Clinical Case Report

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Vertigo caused by longus colli tendonitis

A case report and literature review

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Abstract

Rationale: Tendinitis of the longus colli muscle is an aseptic inflammatory process leading to acute posterior neck pain, neck stiffness, and dysphagia or odynophagia. We present a patient exhibiting an infrequent symptom, vertigo. This is the first description of the occurrence of vertigo symptoms caused by longus colli tendinitis.

Patient concerns: A 38-year-old man was diagnosed with vertigo, presenting with a 1-month history of dizziness, palpitations, and numbness in the hands.

Diagnosis: Longus colli tendinitis. The diagnosis was established using magnetic resonance imaging fat-suppression sequences.

Interventions: Treatment with corticosteroid injections and acupotomy.

Outcomes: The symptoms relieved immediately after the treatment and complete resolution of the symptoms was observed after 1 week.

Lessons: Longus colli tendinitis with vertigo is an under-reported condition in the literature and physicians should be aware of its existence. A lack of familiarity with the anatomy of the prevertebral space and its variable radiographic appearance makes the diagnosis of longus colli tendinitis clinically difficult. Misdiagnosis of this condition may lead to unnecessary interventions in vertigo.

Abbreviations: CT = computer tomography, ECG = electrocardiography, LCM = longus colli muscle, LCT = longus colli tendonitis, MRI = magnetic resonance imaging.

Keywords: acupotomy, corticosteroid injections, longus colli tendonitis, sympathetic trunk, vertigo

1. Introduction

Dizziness is one of the most common reasons for patients to visit a physician. However, it is a difficult symptom to define, which can make the diagnosis of the underlying causes difficult. Numerous conditions can cause diverse types of dizziness, but cervical spine dysfunction associated with the deep neck flexors is one of the lesser-known ones.[1] The deep neck flexors include the longus colli and longus capitus muscles; these muscles play a vital role in cervical spine conditions and are frequently unnoticed as a source of locomotor system dysfunction. Dysfunction of the locomotor system may lead to the dizziness complaints, such as vertigo and disequilibrium.[2] In most cases,[3–7] neck pain, limitation of cervical spine movement due to pain, and swallowing complaints (odynophagia or dysphagia) comprise the classic triad of symptoms. To the best of our knowledge, this is the first description of the occurrence of vertigo symptoms caused by longus colli tendinitis (LCT). The use of corticosteroid injections and acupotomy therapy in LCT led to a successful outcome in our case study.

2. Case report

A 38-year-old man sought medical help in our department, complaining of severe vertigo lasting for more than 1 month, accompanied by numbness in his hands and feet.

The patient experienced vertigo for 1 month. The symptoms worsened with increasingly shorter periods of remission and spontaneously disappeared. When the symptoms occurred, dizziness was accompanied by disequilibrium, palpitation, and chest tightness, as well as numbness of the head, hands, and feet.

The vertigo first occurred approximately 1 month earlier, after the patient had run to catch a bus. In the bus, he was exposed to cold air from an air conditioner and lost consciousness. After regaining full consciousness, he experienced no nausea and vomiting, and the symptoms alleviated spontaneously after 1 minute. When the patient took the subway the next day, he was again shivering due to a stream of cold air from an air conditioner. He felt dizzy and unsteady, and experienced palpitations. A medical examination showed that his pulse was 105 beats/min; blood pressure, 138/90 mm Hg; and fasting glucose level, 5.8 mmol/L. Furthermore, no abnormalities were

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YS and QZ contributed equally to this work and are co-first authors.

The patient gave consent for publication of this case report and images

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noted on an electrocardiogram (ECG). His blood pressure before the incident was 110/70 mm Hg. Subsequent cardiac examination including cardiac ultrasound, heart function while jogging during an ECG, 24-hour Holter, and heart X-ray imaging did not reveal any abnormalities. A relapse occurred where the patient experienced dizziness and numbness after drinking too much alcohol 2 weeks prior to the relapse. He then received head and neck magnetic resonance imaging (MRI) in the emergency room of the Jiangsu Province hospital. The cervical MRI showed a C5-6 disc herniation. The cerebral MRI showed no obvious abnormalities; heart rate, blood pressure, and ECG were normal as well. He then took traditional Chinese medicine meant to support abstinence, and a 1/2 tablet of metoprolol (Betaloc) when palpitations re-emerged. In the previous 2 weeks, he had felt numbness in the head and hands with palpitations, and took 1/2 tablets of metoprolol (Betaloc) twice daily but had poor results. He then came to Peking University People's Hospital to receive a head MRI when experiencing a mild lacunar infarction. He had normal angiogram, carotid artery, and vertebral artery Doppler ultrasound findings. The physicians eliminated hyperthyroidism, electrolyte imbalance, hypoglycemia, and anemia as possible causes of his symptoms. The patient was diagnosed with otitis media at Peking University People's Hospital, as well as with a functional vegetative nerve disturbance and a mild anxiety disorder. He was instructed to take vitamin B and oryzanol, but the effect of this treatment was poor.

