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Etiological Analysis of 248 Cases of Oculomotor Nerve Palsy

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Abstract: *Objective:* To explore the main causes of oculomotor nerve palsy, providing a reference for clinical diagnosis and treatment. *Methods:* A total of 248 patients with oculomotor nerve palsy treated in the hospital from January 2016 to January 2018 were selected, and their causes and treatments were summarized. *Results:* This study found that the main causes of oculomotor nerve palsy were intracranial aneurysms, brain stem lesions, and brain inflammation. A few cases were due to viral infections and congenital oculomotor nerve palsy, while some patients had unknown causes. After treatment in our hospital, most patients experienced relief, although 12 patients died. *Conclusion:* The etiology of oculomotor nerve palsy is complex, and choosing appropriate drugs during treatment is challenging. Timely identification of the cause is an effective method for treatment.

Keywords: Oculomotor nerve palsy; Etiology; Analysis

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1. Introduction

Oculomotor nerve palsy is a common condition treated by ophthalmology and neurology, significantly impacting patients' vision, causing symptoms such as ophthalmoplegia and dilated pupils, and potentially becoming life-threatening in severe cases. The causes of oculomotor nerve palsy are varied, and treatment methods differ accordingly. An unclear diagnosis can greatly affect treatment efficacy and delay appropriate care, making accurate identification of the cause crucial.

Recent research on oculomotor nerve palsy has increased, helping to clarify its main causes. However, due to significant individual differences and the complexity of etiology, analysis must consider each patient's clinical data [1]. Common causes of oculomotor nerve palsy include vascular dysfunction related to aneurysms, inflammatory reactions, trauma, and radiation lesions. Given the diversity of causes, it is essential to promptly identify the underlying factors and implement targeted treatment to control the condition and improve the quality of life for patients [2].

To provide a reference for clinical diagnosis and treatment, a study was conducted involving 248 patients with oculomotor nerve palsy. The main causes were comparatively analyzed, clinical symptoms were observed, and patient prognoses were followed up on, as detailed below.

2. Materials and methods

2.1. General information

To investigate the primary causes of oculomotor nerve palsy and offer valuable insights for treatment, 248 cases admitted to the hospital from January 2016 to January 2018 were studied. Among these patients, 145 were male and 103 were female, aged between 20 and 65, with an average age of 63.79 ± 21.13 years. The disease course ranged from January to June, averaging 4.62 ± 1.35 months. Body mass index (BMI) ranged from 18 to 34 kg/m^2, with an average of 25.98 ± 7.69 kg/m^2. No other clinical symptoms were present aside from oculomotor nerve palsy.

2.2. Methods

Upon hospital admission, patients underwent routine blood and urine tests to check blood sugar and lipid levels, as well as electrocardiograms, chest X-rays, lumbar punctures, and virus detection to fully assess their physical condition and identify the cause of their illness. Treatment measures were tailored to each identified cause, and treatment outcomes were recorded. The causes and therapeutic effects were categorized and analyzed, and the clinical characteristics of the patients were evaluated.

3. Results

After a series of examinations, it was found that there are many causes of oculomotor nerve palsy, which can be roughly divided into two types: congenital and acquired. The treatment effect for congenital cases is generally not ideal, with a very low chance of recovery. Treatment methods can only inhibit the development of the disease. Among the 248 patients, 200 cases of oculomotor nerve palsy were acquired. Of these, 96 patients (48%) were caused by intracranial aneurysms, and 50 patients (25%) were caused by brain stem diseases such as encephalitis. The causes for the remaining patients were varied; some were due to viral infections, some to blood sugar issues, and a few had unknown causes. The acquired cases mainly presented as unilateral onset, simple oculomotor nerve palsy, and complete oculomotor nerve palsy. The specific clinical features are shown in **Table 1**.

After investigating the etiology, patients were treated. Among these, 12 patients died during treatment, while the rest showed improvement. However, only 80 patients were cured, indicating that identifying the etiology plays a crucial role in the treatment and control of the disease. Despite this, treating this condition remains challenging, and conventional treatment methods need to be strengthened.

