Paraneoplastic Encephalitis Associated with Thymoma: A Case Report

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A 42-year-old woman with short-term memory loss visited Gangnam Severance Hospital, and her chest X-ray and computed tomography revealed a right anterior mediastinal mass. On hospital day two, she suddenly presented personality changes and a drowsy mental status, so she required ventilator care in the intensive care unit. She underwent thymectomy, and was pathologically diagnosed with thymoma, type B1. Her mental status eventually recovered by postoperative day 90. Paraneoplastic encephalopathy associated with thymoma is very rare, and symptoms can be improved by thymectomy. We report a case of paraneoplastic encephalopathy associated with a thymoma.

Key words: 1. Paraneoplastic syndromes 2. Thymoma 3. Thymectomy

CASE REPORT

A 42-year-old woman presented with a history of 15 days of short-term memory loss. She complained of generalized weakness and voice changes over the previous 3 months. On physical examination, she had mild bilateral ptosis. Chest X-ray revealed a right hilar mass and chest computed tomography showed a 5 cm anterior mediastinal mass consistent with a thymoma (Fig. 1).

On hospital day 2, she suddenly exhibited personality changes and severe agitation, which evolved into a drowsy mental status. Arterial blood gas analysis demonstrated hypoxemia (PaO₂, 68.4 mmHg), hypercapnea (58.3 mmHg), and respiratory acidosis (pH, 7.187), prompting orotracheal intubation and ventilator care. Brain magnetic resonance imaging (MRI) showed multifocal high intensity signals in the cerebral cortex including the limbic area on T2 flare images (Fig. 2A). Diffuse delta background activity and moderate diffuse cerebral dysfunction were observed on electroencephalography (EEG). In serologic tests, serum acetylcholine receptor (AchR) antibody titer (11.189 nmol/L) was elevated, but antineuronal nuclear antibody (Hu/Ri) and Purkinje cell antibody (Yo) were negative. Considering these findings, we thought that she had myasthenia gravis and paraneoplastic encephalitis associated with a thymoma.

Thymectomy was recommended, but due to the patient’s drowsy mental status, it was difficult to obtain consent for the surgery from her guardians. Ultimately, on hospital day 8, she underwent a thymectomy, the pathology of which revealed a thymoma, type B1. The thymoma had invaded the...
Fig. 1. (A) Preoperative chest X-ray revealed a mediastinal mass in the right hilum. (B) Preoperative chest computed tomography showed a 5 cm anterior mediastinal mass considered to be a thymoma.

Fig. 2. (A) Preoperative brain magnetic resonance imaging (MRI) showing multifocal high intensity signals in the cerebrum on T2 flare images. (B) Follow-up brain MRI, on postoperative day 96, showed that the lesions had disappeared.

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pericardium and pericardial fat tissues with metastasis to the right diaphragm. Despite the thymectomy, the patient’s mental status and odd behavior still did not improve. On postoperative day 10, follow-up brain MRI was performed, but the previous high intensity lesion still remained. Thereafter, her mental status and abnormal behavior gradually improved. On postoperative day 90, her cognitive status had nearly fully recovered and brain MRI on postoperative day 96 showed that the previous lesions had disappeared (Fig. 2B). On postoperative day 106, the patient was discharged without complications. Because the thymoma pathologically invaded adjacent tissues, we recommended additional radiotherapy. However, she refused further treatment. At 2 years after thymectomy, she has had no specific symptoms, but the AchR
antibody titer is still high (13.483 nmol/L). She takes only
180 mg per day of pyridostigmine from our outpatient clinic.

DISCUSSION

Paraneoplastic neurologic syndromes (PNS) are very rare
diseases that are mainly associated with small cell lung can-
cer, testicular cancer, bladder cancer, and breast cancer [1].
PNS is caused by damage to the nervous system due to im-
mune-mediated mechanisms; the primary tumor is typically
not found in the nervous system. To meet the criteria for
PNS, direct tumor invasion to the nervous system, metastasis,
and infection must be excluded [2].

Thymoma is the most common type of tumor in the ante-
rior mediastinum. Its association with myasthenia gravis is
well established, but the associations with other types of PNS
are unknown. Only about thirty cases of PNS associated with
thymoma invading the limbic area and 5 cases of extralimbic
encephalopathy have been reported [3]. What is unusual in
our case is that both the limbic and extralimbic areas were
involved. The main symptoms, such as short term memory
and personality changes, were thought to be associated with
invasion into the limbic area.

Symptoms of paraneoplastic encephalitis are not specific,
but short-term memory loss, personality changes, agitation,
and seizure may occur [4]. Diagnosis is difficult to confirm,
but high intensity lesions are found in T2 flare images on
brain MRI. EEG is generally abnormal, and slow-wave abnor-
malities with epileptiform activity are found [5]. Brain biopsy
can confirm the pathological diagnosis, but is not always nec-

essary [3].

Its pathogenesis remains uncertain, but it is thought that
paraneoplastic encephalopathy is caused by immune responses
to neuronal antigens of tumor cross-reacting with protein ex-
pressed in the nervous system [6]. However, not all patients
with paraneoplastic encephalopathy have antineuronal
antibodies. In our case, only serum AchR antibody was high
while the other antibodies were negative.

The optimal treatment consists of identifying the thymoma
as soon as possible and removing it surgically [7].
Additionally, intravenous immunoglobulin, plasmapheresis,
or immunosuppression can be used against antineuronal
antibodies.

The progression of disease varies so widely that in one re-
port, symptoms were completely resolved within 1 week of
surgery [3], but in another report, symptoms continuously re-
mained despite complete resection of the thymoma [2]. Due
to the rarity of the disease, its pathogenesis and prognosis are
not well known.

In our case, paraneoplastic encephalitis was associated with
a thymoma and manifested as neurologic symptoms corre-
sponding to the limbic system on brain MRI. Neurologic
symptoms improved 3 months after resection of the thymoma.

In conclusion, when patients have neurologic symptoms re-
lated to the limbic area, it is necessary to examine the thy-
mus to rule out potential thymoma. In addition, thymectomy
should be aggressively considered for relief of symptoms as-
associated with paraneoplastic encephalopathy with thymoma.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was
reported.

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