

# Treatment of 2 Cases of Differentiated Thyroid Carcinoma Complicated with Horner's Syndrome

Liyou Song, Zhaojun Li, Zhe Zhang, Rui Zhang, Tong Jin, Hui Jin, Yuanshi Lv and Xiangdang Yin\*

Thyroid Minimally Invasive Surgery, Jilin Cancer Hospital, P.R.China

\*Corresponding author: Xiangdang Yin, Thyroid Minimally Invasive Surgery, Jilin Cancer Hospital, 130000, P.R.China



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## ABSTRACT

The incidence of Horner syndrome is low after surgery for differentiated thyroid cancer as reported by very rare cases [1-3]. A total of 18 cases of Horner syndrome after thyroid surgery have been reported in China and abroad since 1993, according to Meng et al. [4,5], Giuseppe [6-8] reported 29 cases. Herein, we reported 2 cases of Horner syndrome after thyroidectomy.

**Keywords:** Differentiated Thyroid Cancer; Postoperative; Horner Syndrome

## Introduction

Horner syndrome was first demonstrated by Parkinson in 1929 [9]. A variety of lesions can cause the disease in the sympathetic pathway causing a complex etiology. Presently, the treatment of the disease is primarily based on etiological treatment. Certain curative effects can be achieved by treating the primary conditions that cause Horner's current syndrome, such as blood vessels, mass, trauma, and surgery. The clinical Horner syndrome is characterized by [8] ptosis; mydriasis; partial sweating or no sweating on the affected side; retraction of the eyeball on the affected side, which can be cured after conservative treatment.

## Case Report

### Case 1

A 33-year-old female was hospitalized because a left thyroid tumor was found for one month, and a puncture diagnosed thyroid cancer for nine days. Physical examination showed a palpable mass of about 0.8 cm × 0.6 cm in the upper pole of the left thyroid,

with a hard texture and unclear boundary that could move up and down with swallowing, and no enlarged lymph nodes were palpable on both sides of the neck. Color ultrasound tips showed a left thyroid mass of about 0.8 cm × 0.6 cm and a high possibility of thyroid cancer (cT1NxMx). The pathological results of Fine-Needle Aspiration (FNA) showed left papillary thyroid carcinoma, and several routine examinations were improved after admission. The video laryngoscope revealed normal bilateral vocal cord movement. Under general anesthesia within a limited time, the patient underwent total laparoscopic radical thyroidectomy on the left side of the areola, dissection of the left central lymph node, and exposure of the left recurrent laryngeal nerve. When the knife severed the superior thyroid artery, the superior thyroid artery was not completely coagulated, and the broken end of the blood vessel was bleeding. Then suction was used, the ultrasonic scalpel function head was coagulated, and two home locks were clamped. Repeated washing and inspection indicated no apparent bleeding, and the operation was ended.

On the first day after the operation, the drainage tube drained 90 mL of pale, bloody fluid, and there were no obvious signs of improvement. On the second day after the operation, the patient had bilateral asymmetry; the retraction of the eyeball was not obvious, the eyelid closure ability was normal, the left eyelid and the upper eyelid were drooping. Fatigue accompanied by mild congestion, blurred vision, no redness, fever, and no sweating symptoms on the left side of the face, no hoarseness, and abnormal swallowing was observed. The right eyelid was normal, and the pupils were normal bilaterally, as shown in Figure 1. Preliminary consideration of anesthesia, intracranial lesions, myasthenia gravis or eye disease, head MRI, cervical and chest CT, and other tests were all negative. The diagnosis of Horner syndrome was made

following consultation with otolaryngology and brain surgery, and neurotrophic drugs were started, such as intramuscular injection of Micobala 0.5 mg/d followed by dexamethasone 10 mg/d for 3 days. After 3 days, Dexamethasone was changed to 5 mg/d, stopped after 3 days, and then continued to take Micobao 0.5 mg/time, 3 times/d, supplemented by acupuncture daily once for a total of 7 days, the left eyelid on the 14th postoperative day. The ptosis symptoms improved and the eye congestion disappeared. As planned, the outpatient clinic was routinely reviewed while the patient underwent TSH suppression and radionuclide therapy. Partial recovery 2 months after surgery and full recovery 6 months after surgery was observed.



**Figure 1:** Completely endoscopic thyroid surgery.

## Case 2

A 67-year-old female was hospitalized due to the discovery of a left neck mass for 1 month, and the tumor metastasis was confirmed by puncture for 8 days. Physical examination showed a healing scar in the neck, a palpable mass of about 2.0 cm × 1.0 cm in size on the left side of the neck, with a hard texture and unclear boundaries, and no enlarged lymph nodes on the right side of the neck. The patient had a past history of bilateral thyroid cancer and bilateral cervical lymph node dissection. The color ultrasound displayed absent thyroid, two hypoechoes were seen in the left neck zone II, the boundary was clear, the size was about 2.2 cm × 1.3 cm, and the thyroid source was considered. The FNA suggested metastatic papillary thyroid carcinoma in the left cervical lymph node. Routine examinations were done after admission. The video laryngoscope indicated paralysis of the right vocal cord; the movement of the left vocal cord was normal. The left cervical plexus-preserving level II, III, IV, Vb, and VI lymph node dissection was performed under general anesthesia after perfecting the preoperative preparation.

