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Case Report

A Case of Fisher Syndrome Complicated by Maxillary Sinus Cysts

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Abstract: Fisher syndrome (FS) is an autoimmune peripheral neuropathy that occurs in 1 person per 2 million population. The present report is of a patient with FS who presented with diplopia and discomfort of the right cheek and in whom differentiation from maxillary sinus cysts was necessary. The patient was a 43-year-old man with a history of radical surgery of the right maxillary sinus, so we suspected that his symptoms were due to postoperative maxillary sinus cysts. Although computed tomography demonstrated right maxillary sinus cysts, these cysts were not likely to be the cause of the patient's diplopia. Close neurological examination revealed external ophthalmoplegia, cerebellar ataxia, and the absence of a deep tendon reflex; on this basis, a diagnosis of FS was made. Diplopia is caused by various disorders and FS should be taken into consideration when making a differential diagnosis.

Key words: Fisher syndrome, maxillary sinus cyst, diplopia, ataxic gait, differential diagnosis

Introduction

In 1956, Miller Fisher first reported on three patients with Fisher syndrome (FS) exhibiting acute total external ophthalmoplegia, ataxia, and the absence of a tendon reflex, but with a good prognosis. At present, FS is considered an autoimmune peripheral neuropathy and a subtype of Guillain-Barré syndrome[1,2)]. The initial symptoms of FS are usually diplopia and an ataxic gait, with preceding respiratory or gastrointestinal infection. In the present paper, we report on a patient with FS associated with maxillary sinus cysts. In this patient, differentiation from diplopia associated with maxillary sinus cysts was difficult.

Case Report

The patient was a 43-year-old man who had undergone radical surgery for the right maxillary sinus due to chronic sinusitis in 1996. In late April 2008, he noticed discomfort in his

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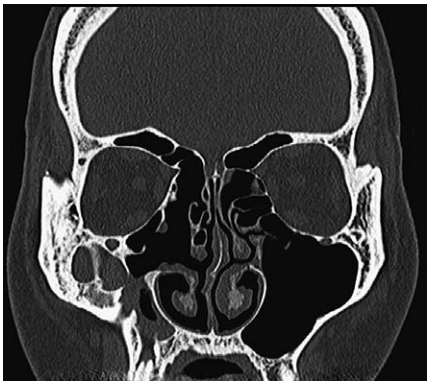

Fig. 1. Coronal CT image
There were multiple right maxillary sinus cysts, but no intraorbital extension.

right cheek and visited a dentist. Computed tomography (CT) revealed cystic lesions in the right maxillary sinus. Because the discomfort in the right cheek was mild, it was decided to observe his clinical course. In late May 2008, the patient noticed diplopia and visited our department. He was fully conscious. His light reflex was rapid and the diameter of the left and right pupils was the same ; however, impaired ocular movement during left and right gaze and diplopia were noted. There was no abnormal nystagmus, exophthalmos, or swelling in the cheek. Intranasal examination did not reveal any abnormal findings. CT was performed and again showed right maxillary sinus cysts (Fig. 1), but there was no clear intraorbital extension of the cysts. White blood cell counts and C-reactive protein were within normal limits, indicating no inflammatory reaction. However, neutral fat, total cholesterol, and hepatobiliary enzyme levels were moderately increased. Based on the CT and blood analysis results, we thought it unlikely that the ocular movement disorder and diplopia were caused by compression of the eyeball by the right maxillary sinus cysts or their infection. Central lesions, such as cerebrovascular disease, were suspected and brain magnetic resonance imaging (MRI) was performed. There were no abnormal findings on the MRI. The patient was referred to the ophthalmologic department for closer examination of ocular movement. No visual loss was noted and funduscopy revealed no abnormalities. The Hess screening test (Fig. 2) revealed mild disturbances of left and right abduction / adduction and elevation. The patient was admitted to our department of Otorhinolaryngology for close examination and treatment in late May 2008.

Due to persistent diplopia and an ataxic gait observed upon admission, demyelinating disease could not be excluded and the patient was referred to the Department of Neurology on his second day in Showa University Northern Yokohama Hospital. In addition to external ophthalmoplegia, cerebellar ataxia, and the absence of a tendon reflex, it was noted that the patient had had a preceding gastrointestinal infection. Based on these findings and

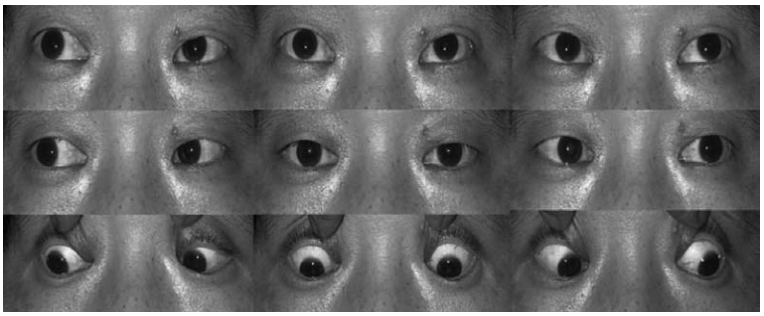

Fig. 2. Findings of ocular movement before treatment

Table 1. Diagnostic criteria for Fisher Syndrome

1. Clinical findings
1) External ophthalmoplegia and cerebellar ataxia reaching a peak within 4 weeks after onset
2) Absence or a decrease in the deep tendon reflex
2. Examination findings supporting the diagnosis
1) Presence of prodromal symptoms (symptoms of respiratory or gastrointestinal infection)
2) Serum-positive for IgG anti-GQ1b antibody
3) Albuminocytologic dissociation of cerebrospinal fluid

the results of the neurological examination, a differential diagnosis of FS (Table 1) was made, excluding other diseases such as myasthenia gravis[3]. The patient was transferred to the Department of Neurology for treatment.

