

Laparoscopic Omohyoid Muscle Transection Surgery: A Novel Procedure Against Omohyoid Muscle Syndrome

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Omohyoid muscle syndrome (OMS), also called omohyoid sling syndrome, is a rare disease. The first OMS case was reported in 1980.^[1] OMS is presented by a mass without pain on the neck when the patient swallows and disappears after swallow. The patient often feels discomfort and dysphasia when the mass appears.

In normal condition [Figure 1a], omohyoid muscle (OH) consists of superior and inferior bellies united at an angle by an intermediate tendon (IT) and it passes behind the sternocleidomastoid (SCM) muscle. The OH depresses the hyoid bone after it has been elevated during swallowing.^[2]

In OMS patients [Figure 1b], the most important pathology change is the loosen of IT tendon sheath.^[3] After that, the OH becomes short and fibrosis because of the disuse atrophy. When the patient swallows, the OH cannot be extended, the IT moved laterally and superiorly. The posterior clavicle margin of OH replace IT as a new origin of force. When the patient swallow, the shorten OH like a string, form an X-shaped tent to elevate the SCM in the lateral neck during upward movement of the hyoid bone. The elevated SCM formed the mass in the neck.

Transection of the OH is the standard treatment for this disease due to the pathophysiology change of OMS.^[4] The prognosis is good except for a 5 cm scar on the neck. The deficits of the procedure are the higher cost and skill demanding due to the utility of laparoscopy. As it is a benign disease, the only reason that the patients choose to undergo surgery is a cosmetic effect. Therefore, we designed this laparoscopic surgery procedure to meet the needs of patients.

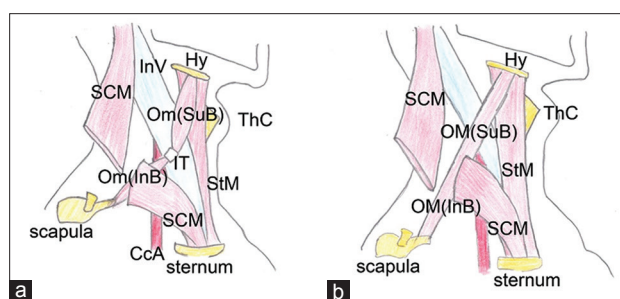


Figure 1: The anatomy and function of omohyoid muscle in normal and omohyoid muscle syndrome patients. (a) In normal condition, omohyoid muscle consists of superior and inferior bellies that united at an angle by an intermediate tendon and it passes behind the sternocleidomastoid muscle. The omohyoid muscle depresses the hyoid bone after it has been elevated during swallowing. (b) For omohyoid muscle syndrome patients, the omohyoid muscle becomes short and fibrous because of disuse atrophy. When the patient swallow, the shorten omohyoid muscle like a string, form an X-shaped tent to elevate the sternocleidomastoid in the lateral neck during upward movement of the hyoid bone. The elevated sternocleidomastoid formed the mass in the neck. CcA: Common carotid artery; InB: Inferior belly; IT: Intermediate tendon; InV: Internal jugular vein; Hy: Hyoid bone; OM: Omohyoid muscle; OMS: Omohyoid muscle syndrome; SCM: Sternocleidomastoid; StM: Sternohyoid muscle; SuB: Superior belly; ThC: Thyroid cartilage.

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From January 1, 2010 to January 1, 2014, there were five patients diagnosed as OMS and underwent laparoscopic surgery. Among them, three cases were male, two cases were female. Ages of the patients were from 26 to 40 years (35 years in average). Disease histories were from 1 month to 2 years (5 months in average). A total of three presented left cervical mass, two presented right. Typical complaint was a sense of mild dysphasia or a foreign body sensation in the throat with normal voice. The disease history was usually several months. There was also the absence of distinct event that might precipitate the onset of symptoms. A family history of similar symptom was absent.

Physical examination showed no positive finding when the patient was not swallowing. When the patient swallowed, a transient swelling raised up on the neck over the junction of the upper two-thirds and the lower third of the sternomastoid muscle. The protruding of the mass coincided with the elevation of the throat, reaching its climax at the moment when the throat was uppermost. With the return of the hyoid, the OMS shrunk to their original resting positions, the mass also disappeared. No further trace of the mass could then be discerned until the patient swallowed again. Special maneuvers like the Valsalva maneuver or tongue protrusion are unrewarding.

All these patients underwent surgeries. The average surgery time was 35 ± 13 min. Average blood loss was 3 ± 1 ml, no case converted to open surgery. No major vessel or nerve damaged. There were no scars on the neck. All the patients were discharged within 2 days. No recurrence occurred during the 1-year follow-up.

The surgical procedure of laparoscopic surgery was as follows [Supplementary Video 1]: The patient was placed in a supine position with the neck slightly extended under general anesthesia. A 10-mm curve skin incision was made at the upper margin of mammary areolas. Diluted adrenalin solution ($\times 300,000$) was injected into the subcutaneous space in the chest wall and in the subplatysmal space of the neck to establish the trocar space. The subcutaneous space was dissected bluntly by a dissector. Then, a 10-mm trocar was inserted. Carbon dioxide was insufflated through the trocar at a pressure of 6–8 mmHg. The endoscope was inserted into the subplatymal space. Two additional double 5-mm trocars below the axilla were inserted into space. Remaining connective tissue in space was dissected by an electronic

hook. Then, an adequate operative space above the SCM muscle was created, then, isolated the SCM muscle. The OH was pale and dark red and adhesion to the SCM muscle tightly. We used a harmonic scalpel and electronic hook to dissect the OH transversely at the upper and lower borders of the SCM muscle. Then, the surgery was done.

Most patients with OMS were treated by surgical transection of OH. The procedure left a 5 cm or longer scar on the neck. Botulinum toxin injection to OH under ultrasonography guidance for OMS could offer an effect of OH dilation without operative scars on the neck, but either if the OMS would recur or requiring another injection was reported.^[5] Theoretically, the paralysis of OH caused by botulinum toxin was incomplete and temporarily.

Endoscopy procedure is now widely used for thyroid and parathyroid gland diseases. It's a safe and effective technique for benign disease with cosmetic effect. Therefore, we try to use this technique in OMS patients. We believe that the endoscopic procedure is suitable for this disease not only because the safe and effective outcome but also cosmetic effect which is the reason why OMS patients undergo surgery.

Supplementary information is linked to the online version of the paper on the Chinese Medical Journal website.

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Conflicts of interest

There are no conflicts of interest.

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