On the first day after the operation, the drainage tube drained 60 mL of pale bloody fluid, and the patient had bilateral asymmetry; the left eyeball was significantly retracted, the eyelid closure ability

was normal, the right pupil was constricted without hyperemia, the left eyelid was droopy, and the lift was weak. Blurred vision, redness, warmth, and anhidrosis on the left side of the face, without hoarseness and abnormal swallowing were observed, as shown by Figure 2. The right eyelid and pupil size were normal. Horner syndrome due to thyroid surgery was considered initially, and otolaryngology and brain surgery were consulted. A head MRI and cervical and chest CT were recommended. All the examinations showed negative outcomes. After consultation, Horner syndrome was detected. Neurotrophic drugs, including intramuscular injection of Micobola 0.5 mg/d, followed by dexamethasone 10 mg/d for a total of three days, were administered. Dexamethasone was changed to 5 mg/d, discontinued after three days, and then continued to take Micobola 0.5 mg orally/time, three times per day, assisted acupuncture treatment, once/d, a total of seven days, the symptoms of left eyelid ptosis improved on the 20th postoperative day, and the degree of mydriasis enhanced. The patient was instructed to take TSH inhibition and radionuclide therapy as planned. The outpatient clinic was routinely reviewed. Partial recovery was accomplished four months postoperatively and complete recovery seven months postoperatively.



Figure 2: Left cervical plexus-preserving cervical lymph node dissection.

## Discussion

Horner syndrome, also known as a cervical sympathetic syndrome, was first described in 1929 by Johann Frieckrich. The lesions may occur in the sympathetic nerve fibers from the hypothalamus (mydriatic center) that sends out through the brainstem and cervical and thoracic spinal cords leading to a complicated etiology. Any damage to the sympathetic ganglion and postganglionic fibers. In clinical practice, detailed physical examination, drug test, and auxiliary examination can detect the location and nature of lesions, also timely and accurate diagnosis

can provide active treatment for patients [10,11]. The lesions can be divided into three types: central lesions, preganglionic lesions and postganglionic lesions. Horner syndrome caused by thyroid surgery is a type of postganglionic lesions, which is relatively rare [12-15]. The cervical sympathetic nerve is damaged by the thermal radiation of surgical instruments, which is a part of the autonomic nerve, involving the thalamus, the descending fibers of the medulla, and the lateral angle of the spinal cord from C8 to T1 (Figure 3). In the eye, innervation of the dilator muscle and the levator palpebrae muscle [16].

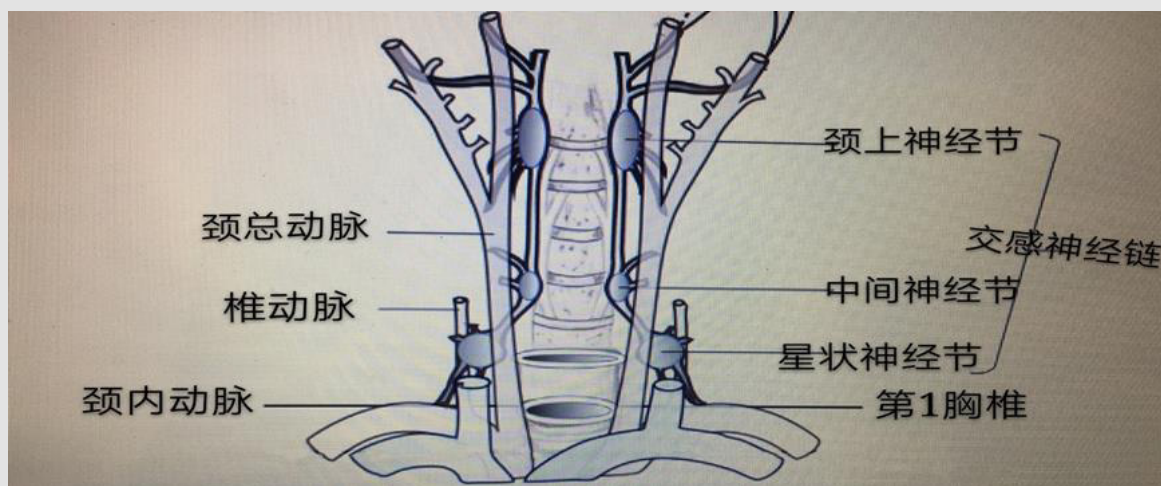


Figure 3: Schematic diagram of the cervical sympathetic chain.

