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Case Report

Novel innervation of accessory slip of lateral head of gastrocnemius muscle

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ABSTRACT

The two heads of the gastrocnemius muscle, as well as the plantaris and soleus muscles, forms the superficial muscular group in the posterior compartment of the leg. The incidental occurrence of accessory slip of the lateral head of the gastrocnemius muscle in the right lower limb, innervated by a twig from the common peroneal nerve, is described in this report. We identified an anomalous 8 cm long muscle in the right popliteal fossa during standard academic dissection of a male corpse at the Department of Anatomy. It was attached to the lateral side of the femur's popliteal surface proximally and joined the lateral head of the gastrocnemius distally. In the left lower limb, no similar variation was observed.

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1. Introduction

Muscle variation is prevalent in normal cadaveric dissections and can be seen. The bulk of these differences are unharmed and come from anomalies in embryological development. The muscle, circulatory, neurological, and/or organ systems may be jeopardized as a result of certain of these variations.¹

The Gastrocnemius muscle is a two-headed spindle-shaped muscle that is part of the calf muscle's superficial group. The medial head emerges right above the medial condyle from the femur's popliteal surface, whereas the lateral head emerges from the lateral section of the lateral condyle. When these two meet at the inferior boundary of the popliteal fossa, the inferomedial and inferolateral bounds of the popliteal fossa are produced.²

The gastrocnemius and soleus muscles have a wide range of origins and/or insertions. Gastrocnemius tertius, accessory soleus, and their coexistence are among the

numerous variations identified so far. These nerves were fed by the sciatic nerve's tibial component.³

In this case report, we discuss the occurrence of accessory slip of the lateral head of gastrocnemius muscle innervated by twig from common peroneal nerve from morphological, genealogical, and clinical perspectives.

2. Case Report

An unusual muscle was identified in the right popliteal area during routine academic dissection of a male corpse. This muscle slip was identified on the roof of the right popliteal fossa after thorough dissection. It was then followed throughout to find its attachment, course, and innervation. (Figure 1). No visible scar related to the trauma or the surgery has been identified.

The muscle extended vertically, proximally attached to the lateral aspect of the popliteal surface of the femur adjacent to the plantaris muscle by its fleshy belly. It then traveled beside and to the side of plantaris, superficial to the tibial nerve and popliteal vessels. It received its nerve

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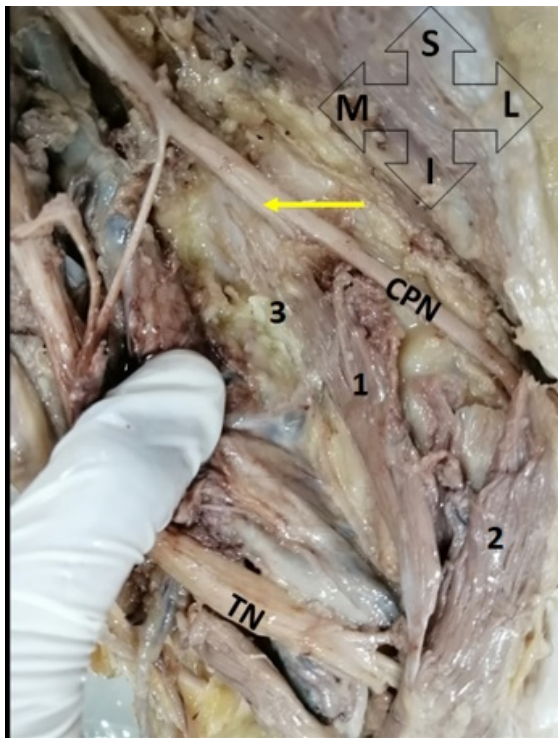


Fig. 1:

supply from a twig of the common peroneal nerve during its anatomical course. It terminated distally by connecting the lateral head of the gastrocnemius. As is customary, the tibial component of the sciatic nerve innervated the lateral head of the gastrocnemius. In the left lower limb, no similar variation was observed.

