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## Research Progress on Tic Disorders in Children

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**Abstract:** Tic disorders (TD) is a neurological and psychiatric disorder that occurs in children and adolescents, with tics as the main manifestation. Currently, the etiology and pathogenesis are not clear, and clinical manifestations are diverse. In recent years, with the increase of incidence rate year by year, people have a new understanding of tic disorder in children. This article reviews the pathogenesis, diagnosis, and treatment methods of tic disorders in children by referring to existing literature, in order to provide reference for clinical practice.

**Keywords:** tourette syndrome in children; pathogenesis; diagnosis; treat

### 1 Etiology and pathogenesis

#### 1.1 Genetic factors

Through investigation and research on TD patients and their immediate family members, it was found that about 30% of patients have a positive family history. The incidence of TD in the first degree relatives of TD patients is tens or hundreds of times higher than that of the normal population. This indicates that TD has a certain genetic susceptibility, but its specific genes and inheritance mode have not been confirmed. Experts have pointed out that this disease may be related to autosomal dominant inheritance or polygenic inheritance [1]. Genetic research has found that de novo replication of chromosomes 7q22.1-q31.1, insertion at 7q35-q36, and deletion of exons 4, 5, and 6 of NLGN4X can all induce tic behavior. Foreign literature reports that PVRL3, MPPL3, DNAJC13, and OFCC1 gene variations are closely related to Tourette syndrome (TS) [2]. At present, the localization of susceptible genes is still the primary issue that needs to be addressed in the etiology research of tic disorders.

#### 1.2 Perinatal factors

The mental and psychological state, lifestyle, and dietary habits of pregnant mothers can all affect the development of the fetal brain. Early pregnancy is the golden period for the development of the fetal nervous system. Malnutrition is more common during this period, which can easily cause disorders in the fetal brain and basal ganglia pathways, DNA methylation, etc., all of which can increase the incidence of TD in children. In addition, delivery method is an independent risk factor for the onset of tic disorders in children, and it has been proven that cesarean section increases the risk of developing tic disorders in children [3]. Suffering from asphyxia, hypoxia, intracranial hemorrhage, and massive tumor formation at birth can increase the risk of tic disorders.

#### 1.3 Central nervous system factors

The imbalance of central nervous system neurotransmitters in children with TD is caused by dopamine dysfunction in the DA, NE, 5-HT, striatum, cerebral cortex, and hippocampus, as well as an increase in monoamine neurotransmitter serotonin content, which may be related to the onset of TD [4]. Especially, the dysfunction of dopamine, which mainly leads to the onset of TD, has been recognized by many scholars. In addition, through imaging examinations, it was found that some children with TD have developmental defects and anatomical abnormalities in the central nervous system, with the main lesions concentrated in the basal ganglia, frontal cortex, and limbic system [5].

#### 1.4 Infection factors

About 30% of TD cases have precursor bacterial or viral infections, with hemolytic streptococcal infections being the most common. The main mechanism is the induction of immune dysfunction after infection. Antigen antibody complexes produced by abnormal cellular immunity can cause cytokine activation or abnormal transmission of neurons, resulting in tics. Research has shown that children with recurrent tonsillitis and upper respiratory tract infections are more prone to developing tic symptoms [3,6].

### 2 Clinical manifestation

Tourette can be divided into motor tics and vocal tics [9]. According to the duration of tics, the participating

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body parts and muscle groups, motor tics and vocal tics can be further subdivided into simple and complex tics. Simple tics often manifest as sudden, brief, meaningless vocalizations or movements, while complex tics manifest as slightly longer lasting motor behaviors or language, seemingly with a certain purpose. In clinical practice, the duration of tic manifestations is often used for preliminary identification <sup>[1, 10]</sup>.

### **3 Diagnosis and diagnostic criteria**

At present, there is no unified diagnostic gold standard for this disease both domestically and internationally. The existing diagnostic process usually focuses on tic symptoms and related accompanying mental and behavioral manifestations, supplemented by physical and auxiliary examinations, and excludes other related diseases <sup>[11]</sup>. The latest diagnostic standard in China is the "Chinese Expert Consensus on the Diagnosis and Treatment of Tourette Syndrome" formulated by the Tourette Disorder Alliance of the Neurology Group of the Chinese Society of Pediatrics in August 2020 <sup>[11-12]</sup>, which divides TD into transient TD, chronic TD, and Tourette syndrome (TS). Some children cannot be classified into any of the above types and belong to other undefined types of TD <sup>[13]</sup>, such as TD (delayed onset TD) that occurs in adulthood. However, refractory TD is a new concept that has gradually emerged in recent years <sup>[14]</sup>, and there is no clear definition yet.

