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กล้ามเนื้อ Accessory Abductor Digiti Minimi

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Accessory Abductor Digiti Minimi Muscle

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หลักการและเหตุผล: ใยกล้ามเนื้อส่วนเกินของกล้ามเนื้อ hypothenar ในมือ จะมีผลในการกดทับหลอดเลือดและเส้นประสาทในมือ กล้ามเนื้อที่พบเปลี่ยนแปลงมากที่สุดได้แก่ abductor digiti minimi (AbDM) วัตถุประสงค์ของการศึกษาเพื่อหาจำนวนและลักษณะของกล้ามเนื้อ AbDM ที่เปลี่ยนแปลงไป กล้ามเนื้อมัดนี้ชื่อ accessory abductor digiti minimi (AAbDM)
วัตถุประสงค์: เพื่อศึกษาจำนวนและลักษณะของกล้ามเนื้อ AAbDM ในคนไทย
รูปแบบการศึกษา: การศึกษาเชิงพรรณนา
สถานที่ศึกษา: ภาควิชากายวิภาคศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น
กลุ่มตัวอย่าง: มือ 600 มือจากศพคนไทย 300 ศพ อายุระหว่าง 25-82 ปี
การวัดผล: 1. ศึกษาจำนวนของมือที่พบกล้ามเนื้อ AAbDM
2. พรรณนากล้ามเนื้อที่เปลี่ยนแปลงไป ได้แก่ ที่เกาะต้น ที่เกาะปลาย และเส้นประสาทที่มาเลี้ยง
ผลการวิจัย: พบกล้ามเนื้อ AAbDM เพียงมัดเดียวจากมือของศพที่ศึกษา 600 มือ พบในมือขวาของศพชายไทยอายุ 55 ปี กล้ามเนื้อมัดนี้มีที่เกาะต้นมาจากกระดูก pisiform ใยกล้ามเนื้อแยกมาจากด้าน dorsal ของ AbDM กล้ามเนื้อ AAbDM มีลักษณะเป็นใยกล้ามเนื้อครึ่งมัดแล้วแผ่เป็นแผ่นไปเกาะปลายที่ base ของ proximal phalanx ของนิ้วก้อย เส้นประสาทที่มาเลี้ยงคือ deep branch ของเส้นประสาท ulnar
สรุป: จากการศึกษา 600 มือของร่างศพ พบว่ามีเพียงมือเดียวข้างขวาที่พบกล้ามเนื้อ AAbDM ได้พรรณนาที่เกาะต้น ที่เกาะปลาย และเส้นประสาทที่มาเลี้ยงกล้ามเนื้อมัดนี้

Background: Accessory belly of the hypothenar muscles in hand have been involved in vascular and nerve compression. The most common variable muscle is abductor digiti minimi (AbDM). The purpose of this study is to investigate the anomaly of AbDM that is called AAbDM.
Objective: To study quantity and describe the AAbDM in Thai people.
Study design: A descriptive study
Setting: The study was carried out at the Department of Anatomy, Faculty of Medicine, Khon Kaen University, Thailand.
Subject: The study included six hundred hands from 300 formalin-embalmed cadavers, 25-82 years of age.
Methods: 1. Study the number of hands which was found AAbDM.
2. Describe the origin, insertion and nerve supply of each muscle.
Results: Only one hand from 600 hands was seen AAbDM. It was found in the right hand of Thai male cadaver aged 55 years. The origin of this muscle arises from pisiform bone, splitting from AbDM then forms aponeurosis and inserts into the base of the proximal phalanx of the fifth finger. The innervation is by the deep branch of ulnar nerve.
Conclusion: Only one right hand from 600 hands was found AAbDM. The origin, insertion and nerve supply of this muscle were described.
Key Words: Abductor digiti minimi muscle, Accessory abductor digiti minimi muscle, Variation, Anomaly.

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Introduction

The anomalies of the hypothenar muscles are demonstrated as duplication, absences, fusion with neighboring muscles and variations of their origin and/or insertion. The accessory abductor digiti minimi is one of these variable muscles. These anomalous muscles have received various names such as abductor longus digiti quinti muscle [4], flexor digiti minimi brevis accessorius [10], accessorius of abductorem minimi digiti manus [1].