The patient's medical history included allergic rhinitis, with a history of allergies to pollen and dust mites.

Our department integrated the previous examination results and suggested adding a cervical MRI fat-suppression sequence to observe the condition of the patient's neck soft tissue, as well as a cervical flexion-extension radiograph to detect acute injuries. Cervical MRI fat-suppression sequences showed a hyperintense longus colli muscle (LCM) located in vertebrae C5 and C6 (Fig. 1). The cervical FE radiograph showed no fracture or subluxation; no abnormal calcification was noted (Fig. 2). Based on the finding of diffuse edema in the LCM, along with the clinical presentation, a diagnosis of calcific tendinitis of the LCM was made.

We treated the patient's LCM with an injection on the front edge of the C5/6 vertebrae (2.5 mL of 2% lidocaine + 1 mL of diprospan + 2.5 mL NaCl 0.9%) as shown in Figure 3, and with a percutaneous release treatment of LCM with acupotomy on the front edge of the C5/6 vertebrae, as shown in Figure 4.

After 1 treatment administration and 1-week follow-up, the patient's self-reported symptoms such as dizziness, palpitation, and episodes of syncope, completely resolved.

2.1. Literature review

A PubMed database search using "longus colli tendinitis," "prevertebral tendinitis," and "retropharyngeal tendinitis" retrieved 148 relevant citations from 1964 to September 2018. Only full-text articles of case reports in the English language were reviewed. For each individual case, the following specific details were extracted: epidemiologic characteristics, chronologic details, chief complaint on presentation, symptoms, imaging findings, and treatment.