### **4 Treat**

Based on the severity of the patient's illness, empirical and individualized treatment is often adopted in clinical practice. The main forms include drug therapy and non drug therapy <sup>[21]</sup>. Some children with refractory TD can be treated with Chinese medicine acupuncture and moxibustion, massage or surgery, and surgical intervention is usually the last way to treat TD. There are various treatment options available globally, and a unified diagnosis and treatment guideline has not yet been formed <sup>[11,22]</sup>.

### **5 Summary**

To sum up, with the increasing incidence of TD in recent years, people have made more in-depth research on TD, and understanding its etiology and pathogenesis is of great significance for us to diagnose and treat TD. For the treatment of TD patients, drug therapy is usually the main approach, supplemented by non drug therapy, with comprehensive intervention and personalized treatment.

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## Application of Ultrasonography in Sentinel Lymph Node Examination of Breast Cancer

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**Abstract:** After routine axillary lymph node dissection, it is easy to cause ipsilateral upper limb edema in breast cancer patients, which is difficult to treat and has a greater impact on the quality of life of patients. Sentinel lymph node is a common local metastasis site in patients with breast cancer. To determine whether axillary lymph node metastasis is the key information for formulating individualized treatment. Sentinel lymph node metastasis in breast cancer is a predictor of recurrence rate and overall survival rate of patients, and its status directly determines the scope of surgery and whether radiotherapy is performed after mastectomy. With the development of clinical imaging, contrast-enhanced ultrasound has been widely used in sentinel lymph node examination of breast cancer, which can improve the accuracy of the examination. This article reviews the application of ultrasound in sentinel lymph node examination of breast cancer, hoping to provide reference for clinical related work.

**Key words:** sentinel lymph nodes of breast cancer; ultrasound examination; breast cancer patients; check accuracy

In recent years, breast cancer has become one of the most common malignant tumors among women in the world, and it is also one of the important reasons for women's death. As a developing country, due to various factors, the incidence rate of breast cancer in China continues to increase, and shows a younger trend. Breast cancer occurs when breast epithelial cells proliferate out of control under the action of a variety of carcinogens. In the early stages of this disease, it usually presents as breast lumps, nipple discharge, and enlarged axillary lymph nodes. However, in the later stages, multiple organ lesions may occur due to distant metastasis of cancer cells, posing a great threat to the patient's life [1-3]. Sentinel lymph nodes are the first stop lymph nodes for primary tumor drainage, and their histological morphology can represent the status of the entire axillary lymph nodes. Sentinel lymph node metastasis in breast cancer is a predictor of recurrence rate and overall survival rate of patients, and its status directly determines the scope of surgery of patients and whether radiotherapy is performed after mastectomy [4]. With the development of clinical imaging, contrast-enhanced ultrasound has been widely used in sentinel lymph node examination of breast cancer, which can improve the accuracy of the examination. This article reviews the application of ultrasound in sentinel lymph node examination of breast cancer.

### 1 Principles of contrast-enhanced ultrasound

CEUS is used in sentinel lymph node examination of breast cancer. It is mainly through the absorption of the ultrasound contrast agent injected subcutaneously by the true subcutaneous lymphatic vessels around the areola, and then through the lymphatic vessels in the breast to the armpit to reach the sentinel lymph node [5-6]. Studies abroad have confirmed that injecting ultrasound contrast agents around the tumor can identify draining lymphatic vessels and sentinel lymph nodes, and it has been found that injecting 1mL and 2mL of contrast agents does not significantly affect the development of lymphatic vessels and lymph nodes [7]. Subsequently, the Guide for Extrahepatic Application of Contrast Ultrasound of the Federation of Biomedical Ultrasound Societies of Foreign Countries also introduced the application of contrast-enhanced ultrasound in sentinel lymph node examination of breast cancer, and clearly pointed out that ultrasound contrast agents are non-toxic, and their diagnostic efficacy is equivalent to that of radioisotope methods. Ultrasound contrast can guide sentinel lymph node biopsy, ultimately facilitating clinical treatment [8]. Currently, the examination method for sentinel lymph nodes in clinical practice is to scan the breast and armpits under conventional ultrasound, and inject ultrasound contrast agent intradermal or subcutaneous around the areola at 3 o'clock, 6 o'clock, 9 o'clock, and 12 o'clock directions. By tracking and draining lymphatic vessels to the sentinel lymph nodes at the end of the lymphatic vessels, the sentinel lymph nodes