The AbDM muscle usually arises from the pisiform bone, the flexor carpi ulnaris tendon and the pisohamate ligament. It ends in a flat tendon which is divided into two slips, one attached to the ulnar side of the base of the proximal phalanx of the little finger, whereas the other one to the ulnar border of the dorsal digital expansion of the extensor digiti minimi muscles [19]. Occasionally, this muscle is divided into three slips. Furthermore, it may be fused with the flexor digiti minimi brevis muscles, being absent in the other case [1,5-7]. Although accessory bellies of this muscle have been extensively reported [1], their origin and insertion are variable and their embryonic explanation has been inadequate. The purpose of this study is to study the number and describe unusual AAbDM that could be of clinical interest regarding compressive neuropathy and vasculopathy. The embryonic explanation is also attempted .

Materials and Methods

Six hundred hands of 300 formalin-embalmed cadavers, in the Department of Anatomy, Faculty of Medicine, Khon Kaen University, Khon Kaen, Northeast of Thailand, were investigated. None of hands has evidence of previous injury or surgery. The variable muscles were observed.

Results

Only one hand was demonstrated with AAbDM muscle in this observation. At the same time, the rest 599 hands were also studied, but no anomalous AAbDM muscle was seen. In this case, the anomalous AAbDM muscle was found in the right hand of 55-year-old male cadaver. The superficial layer of hypothenar muscles (AbDM and flexor digiti minimi) were shown in Figure 1. The AAbDM muscle was shown in figure 2, after cut and reflected the AbDM and flexor digiti minimi muscles. This muscle was located dorsal to AbDM muscle. Its origin arises from the pisiform bone and forms aponeurosis to insert into the base of the proximal phalanx of the fifth finger (Figure 2). The innervation of the AAbDM muscle is the deep branch of ulnar nerve. (Figure 3).

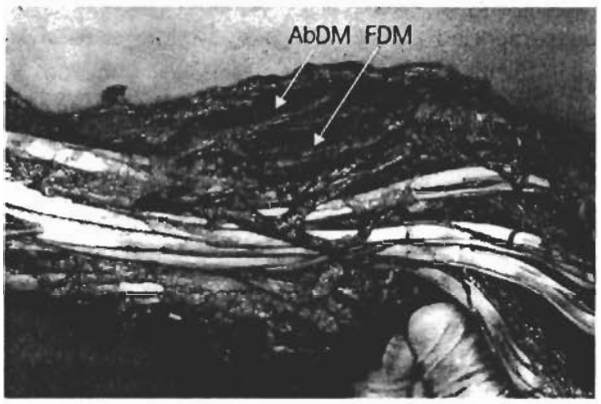

Figure 1 Photograph showing hypothenar muscles. AbDM = aductor digiti minimi, FDM = flexor digiti minimi.

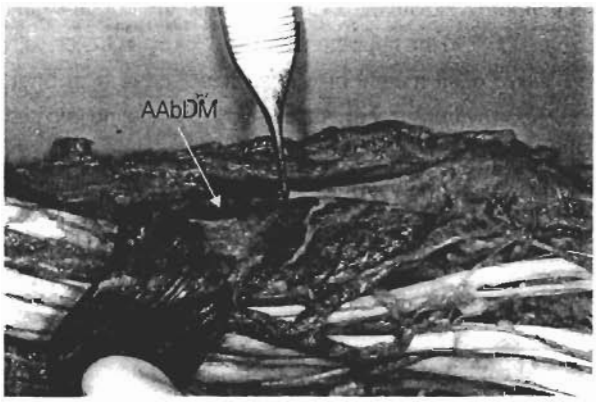

Figure 2 Photograph showing accessory adbuctor digiti minimi (AAbDM), AbDM & FDM were reflected.

