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CASE REPORT

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Bilateral non-traumatic multiple calf muscle hernias in a young adult: a rare case report

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Abstract

Background Muscle hernia refers to the localized protrusion of muscle from a weak point due to fascia defects. Muscle hernias can be classified as structural or traumatic. There are many reasons for the formation of fascia defects. Currently, there are few reports on the causes of muscle hernia in clinical practice. There are not many patients with muscle hernia in clinical practice, and there are fewer patients with multiple muscle hernias. The reasons for their multiple occurrence are worth exploring. Patients usually seek medical advice due to pain, cosmetic reasons or concerns about tumors. This disease is often ignored by doctors, which can easily lead to misdiagnosis and delayed treatment.

Case presentation We report a rare case of multiple muscle hernias in both lower limbs in a 25-year-old adult. The patient has been exercising a lot for a long time. The muscle hernias were more obvious when running and squatting, but were asymptomatic. We used ultrasonography to examine the muscle hernias one by one and found that most of them had a large number of blood vessels. We diagnosed the patient with multiple muscle hernias in both lower legs. Conservative treatment such as wearing elastic stockings and limiting running activities was performed, and regular outpatient follow-up was performed. When the patient was followed up 3 months later, no significant changes were found in the number and morphology of calf muscle hernias.

Discussion and conclusion We reviewed a large number of literatures and found that few of them reported the relationship between muscle hernia and blood vessels. Most of the muscle hernias in this patient had arteries and veins passing through them, which may be the cause of the weak fascia. In addition, he has been running for a long time and is susceptible to chronic fascial syndrome. His muscle fibers have become larger and he has repeatedly directly damaged the fascia. These combined factors may have led to the formation of multiple muscle hernias in both lower limbs. The formation of multiple muscle hernias in the patient's calves may be related to vascular perforation and excessive exercise. The patient was advised to wear elastic stockings and reduce exercise. During follow-up, no obvious changes were found in his muscle hernias. It is hoped that clinicians can have a better understanding of the diagnosis and treatment of muscle hernias through this case.

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Keywords Muscle hernia, Ultrasonography, Blood vessel

Background

In 1929, Ihde first described the disease of muscle hernia. Muscle hernia refers to the localized protrusion of muscle from a weak point due to fascia defect. According to the cause of fascia defect, muscle hernias can be classified as structural or traumatic [1]. Structural muscle hernia refers to the protrusion of muscle from weak muscle fascia, especially after continuous chronic pressure. Trauma-related muscle hernia can be caused by direct damage to the fascia or indirect damage to the fascia by muscle contraction [2]. In addition, muscle herniation can also be seen in postoperative patients and patients with chronic compartment syndrome, such as soldiers, climbers, skiers, and athletes [3–5]. The causes of muscle herniation may be complex. Clinically, there are not many patients with muscle hernia, and there are fewer patients with multiple muscle hernias. The reasons for their multiple occurrence are worth exploring. We introduce a case of a long-term runner with multiple muscle herniations in both lower limbs. Ultrasonography was used to explore the cause of the disease. The cause of the weakness of the muscle fascia may be related to the course of blood vessels.

Case report

The patient was a 25-year-old male. He went to the hospital because of masses appearing on both sides of his lower limbs over the past 4 years. The masses did not appear when the calf was relaxed, but appeared when bearing weight or squatting (Fig. 1). It was obvious after squatting or running. The patient had no relevant family history and had been running for 8 years, 5–10 km/day. The lower extremity masses were examined by ultrasonography (Fig. 2). We diagnosed the patient with multiple muscle hernias in both lower legs. Conservative treatment such as wearing elastic stockings and limiting running activities was performed, and regular outpatient follow-up was performed, The number and morphology of the calf muscle hernias in the patients were followed up for 3 months and no significant changes were found.

Discussion and conclusion

Among the approximately 200 cases of muscle herniation reported in the limbs, muscle herniation most typically involves the tibialis anterior and forearm muscles [6]. It can also be seen in the peroneus brevis, peroneus longus, gastrocnemius, extensor digitorum longus, and hamstrings. It often needs to be differentiated from some diseases, such as varicose veins, hemangioma, neurilemmoma, vascular malformation, epidermoid cyst, lipoma, hematoma, soft tissue sarcoma, leiomyoma, etc [2, 7–11]. Muscle hernias are usually reducible, but may not be reducible when the muscle is entrapped [12]. The diagnosis of muscle hernia usually relies on clinical symptoms and physical examination. Muscle hernias are often asymptomatic, but some people experience pain, limited function, heaviness, and weakness during activities, which usually disappear after rest [13]. Physical examination may palpate a soft tissue mass, which usually appears or expands when the muscle contracts and disappears or shrinks when the muscle relaxes. Although there is currently a lack of consensus on the imaging method of muscle hernia, ultrasonography is generally considered to be the preferred examination for muscle hernia due to its convenience and low cost [14]. Due to the lack of a unified consensus or guidelines, the treatment options for muscle hernia are still under debate and widely discussed. There are currently a variety of treatment methods, including conservative treatment and surgical treatment. Conservative treatment includes rest, elastic stockings, and movement restriction [2, 9]. Surgery includes direct repair [9, 15], mesh repair [16, 17], autologous graft repair [10], and fasciotomy [18]. However, surgery is accompanied by some corresponding complications, such as postoperative pain, infection, compartment syndrome, nerve damage, and muscle hernia recurrence [19–21]. If there is no nerve compression, or obvious symptoms of pain or weakness, surgical treatment should be chosen with caution.

