CASE REPORT

Tonic Pupil, a Paraneoplastic Neuro-Ophthalmological Disease Associated with Occult Breast Cancer

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Abstract: Here, we present a case of tonic pupil associated with occult breast cancer as a paraneoplastic neuro-ophthalmology syndrome. A 45-year-old woman developed progressive photophobia and blurred vision due to unilateral Adie's tonic pupil. Magnetic resonance image of her brain and neurological examination (including deep tendon reflexes) were normal at first visit. Follow-up examinations performed by ophthalmologist every 6 month without any change in her condition. After 2 years, patient discovered a mass in her breast which identified to be malignant after diagnostic procedures. Despite surgical and medical treatment for cancer, no change in the ocular condition was happened.

Key Words: Adie's tonic pupil, breast cancer, paraneoplastic syndrome

Paraneoplastic neurological syndromes are rare, immune-mediated syndromes occurring in less than 1% of patients with breast cancer (1,2). The clinical findings are heterogeneous and the pathogenesis is not well understood, however, specific auto antibodies targeting onco-neuronal antigens, such as anti-Hu, anti-Ri, anti-Yo, and anti-Ma may be identified in the serum and cerebrospinal fluid of affected patients (1,3). These autoantibodies, formed in response to the presence of a tumor, may cross-react with cells of the central or peripheral nervous systems. These syndromes may antedate the diagnosis of cancer or occur at any point after the diagnosis of cancer (3). Diagnosis requires exclusion of other, more common causes of neurologic dysfunction. The diagnosis of these syndromes is based mainly on the degree of suspicion by clinicians, which depends on their knowledge of the relationship between the development of characteristic neurological symptoms and the presence of a specific type of the tumor. In this report, we present a case of tonic pupil associated with breast cancer possibly as a paraneoplastic syndrome. To best of our knowledge, this is the first report of this association.

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The patient was a 45-year-old woman with symptoms of unilateral photophobia and blurred vision. She had referred to ophthalmologist, and after primary examination and tests Adie’s tonic pupil in left eye diagnosed as the cause of photophobia. Potential causes like orbital vasculitis, infection, inflammation, tumors, and surgeries that affecting ciliary ganglion and nerves ruled out for patient. She referred to neurologist for systemic evaluation. Magnetic resonance image of patient’s brain and other neurological examinations including deep tendon reflexes, and autonomic nervous system evaluation were normal.

No medications for eyes prescribed and patient advised to use sunglasses to decrease symptoms of photophobia. Follow-up exams arranged every 6 month. Ocular condition not changed in examinations during 2 years after diagnosis. After 2 years of diagnosis of Adie’s tonic pupil, patient became aware of a mass in her left breast which was diagnosed as poorly differentiated infiltrating duct cell carcinoma.

Ophthalmologic findings

Uncorrected visual acuity was 20/20 in both right and left eyes with no refractory error, eyelids and fissure were normal, external ocular movements were normal, no ocular deviation observed, relative afferent
pupillary defect test was negative in any eye, right pupil was 4 mm and reactive to light, left pupil was 7 mm and nonreactive to light (Fig. 1), slit lamp biomicroscopy of cornea and anterior segment, and indirect fundoscopy were unremarkable. Instilling 1 drop of diluted 0.1% pilocarpine caused obvious constriction only in left pupil confirming super-sensitivity of iris receptors and proving the diagnosis of Adie’s tonic pupil (Fig. 2).

**DISCUSSION**

Adie’s tonic pupil is a disorder of autonomic nervous system (4,5). Patients with paraneoplastic syndromes may show signs of involvement of autonomic nervous system (6), and there are reports of association between tonic pupil and some malignancies (7,8) but to best of our knowledge association of Adie’s tonic pupil with breast cancer is not already reported in the scientific literature.

Tonic pupil of any etiology is not expected to resolve even after resolution of the contributory condition according to natural history of the disease in literature (5). On the other hand, in our case, the treatment of the malignancy was not anticipated to be a total cure. Therefore, we did not expect the resolution of tonic pupil after treatment of the breast malignancy. Unfortunately, our patient had no history of any screening tests or even self-examination to assist her finding the culprit breast mass in early stage, and we had not referred her for complete evaluation after detection of ocular sign. It is a presumable that the possible cause was existent undetected at the time of unveiling ophthalmic condition.

According to this report, it may be sensible to advice for careful breast examination in female patients with idiopathic tonic pupil for early diagnosis of probable breast problems.

**DISCLOSURE**

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