Accessory iliacus muscle with splitting of the femoral nerve: a case report

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Abstract

Introduction
Variations in the iliopsoas muscle complex certainly have some clinical importance. Because these variations are usually associated with unusual femoral nerve formation, here we report a case of variation in the iliacus muscle combined with variation in the femoral nerve.

Case report
Variation in the iliacus muscle combined with variation in the femoral nerve was observed while performing a routine dissection of a 65-year-old male cadaver in the Department of Anatomy, SRM Medical College. The accessory iliacus muscle originated from iliac crest and inserted to the lesser trochanter of femur along with psoas major. This muscle variant was found to split the femoral nerve into medial and lateral slips.

Conclusion
The existence of this muscle variation along with nerve variation may increase the chances of nerve compression. Hence, detailed knowledge of these variations has immense importance in various pelvic and pelvifemoral surgeries.

Introduction
Iliacus is a muscle of the posterior abdominal wall. It takes origin from superior 2/3 of the inner lip of the iliac crest, upper portion of lateral surface of the sacrum, capsule of the hip joint and ventral sacroiliac and iliolumbar ligaments, and is inserted into the lesser trochanter of the femur and into the femur just below and in front of the lesser trochanter along with psoas major. This muscle is supplied by branches from the femoral nerve and direct branches from lumbar plexus¹. Various studies have reported on the iliopsoas muscle complex, variations such as accessory iliacus muscle (iliacus minimus/iliocapsularis) and aberrant slips of the iliacus muscle with splitting and compression of the femoral nerve².

The femoral nerve is formed by the dorsal division of ventral rami of L2, L3 and L4 nerve roots of the lumbar plexus and it descends downwards between the psoas and iliacus muscles deep into the iliac fossa and passes behind the inguinal ligament to reach the thigh, where it divides into anterior and posterior division to supply the thigh. The femoral nerve has been used by anaesthetics for nerve blocking in pelvic surgeries³. Thus, a detailed knowledge of the muscle complex and the formation of the femoral nerve are important for clinicians working in this area. Here we report a case of accessory iliacus muscle with splitting of the femoral nerve.

Figure 1: Right iliac fossa with iliacus, iliacus minimus and psoas major muscle with the femoral nerve.

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**Case report**

We encountered the aforementioned variations in a 65-year-old male cadaver, which was dissected for study purposes, in the Department of Anatomy, SRM Medical College Hospital and Research Centre, Chennai. The posterior abdominal structures were dissected out and while dissecting the right iliac fossa, we traced an accessory iliacus muscle named iliacus minimus along with the normal iliacus muscle. No such variations were observed on the left side. The iliacus minimus muscle originated from the middle of the inner lip of the iliac crest. This muscle was separated from the iliacus muscle by a separate fascia. This accessory muscle, during its course, divided the femoral nerve into medial and lateral slips. Then, it further coursed downwards and passed behind the inguinal ligament and inserted into the lesser trochanter of the femur along with psoas major (Figures 1 and 2).

The femoral nerve was further dissected along its course and the following variations were noted.

The medial slip of the femoral nerve further divided into medial and lateral divisions. The lateral division joined with the lateral slip of the femoral nerve and continued downwards as anterior division of the femoral nerve, and the medial slip continued as posterior division of the femoral nerve. This minimus muscle was supplied by the medial slip of the femoral nerve (Figure 3).

**Discussion**

Very few interesting variations of the iliacus muscle have been reported in the literature. These variations describe iliacus muscle variation as such or variations associated with alterations in the femoral nerve. The embryological reason for the muscular variation along with the nerve variation as described in the literatures is that, unknown disturbance in the embryonic muscular blastema and its interaction with the aggressive ingrowths of the femoral nerve through the developing iliopsoas muscle complex.4

Bergmen et al. described iliacus minor or iliocapsularis muscle which takes origin from the anterior inferior iliac spine and gets inserted into the intertrochanteric line of the femur or into the iliofemoral ligament.5 This study contradicts with our present study both in origin and insertion.

Spratt et al. reported unilateral slips of these variations in two cases. They noted accessory iliacus muscle with its proximal attachment to the iliolumbar ligament in one specimen and to the ala of sacrum in the other specimen and distal attachment to the lesser trochanter and to the shaft of the femur. They also described these discrete muscle slips lying anterior to the iliacus muscle proper. In both the cases, the femoral nerve complex was observed to be normal.6

D’costa et al. described a case of accessory iliacus muscle slip with proximal attachment to the iliac crest and distal attachment to the lesser trochanter. This additional muscle slip compresses the L4 nerve root of the femoral nerve. Our study coincides with this study with regard to all the aforementioned variations.

Bilateral presence of accessory iliacus muscle, i.e. iliacus minimus,
Case Report

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Figure 3: Iliacus minimus muscle with splitting of the femoral nerve into medial and lateral slips. The medial slip further divided into medial and lateral divisions. The lateral division united with the lateral slip and formed the anterior division of the femoral nerve and the medial slip continued as the posterior division.

has also been reported along with bilateral splitting of the femoral nerve into medial and lateral slips to enclose the additional muscle. After splitting, the femoral nerve reunites to form a single nerve trunk. The accessory muscle is supplied by the lateral division of the femoral nerve7. However, we noted unilateral variation with splitting of the femoral nerve into medial and lateral slips and also variations in the formation of the anterior and posterior divisions, which has not been often reported in the literatures, and the accessory muscle was observed to be supplied by the medial slip.

Occurrence of the iliacus muscle complex variation may be asymptomatic and does not produce any disturbance in the lower limb movements, and the variation is of great clinical importance when it causes compression of the femoral nerve complex. In most cases, there is a frequent coexistence with the unusual course and splitting of the femoral nerve8. Presence of aberrant slips of iliacus muscle which interrupt the femoral nerve may have a risk of nerve entrapment, leading to femoral neuropathy. This may lead to weakness of the quadriceps muscles and parenthesis of the anterior and medial compartments of the thigh. In some reports, the iliacus muscle was found to be divided into superior and inferior fibres and both the fibres blended medially and attached to the tendinous border of the psoas major, thereby resembling a single muscle9.

Conclusion

The most common pain-reliving measure for fractured femur, which is considered to be an orthopaedic emergency, is the femoral nerve block. Any variations in the formation of the femoral nerve, such as higher division of this nerve, may result in incomplete femoral nerve block. This case study reports a unique division of the femoral nerve associated with the presence of iliacus minimus muscle, which also splits the nerve. Hence, this case study will be a useful guideline for anaesthetists, surgeons and radiologists for correct interpretation of images and treatment.

References

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