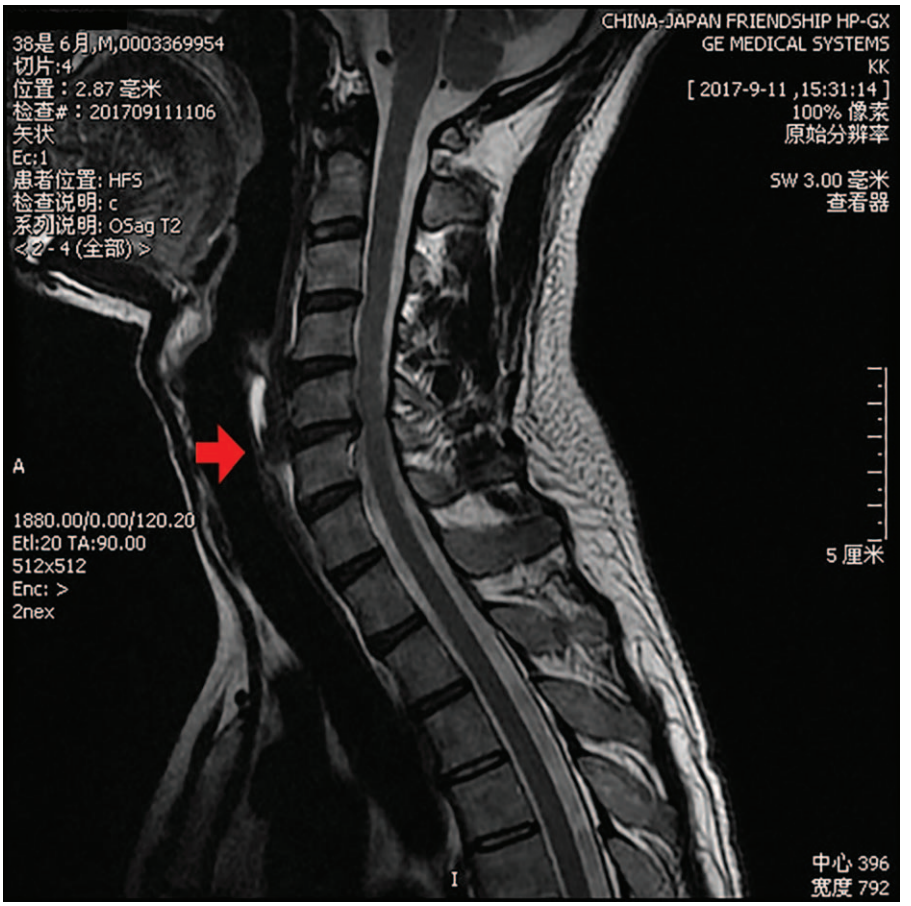

Figure 1. Magnetic resonance imaging T2 fat-suppression sequences show high signal in the longus colli muscle located at the level of C5 and C6 (red arrow).

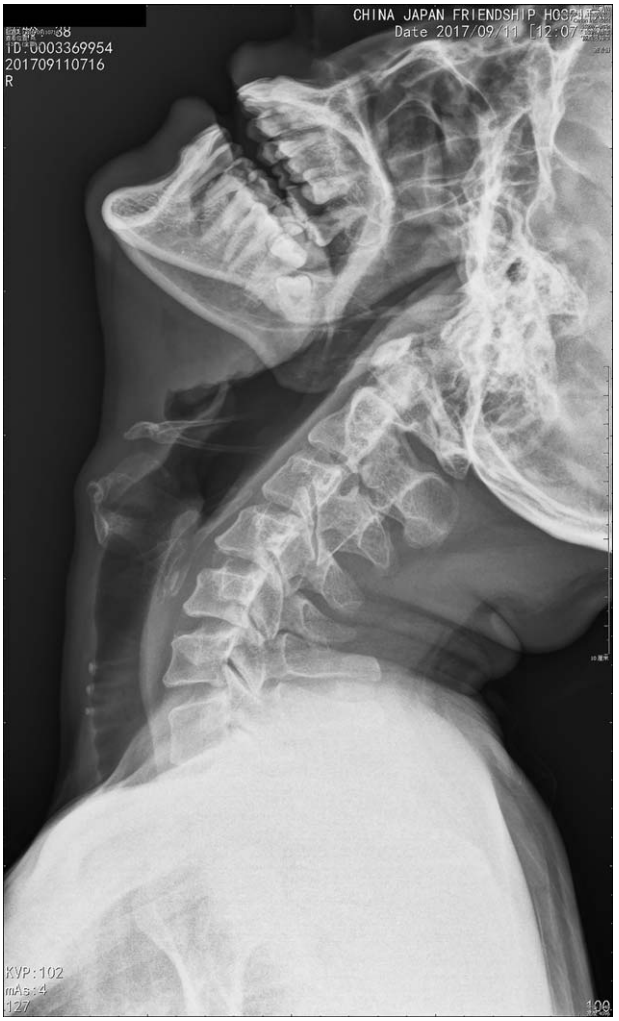

Figure 2. Cervical flexion-extension radiograph shows no fracture or subluxation; no abnormal calcification was noted.

Two hundred and seventy-eight patients with LCT were identified in our review of the literature (Table 1). Their ages ranged from 21 to 78 years with an average of approximately 44.5 years. One hundred forty-seven patients (52.9%) with LCT were women and 131 (47.1%) were men. The most common symptoms at presentation were neck pain (97.8%), limited range of neck motion (95.6%), and swallowing complaints (81.6%). The clinical symptoms of LCT are nonspecific and variable including pain and stiffness in the neck (posterior, anteroposterior, and lateral), shoulder and arm pain, odynophagia, dysphagia, a choking sensation, upper back pain, occipital headache, and torticollis. In the published literature, we found no mention of vertigo. Only 1 report[8] mentioned dizziness and nausea, but no case reports or analysis of vertigo symptoms were reported in the references in this study.[9] Calcifications were evident in 209 cases (76.8%) in which computer tomography (CT) or MRI were used. In 214 (78.7%) cases, prevertebral soft-tissue swelling or effusion was present.