This article introduces a very rare case of multiple muscle hernias in the lower limbs of a man. Ultrasonography revealed that most of the fascia in the affected area had arteriovenous courses, which may be the cause of fascial weakness. Blood vessels passed through the fascia, causing local fascia weakness. When the pressure in the fascia is too high, muscle fibers passed through the weak area to form a muscle herniation. We reviewed a large number of literature and found that few literature reported the relationship between muscle hernia and blood vessels. In addition, he has been running for a long time and is susceptible to chronic fascial syndrome. When the thick muscle fibers contracted, the muscle fibers with greater tension repeatedly rubbed against the fascia, causing local fascia damage. When the damage reaches a certain degree, the muscle breakthrough the weak area of the fascia to form a hernia. These combined factors may have led to the formation of multiple muscle hernias in the lower limbs. However, the relationship between the multiple muscle hernias and the number and direction of blood vessels in this patient needs further study. The patient was followed up for 3 months, and the number and morphology of the muscle hernias in both calves did

Fig.1 Distribution of muscle hernias in both lower limbs. (**A**) and (**B**) are the standing and flexed positions of the left calf, respectively. (**C**), (**D**) and (**E**) were the standing and flexed positions of the right calf, respectively. It can be seen that the size of the muscle hernia in the flexion position is significantly larger than that in the standing position. **a** and **b** are two muscle hernias in the left calf, respectively. **c**, **d**, **e**, **f** and **g** are five muscle hernias in the right calf, respectively.

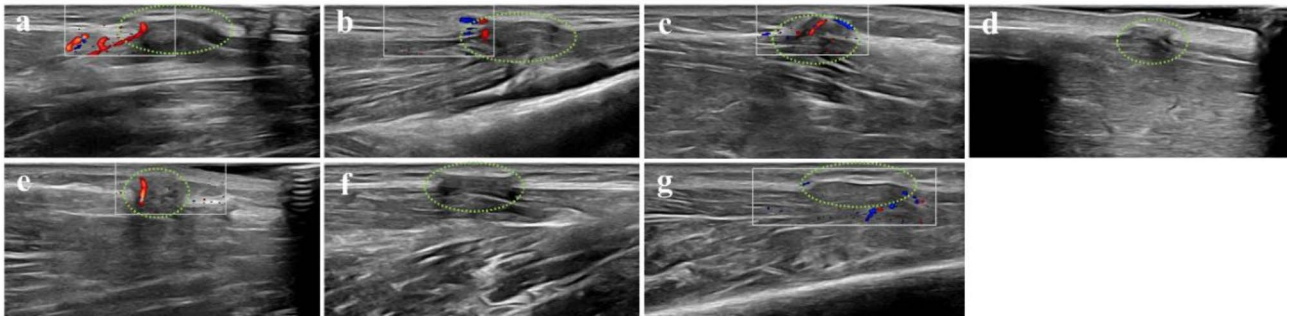

Fig. 2 Ultrasonography findings of muscle hernias in both lower limbs. Muscle hernias **a**, **b**, **c**, **e**, and **g** show that blood vessels pass through the fascia, which may be the cause of the weakness of the fascia. The dotted circle is the location of the muscle hernia, and the red and blue areas in the rectangle refer to the course of blood vessels (**a**-**g** correspond to the muscle hernias of the lower limbs in Fig. 1, respectively.)

not change significantly. However, there is a lack of long-term follow-up data for this patient, and the progression of the patient's condition after several years deserves follow-up attention. Because this patient had no symptoms in his lower limbs and did not affect his life, he was temporarily treated with conservative treatment such as wearing elastic stockings and limiting running activities. Conservative treatment avoided surgical trauma and the occurrence of surgical complications such as hematoma, infection, vascular and nerve damage. If the symptoms were severe in the later stage and surgical treatment was required, the blood vessels should be fully considered during the operation to avoid vascular injury. Patients with muscle hernia usually seek medical advice due to pain, cosmetic reasons or concerns about tumors, and often visit dermatology, plastic surgery or general surgery clinics. Because this type of disease is rarely reported, it is usually ignored by doctors, which can easily lead to misdiagnosis and delayed treatment. It is hoped that this article will help clinicians further understand muscle hernia.

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Author contributions
Shihong Li wrote and proofread the manuscript. Zhiqiang Ma, Junlong Wu, Peng Zhou and Yingchao Tang edited the figures. Ruonian Zhai performed the ultrasonographic examination. Qingyun Xie and Song Chen performed the medical history collection and analyzed the data.

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Data availability
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
The patient received prior information before providing her written, informed consent in accordance with the Declaration of Helsinki. To protect privacy and respect confidentiality, none of the raw data has been made available in any public repository. The original reports, laboratory studies, imaging studies, and outpatient clinic records are retained as per normal procedure within

the medical records of our institution. The article was approved by the ethics committee of Chinese People's Liberation Army General Hospital of Western Theater Command.

Consent for publication
Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal. The design of the work conforms to standards currently applied in the country of origin.

Competing interests
The authors declare no competing interests.

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