核磁共振造影檢查發現，患者延腦下部和頸椎神經在 T2WI 有不正常高訊號，當時無論臨床和影像表現都附合了典型“多發性硬化症”的診斷。可是，後來病人有多汗症狀，而且體溫表現不穩定。另一方面，腦部核磁共振造影發現右側下視丘在 T2WI 有不正常高的訊號，而且逐漸往左側侵犯，這些都少見於多發性硬化症，造成臨床診斷的困擾。

多發性硬化症是一種漸進式的脫髓鞘疾病，腦部中以腦室旁室管膜下和胼胝體等等常被侵犯，至於“多發性硬化症”伴隨下視丘病變是很罕見的。回顧國外文獻後發現，曾有病例報導有關“多發性硬化症”侵犯下視丘會引發多汗症。

關鍵詞：多發性硬化症；下視丘；多汗症