3. Discussion

In this case, lidocaine and diprospan were injected into the long neck muscles. Simultaneously with the acupotomy therapy, the long muscles of the neck were penetrated and cut on their surface. Acupotomy therapy is different from traditional acupuncture treatment in that it focuses more on anatomical structures rather than on acupuncture points. Minimally invasive surgery using a needle knife device has been widely used in the treatment of sports injuries and pain disorders in China. In this study, acupotomy devices were inserted into the long muscles of the neck for release, and the stimulating factors of the cervical sympathetic trunks were relieved by the LCM fasciitis, thereby reducing the symptoms of vertigo. Although acupotomy therapy is widely used in China, it is essentially a minimally invasive surgery that is strictly aimed at relieving the cause of the disease, rather than a

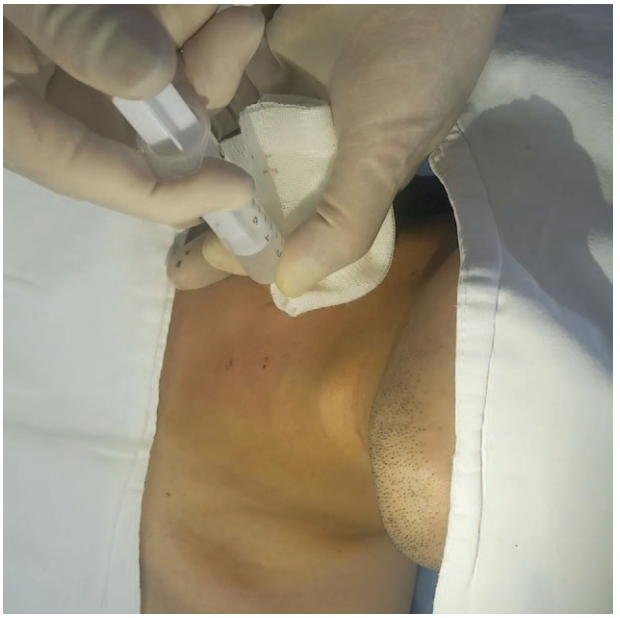

Figure 3. Image showing the corticosteroid injection in the longus colli muscle of the patient.

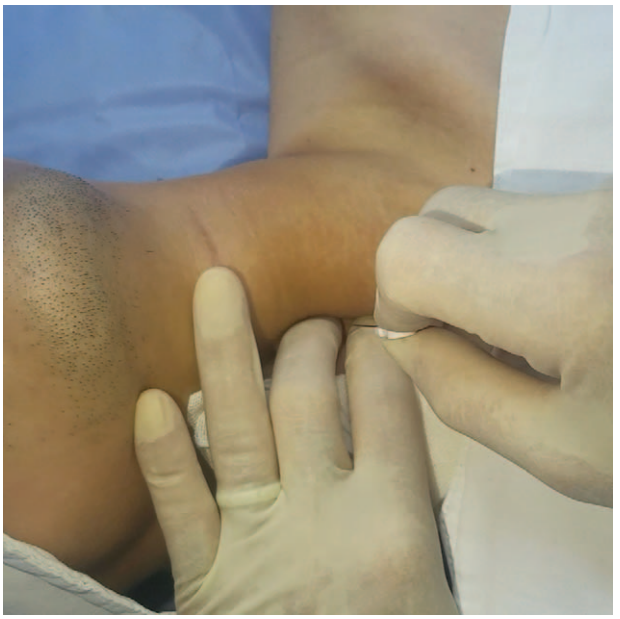

Figure 4. Percutaneous release treatment of the longus colli muscle with acupotomy.

Table 1

Summary of the results of the available cases in the literature.

Total number of cases	278
Average age, y	44.5 (range 21–78)
Sex (females/males)	147/131
Neck pain	272 cases (97.8%)
Limited range of motion	266 cases (95.6%)
Swallowing complaints	227 cases (81.6%)
Vertigo or dizziness	0 case (0.0%)
CT/MRI findings of calcifications	209 cases (76.8%)
Prevertebral soft-tissue swelling or effusion	214 cases (78.7%)

CT = computed tomography, MRI = magnetic resonance imaging.

physical stimulation therapy. In this case, we discovered the cause of the patient's vertigo, so the result of treatment was satisfactory.