Table 1. Statistics of clinical characteristics of acquired oculomotor nerve palsy patients

Index	Number	Proportion (%)
Unilateral onset	165	82.50
Bilateral onset	35	17.50
Simple oculomotor nerve palsy	153	76.50
Combined with other cranial nerve and nervous system diseases	47	23.50
Complete oculomotor nerve palsy	159	79.50
Simple upper branch involvement	2	1.00
Simple lower branch involvement	3	1.50
Special type of seizure (COPS/Marcus Gunn syndrome)	36	18.00
Pupil involvement	158	79.00

4. Discussion

4.1. Definition and etiology of oculomotor nerve palsy

Oculomotor nerve palsy, as its name suggests, is a condition caused by various pathological changes leading to paralysis of eye nerves and muscles, dilated pupils, impaired vision, and in severe cases, can be life-threatening [3]. The causes are numerous and often related to other diseases, which will be introduced individually. The most common and primary cause is intracranial aneurysms, including pituitary adenoma and craniopharyngioma. Since the ophthalmic nerve is controlled by the brain, the presence of a tumor can cause significant compression on the nerve, leading to various eye diseases. Another major cause includes encephalitis and meningitis, which are also prevalent. Less common causes are trauma, intracranial hemorrhage, fractures, multiple neuritis caused by diabetes, and viral infections. Additionally, congenital oculomotor nerve palsy is often difficult to diagnose promptly, complicating treatment [4].

4.2. Analysis of clinical features of oculomotor nerve palsy

The clinical characteristics of patients with acquired oculomotor nerve palsy were analyzed, revealing that most patients had unilateral onset (82.50%), with bilateral onset being relatively rare. Most patients exhibited simple oculomotor nerve palsy (76.50%), while some had complications involving other cranial nerve and nervous system diseases. Regarding nerve involvement, complete oculomotor nerve palsy accounted for the highest proportion (79.50%), with some patients experiencing special types of seizures such as COPS/Marcus Gunn syndrome. A few patients had simple upper or lower branch involvement. Additionally, most patients exhibited pupil involvement, with intracranial aneurysm being the primary cause of oculomotor nerve palsy and pupil involvement. Research indicates that all patients with aneurysms have pupil involvement, while the rate is relatively low for other causes, providing a basis for differential diagnosis [5].

4.3. Complications of oculomotor nerve palsy

Oculomotor nerve palsy can lead to various complications, primarily affecting vision, ranging from mild amblyopia to severe blindness. Once blindness occurs, the chances of cure are very low. Effective prevention methods are currently lacking, making timely identification of the cause crucial for treatment. In addition to visual acuity, eye morphology is also affected, with most patients exhibiting dilated pupils, drooping eyelids, and strabismus. These external morphological changes can have a severe psychological impact on patients, negatively affecting diagnosis and treatment. Dilated pupils result in a loss of response and adjustment to light, causing the patient to tilt their head towards the healthy side, potentially leading to paralysis in severe cases. Congenital oculomotor nerve palsy often lacks a direct cause, complicating targeted treatment. Typically, this condition affects one eye, with no symptoms in the other eye, and may cause facial paralysis, affecting sensory organs on the same side, including hearing [6].

4.4. Clinical treatment analysis of oculomotor nerve palsy

Once the cause of the patient's condition is identified, targeted treatment measures are taken. Intracranial aneurysm is a significant cause of oculomotor nerve palsy, accounting for about 50% of cases, mainly involving posterior communicating artery aneurysm, aneurysm, and venous fistula [7]. Most of these patients have pupil involvement, necessitating the elimination of intracranial aneurysm compression and emergency neuro-ophthalmology treatment to improve symptoms. For patients with oculomotor nerve palsy caused by infections or inflammatory diseases, hormone therapy should be administered immediately after ruling out intracranial aneurysm to exert anti-inflammatory effects, improve nerve involvement, and control disease progression. Most patients respond well to anti-inflammatory treatment [8]. The causes of other patients with oculomotor nerve

palsy are complex and difficult to diagnose, such as tiny meningioma and neurofibroma, which may be missed in conventional magnetic resonance examinations. Thin-layer orbital magnetic resonance scanning and enhanced scanning should be used to explore the condition thoroughly along the oculomotor nerve path, identifying subtle neuroimaging changes to avoid missing related lesions [9]. Additionally, attention should be paid to oculomotor nerve palsy caused by myasthenia gravis. The condition can be clearly determined by bromostigmine and ice-water tests. Symptoms of oculomotor nerve palsy caused by pupil involvement quickly improve after bromostigmine injection, whereas those not caused by myasthenia gravis show no significant improvement.

5. Conclusion

This clinical study provides a comprehensive understanding of oculomotor nerve palsy, a condition that causes significant distress to patients and their families. The study aims to help patients and their families face the disease correctly and offer valuable reference opinions for medical professionals, hoping to aid future treatments. The study indicates that the etiology of oculomotor nerve palsy is complex, making diagnosis and treatment challenging. Further research is needed to achieve the best diagnosis and treatment outcomes.

Disclosure statement

The authors declare no conflict of interest.

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