From Day 2 of hospitalization, the patient was treated with intravenous immunoglobulin therapy (30 g / day) for 5 days. On Day 5 of hospitalization, a lumbar puncture was performed; the initial pressure was 100 mmH_2O and cerebrospinal fluid (CSF) protein and glucose levels were 102 and 64 mg / dL, respectively, indicating albuminocytologic dissociation. On Day 8 of hospitalization, the patient's unsteady gait improved, but median fixation of the eyeballs was observed. On the same day, rehabilitation was initiated. On Day 13 of hospitalization, the patient was discharged and follow-up started. By Day 44 (from initial hospitalization), although mild disturbances of left and right abduction / adduction remained, the patient's unsteady gait had disappeared. By Day 149, the impaired ocular movement and associated diplopia had improved, with the patient showing complete remission.

Discussion

FS is an autoimmune peripheral neuropathy that occurs in one person per 2 million population. It is characterized by preceding respiratory or gastrointestinal infection[4]. In general, autoimmune disorders more frequently affect women, but the male : female ratio in FS is 2 : 1[5]. The incidence of FS increases with age, with two peaks observed : one in young adults and one in the elderly[6]. The mean age at onset is 44 years.

Table 2. Disorders inducing binocular diplopia

Disorders inducing paralysis of the oculomotor, trochlear, and abducens nerves :
Diabetes mellitus, hypertension, cerebral aneurysm, cerebral abscess, cavernous sinus fistulation, cavernous sinus thrombosis
Disorders inducing multiple oculomotor nerve palsy :
Carcinomatous meningitis, temporal arteritis, mycosis, myasthenia gravis, Lamber-Eaton syndrome, Fisher Syndrome
Otolaryngological field :
Paranasal sinus cyst, paranasal sinus mycosis, malignant tumor of the nose / paranasal sinus, facial bone fracture (orbital floor, zygomatic bone, maxilla)
Gradenigo syndrome, Tolosa-Hunt syndrome

The triad of FS consists of external ophthalmoplegia, cerebellar ataxia, and absence of the deep tendon reflex, which develops acutely. This triad is diagnostically important. Our patient developed external ophthalmoplegia, followed by cerebellar ataxia, showing a typical clinical course. In general, FS can be diagnosed based on clinical symptoms, but attention should be paid to patients in whom not all three symptoms are present[7]. When external ophthalmoplegia and cerebellar ataxia are observed, the presence or absence of the deep tendon reflex should be determined, even by otolaryngologists, because this examination is relatively straightforward. It has been reported that patients visiting otolaryngologic outpatient clinics may present with chief complaints of ataxic gait, diplopia, pharyngeal discomfort, or facial nerve paralysis[5, 8–9]. FS should be taken into consideration as a disease requiring differentiation in patients who complain of an unsteady gait in particular.

The initial symptom of FS most frequently observed is diplopia, followed by an ataxic gait, pharyngeal discomfort, and facial paralysis[8–10]. The patient described herein visited our department because of diplopia, but had a history of radical surgery of the maxillary sinus. CT examination revealed maxillary sinus cysts. These findings suggested eyeball compression by the cysts and eye symptoms due to cyst infection. However, based on the location of the maxillary sinus cysts and the absence of blood analysis findings suggesting infection, we concluded that although the mild discomfort in the patient's right cheek was caused by the maxillary sinus cysts, the diplopia was not likely to be a rhinogenous symptom. We concluded that the diplopia was caused by other disorders, but regrettably did not consider FS in our differential diagnosis.

Diplopia is mono- or binocular. Diplopia associated with external ophthalmoplegia, as observed in our patient, is classified as binocular. When examining patients with diplopia, it is important to determine whether the diplopia is mono- or binocular for the differentiation of various disorders.

In binocular diplopia, the shielding of one eye results in the disappearance of the diplopia. Disorders that can cause binocular diplopia are listed in Table 2. When binocu-

lar diplopia is associated with ocular movement disorders and diagnostic imaging shows paranasal sinus cysts, even mild ones, around the orbit, it may be difficult to differentiate between binocular diplopia caused by periorbital organic abnormalities and that caused by neuropathy.

In monocular diplopia, the diplopia does not disappear after one eye is shielded. Monocular diplopia is typically caused by organic abnormalities of the eye itself, such as a conical cornea. Findings such as decreased visual acuity, pupillary abnormality, blepharoptosis, exophthalmos, and enophthalmos are also important for the differentiation between mono- and binocular diplopia.

Other findings that are useful in the diagnosis of FS are serum positive for IgG anti-GQ1b antibodies and albuminocytologic dissociation observed by lumbar puncture, both of which are used as adjunctive diagnostic findings for FS[11–13].

In general, FS has a favorable prognosis and natural remission can be expected[14]. Therefore, there are no established treatment methods and patients are treated as they would be for Guillain-Barré syndrome. However, sequelae such as oculomotor impairment and ataxic gait remain in approximately 10% of patients. To reduce sequelae and prevent the progression of symptoms, high-dose immunoglobulin therapy or plasma exchange is recommended[15].

Conclusion

We encountered a patient with FS associated with maxillary sinus cysts. It is possible for patients with FS to present first to an otolaryngologic department because of diplopia and unsteadiness of gait. In such patients, FS should be considered in the differential diagnosis. A patient with diplopia may visit any medical department for any reason, and neuro-ophthalmologic and neurological consultations are absolutely required.

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