3. Discussion

The variant muscle emerged from the popliteal surface of the femur and distally united with muscle fibres of the lateral head of gastrocnemius, the variant muscle is called accessory slip to the lateral head of gastrocnemius. Because it is innervated by the common peroneal nerve, it is not called gastrocnemius tertius (caput tertium/third head of gastrocnemius).^{3,4}

The gastrocnemius muscle is a peroneal muscle, which means it is on the peroneal side of the leg. Embryologically, it begins as a blastomere in the calcaneum and migrates upwards to the inferior femoral epiphysis. The short head of the biceps femoris muscle, linea aspera, lateral epicondyle of the femur, capsule of the knee joint, or fascia cruris can all induce accessory slip. It may loop and arise from multiple regions, or it may divide near its end to join the two gastrocnemius heads, or either of them.³

A third head of gastrocnemius muscle was discovered originating towards the midline of the posterior distal femur and joining the medial aspect of the lateral head of the

gastrocnemius in a prospective analysis of 1039 consecutive knee magnetic resonance scans carried out by Koplak et al. in 2009. The third head in all of these patients ran lateral to the popliteal arteries, with none running between them. With the exception of the nerve supply, this is essentially identical to our observations.⁵

Yildirim et al. documented the co-existence of bilateral gastrocnemius tertius and auxiliary soleus muscles in the same cadaver in their case report from 2011. Entrapment syndromes are most typically associated with the third head of the gastrocnemius muscle contacting the medial head of the muscle. Leg soreness, tenderness in the popliteal fossa, and reduced pulsations of the distal arteries are all common indications and symptoms. The use of a simple Doppler examination to diagnose is beneficial. The symptoms are relieved by surgical resection of the third head.⁶

The accessory muscle's nerve supply originates from the popliteal fossa's common peroneal nerve. This denotes that the muscle is part of the extensor compartment. The accessory head, on the other hand, is placed in the back of the leg, near the superficial flexor muscles. The peroneus longus and peroneus brevis muscles are linked to the lateral surface of the fibula. The superficial peroneal branch of the common peroneal nerve innervates them, showing that the peroneal compartment of the leg is essentially part of the extensor compartment. The soleus and flexor hallucis longus muscles, which belong to the flexor compartment of the leg and are supplied by the tibial nerve, are joined just medial to posterior border of fibula. As a result, the posterior border of the fibula serves as a dividing line between the flexor and extensor compartments of the leg. This accessory head of the gastrocnemius joined the bulk of the gastrocnemius in the upper part of the leg, passing medial to the lateral head of the gastrocnemius in the popliteal fossa. The common peroneal nerve also supplies the short head of the biceps femoris, and its lowermost origin is quite close to the lateral portion of the popliteal surface of the femur, from which the accessory head of the gastrocnemius originates in this case. As a result, it is proposed that the accessory head of gastrocnemius seen in this case could be seen as detached fascicles and amalgamation of short head of biceps and peronei, and that this muscle mass was relocated to the posterior compartment of the leg and incorporated with gastrocnemius for convenience. Because it is exclusively seen on the right side, this characteristic indicates an unintended morphological occurrence of local musculature rearranging for supporting the knee and locomotor assembly of the leg, rather than an evolutionary sequence.⁷

4. Conclusion

We conclude that this is a novel case of accessory slip of the lateral head of the gastrocnemius innervated by the common peroneal nerve after conducting a thorough literature search and comparing it to the present case. The tibial nerve

and popliteal vessels may be compressed by this abnormal muscular mass. The muscle dynamics of the superficial leg musculature will change if the common peroneal nerve that supplies it is injured. This knowledge may help avoid radiologists and surgeons from misinterpreting it as a pathological structure.

5. Source of Funding

None.

6. Conflict of Interest

The authors have none to declare.

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