The appearance of the symptom of vertigo in the present case study is related to a pathology of the neck anatomy. In particular, due to the anatomical positional relationship between the LCM and the cervical sympathetic ganglia, the swollen LCM stimulated the cervical sympathetic ganglia at its front edge to cause vertigo. The longus colli is the longest muscle, and the medial portion is the longest part of the prevertebral muscle. It lies in the prevertebral space, posterior to the retropharyngeal space. It is the deepest anterior cervical muscle and comprises 3 sections: upper oblique, vertical, and lower oblique.[10–12] Upper oblique fibers arise from the anterior tubercles of the transverse processes of the C3-C5 vertebrae and extend to the anterior tubercle of atlas, while vertical fibers extend from the bodies of the upper thoracic and lower cervical vertebrae to the bodies of the upper cervical vertebrae. The lower oblique fibers extend from the front part of the T1-T3 vertebral bodies to the anterior tubercles of the transverse processes of the C5-C6 vertebrae. The cervical sympathetic ganglia are identified as superior, middle, intermediate, and inferior. The superior cervical ganglia are approximately 3 to 5 cm in length and situated on the longus capitus muscle, anterior to the transverse process of the 2nd, 3rd, and, rarely, 4th cervical vertebrae; the middle cervical ganglia are the smallest of the cervical ganglia situated on the LCM, anterior to the base of the transverse process of the 6th vertebrae, and are located on the medial side of the vertebral artery. The inferior cervical ganglia are located on the transverse process of the C7 vertebrae, whereas the first thoracic ganglia are situated in front of the neck of the first rib.[13] The average distance between the corticospinal tract and the medial border of the ipsilateral LCM was 17.2 mm at C3 and 12.4 mm at C7, as the corticospinal tract converged caudally, the LCMs diverged. The average distance between the anterior tubercles of transverse processes of the cervical vertebrae and the lateral borders of the ipsilateral corticospinal tract was 3.4 mm at C4, 3.2 mm at C5, and 3.9 mm at C6.[14] According to Falla et al,[15] many proprioceptors are distributed over the longus colli and longus capitis muscles. Liu et al[16] used MRI to investigate the relationship between the LCM and cervical vertigo, and suspected that a shorter inner distance and smaller cross-sectional area would represent a weaker LCM, which could lead to cervical spine instability and cause vertigo symptoms.

A commonly used method for evaluating cervical long-fat fasciitis is an imaging-based examination to determine calcification. MRI can visualize the edematous LCM. The diffuse swelling of the muscle is associated with prominent high signal intensities in T2-weighted images. MRI can also show prevertebral edema and its corresponding fluid effusion; however, it is difficult to recognize the calcific deposits with this imaging method. CT scanning is the gold standard for diagnosing this condition as it can identify both the prevertebral edema and calcium hydroxyapatite crystals deposition in the longus colli tendon.[17,18] LCT is a self-limiting condition and symptoms usually resolve spontaneously within 2 to 3 weeks. The pathophysiologic basis of the condition is a foreign-body inflammatory response to deposited calcium hydroxyapatite in the superior oblique tendon of the longus colli. In studies that used CT or MRI, calcifications were obvious in 185 cases (approximately 76.44%), and in 190 (78.51%) cases, prevertebral soft-tissue swelling or effusion was present. In 14 (5.7%) cases, there was no comment on the presence of effusion or soft-tissue edema, while in 6 cases soft-tissue swelling or effusion was absent. An increased prevertebral soft-tissue shadow on the lateral plain X-ray image of the cervical spine was considered to indicate soft-tissue swelling or effusion. LCT is probably severely underdiagnosed because LCT symptoms are nonspecific, and treating physicians are often unfamiliar with it. Clinicians making diagnoses based on imaging should pay attention to the presence of pathognomonic calcification in the superior tendon fibers of the LCM, the presence of fluid within the retropharyngeal space but no associated enhancement around the effusion suggesting abscess formation, no bony destructive change to the adjacent cervical spine vertebrae, and recognize tendinous calcium deposition in the affected muscle tendon.[19] Acute calcific tendinitis of the LCM is an inflammatory process affecting the upper oblique fibers. The most common characteristic triad of symptoms for this disease consists of acute neck pain, neck stiffness, and odynophagia.[5] Its close proximity to the esophagus can cause dysphagia and odynophagia. The greater occipital nerve, which emerges between C1 and C2, may be irritated and the source of occipital pain.[20] In this case, we did not see significant calcification in the front of the patient's neck, only the edematous area, which may be one of the main causes of the difficulty in the diagnosis of vertigo symptoms.

In summary, dizziness can be caused by a variety of reasons. After a routine investigation, the possibility of cervical lesions should be considered. Pathologies of soft tissues in the neck are often neglected. LCT is an uncommon condition with nonspecific and heterogeneous presentation, which may result in vertigo symptoms due to the stimulation of the cervical sympathetic trunk by the LCM.

Author contributions

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Writing – review & editing: Shiliang Li.

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