Lateral cervical lymph node are dissected with preservation of the cervical plexus during thyroid surgery, which includes the lymph nodes around the carotid sheath and often involves the sympathetic network around the carotid artery. Horner syndrome can be caused by surgery in the cervical sympathetic nerve course [17], which generally occurs at the thoracic entrance and upper mediastinum surgery, and rarely in thyroid surgery. The main manifestations after the injury are ptosis of the upper eyelid,

miosis, and retraction of the eye on the affected side. Some patients may be accompanied by mild conjunctival hyperemia due to eyelid insufficiency, similar to eyelid inflammatory diseases. The use of neurotrophic drugs and hormone therapy can be effective for some patients [18-20]. The reported recovery time ranges from two months to 24 months, and some patients cannot completely recover their symptoms. In this case, the two patients only partially recovered in the second and fourth months by taking neurotrophic

agents, hormones, and traditional Chinese medicine acupuncture on a regular basis. As Horner syndrome has similar symptoms to intracranial lesions, myasthenia gravis, or eye diseases [21,22], most doctors mistakenly believe it to be other diseases. Therefore, if a similar Horner syndrome occurs after surgery, the patient should be referred to relevant departments for consultation, and the above reasons should be excluded first.

In thyroid surgery, the lymph nodes invade the deep fascia, and in patients with secondary or multiple thyroid surgery, due to the severe adhesion of the mass to the surrounding tissue or the destruction of the surrounding normal tissue, the peripheral nerve cannot be properly protected, and the nerve is directly damaged. Additionally, there occurs minute direct damage to nerves during surgical operations; thermal radiation damage due to monopolar electrocautery, small bipolar and ultrasonic scalpels, and local tissue inflammation, edema, and hematoma after surgery, and postoperative ischemia. Nerve damage is the most common cause [8]. In recent years, with further standardization of thyroid surgery and advancement of surgical techniques coupled with the investment of many advanced energy platforms, Horner syndrome is uncommon even after multifunctional cervical plexus-preserving lateral cervical lymph node dissection. Careful handling of the proximal vascular sheath in the neck to avoid unnecessary dissection and completing with minimal invasive procedures are effective measures to avoid this complication. Therefore, when cervical lymph node dissection is required, the surgeon should also be familiar with the anatomical and adjacent structures of the cervical sympathetic nerve and protect the cervical sympathetic nerve in addition to protecting the accessory nerve, phrenic nerve, vagus nerve, and brachial plexus.

## Conclusion

There is a low incidence of Horner syndrome after surgery for differentiated thyroid cancer. Once the clinical manifestations of Horner syndrome are found, it is recommended to use neurotrophic drugs and give an appropriate amount of glucocorticoids, supplemented by traditional Chinese medicine acupuncture. The disease can be cured with conservative treatment.

## Personal Diagnosis and Treatment Experience

Generally, Horner syndrome after surgery for differentiated thyroid cancer is curable with conservative treatment, and this complication is minimized during surgery. A longer treatment time in Horner syndrome will increase the psychological pressure of patients and doctors, inducing doctor-patient conflicts and may also consume more medical resources. Therefore, based on these two cases, it is learned that [1] Thyroid surgeons should be aware of cervical sympathetic nerves course, know the anatomical and adjacent structures of nerves, and protect the cervical sympathetic

nerves. No matter whether the surgery is endoscopic or open, the dissection should be refined when handling the upper pole vessels of the thyroid; [2] Careful attention should be taken while handling the vascular sheath in the neck, unnecessary excessive dissection should be avoided, and completing the operation with a minimally invasive technique; [3] The operator should not dissect the lymph nodes too deeply, when the cervical lymph node recurs, and the lymph node has tightly adhered to the surrounding tissues. The superficial fascia should be used as a beacon to dissect the lymph nodes on it, and a small bipolar must be used as much as possible. It is only restricted between the tweezers at both ends, and the degree of thermal damage and impact on adjacent tissues is low, which makes it relatively safe; [4] The ultrasonic knife head should be suspended in the air, when laparoscopic thyroid surgery is performed on the upper pole of the thyroid, and the carotid artery should not be pressed excessively. To reduce the thermal damage of the ultrasonic knife to the sympathetic nerve, the sheath or functional surface of the ultrasonic knife must be kept away from the dorsal side of the thyroid or isolated with a small piece of gauze, and the superior thyroid artery should be finely separated to minimize the direct loss of energy equipment to the nerve. [5] Lastly, patients and their families must be informed before surgery that thyroid surgery may have Horner syndrome complications. Though the incidence is minimal, the treatment time is lengthy so that patients, especially young female ones, are psychologically prepared.

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## Conflict of Interest

The authors declare that there is no conflict of interest.

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Xiangdang Yin. Biomed J Sci & Tech Res



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