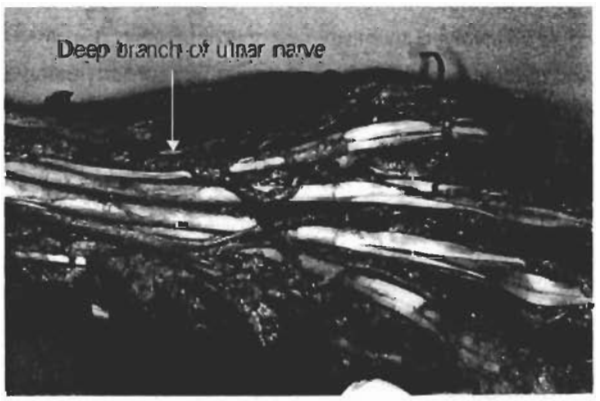

Figure 3 Photograph showing deep branch of ulnar nerve entering the Accessory Abductor digiti minimi.

Discussion

The most common variable muscles associated with hypothenar muscles is AAbDM. It was found, from this observation, that the origin of AAbDM was a single origin from the pisiform bone. Many investigators, however, have been reported the variable single origin of AAbDM such as the palmaris longus tendon[13-14], the flexor retinaculum[1], the ulna [1], medial intermuscular septum[15], flexor carpi radialis and flexor carpi ulnaris[1-6]. A double origin is also reported from the palmaris longus tendon and superficial antebrachium fascia [9], from the flexor carpi ulnaris tendon and superficial antebrachial fascia[9].

In respect to the insertion, in this case it was found that it attached at the base of the proximal phalanx of the fifth finger. Mainly, there are two kinds of insertion of AAbDM have been reported. One fusing with the muscle belly of the AbDM muscle, whereas the other coalescing over its tendon to form a single insertion to the fifth finger[11]. However, an insertion into the dorsal digital expansion[18], in the hypothenar fascia[15] or by its fusion with the flexor digiti minimi brevis muscle[1-9] have also been described. Furthermore, the insertion by dividing into two tendons, the deep tendon fused with the flexor digiti minimi brevis tendon and the most superficial fibers inserted into the dorsal aponeurosis of the fifth finger have been observed [13].

In this case, the nerve supply of the AAbDM muscle was deep branch of the ulnar nerve. Similarly, it has been reported that this muscle was innervated by a branch from the ulnar nerve[13]. However, double nerves innervation of this muscle by the median and ulnar nerves were also reported.[2]

The anatomic relationships of the AAbDM muscle could be involved in entrapment neuropathies of the ulnar[12] and median nerves[7-18] , the muscular hypertrophy being a precipitating factor[5-17] . The AAbDM, in our case, did not entrap neither the ulnar nor the median nerve. It was unlikely to be involved in neuropathy. On the other hand, this muscle ran slightly obliquely through Gyon's canal over the ulnar nerve and vessels.[13]

In embryonic aspect, little is known about the mechanisms that guide the splitting of common muscle masses through migration, fusion, displacement and tissue interactions as well as genetically programmed cell death would be involved in definitive muscle formation[8].

The development of the hand muscles has been described as there are two layers of six muscular anlagens. The superficial layer differentiates earlier, giving rise to three blastemas namely radial, middle and ulnar blastemas. These three blastemas differentiate into the abductor pollicis brevis, flexor digitorum superficialis and abductor digiti minimi muscles respectively, whereas the rest of hand muscles differentiate from blastemas in the deep layer[3]. This could be a blackground to describe the anomaly of AAbDM muscle in this case. It could be presented by anomaly of undifferentiated group of the mesenchymal cells. This is probably due to a failure in their unusual programed cell death during the splitting process which comes from the deep surface of AbDM muscle and deep blastema which differentiated into the opponens digiti minimi muscle. It similarly has been described by Soldao- Carrera and colleague. They explained the anomaly of AbDM as could be stemmed from abnormal process of splitting the flexor digitorum superficialis and abductor digiti minimi blastemas during differention to form adult muscles.

Usually, the differentiation of the fascia occurred following the differention of blastema in the superficial and deep layers. In this case, half length of the muscle was an aponeurosis before inserting into the base of the proximal phalanx of the fifth finger. It could be explained by relating to either the sequence of differentiation of the connective tissue earlier or failure in their unusual programed cell death during the later stage of muscle differentiation.

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