

Unilateral Hypoplasia of Distal Part of the Psoas Muscle: An Incidental Rare Anomaly

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ABSTRACT We report a case of incidentally detected unilateral hypoplasia of distal part of the psoas muscle on cross-sectional imaging in a 36-year-old male. Physical examination findings were within normal limits. No other muscle and skeletal abnormality was identified on imaging. In this case report, we describe computed tomography and ultrasound findings of this uncommon isolated anomaly. This case aims to raise the awareness of the reader about recognizing hypoplasia of distal part of the psoas muscle and distinguishing it from serious pathologies. To the best of our knowledge, this is the third report in the general literature and second report in English language.

Keywords: Psoas muscle; hypoplasia; computed tomography; ultrasound

Unilateral hypoplasia of distal part of the psoas muscle (UHDPPM) is a very rare condition. To date, only two case reports have been reported in the literature. The first case report, including five asymptomatic cases, was published in English language in 1993. Second case report, including one symptomatic case, was reported in Croatian language in 2010.^{1,2} To the best of our knowledge, this case is the third case report in the general literature and the second case report in the English language literature. We present a case of asymptomatic UHDPPM detected incidentally on computed tomography (CT). We also describe associated ultrasound (US) appearance which may be helpful for diagnosis of this very rare entity. The etiology and clinical significance of this rare abnormality are not clearly known. In this article, the anatomy, function and distal hypoplasia of the psoas muscle were discussed in detail along with previous published cases.

CASE REPORT

A 36-year-old male patient was admitted to the urology outpatient clinic with a complaint of nonspecific right flank pain. His medical history was unremarkable. Physical examination and laboratory findings were within normal limits. The patient underwent CT scan without intravenous and oral contrast agent administration. On CT, we detected hypoplasia in the distal part of the left psoas muscle incidentally. Hypoplasia started at the level of the L5 vertebra and continued up to the distal end. Upper part of the left psoas muscle was normal, but the distal part was markedly thin and small. Proximal volumes of both psoas muscles were similar (Figure 1a-c). Then, we obtained US images of the hypoplastic left psoas muscle with convex and linear probe for case report (Figure 2a, 2b). At the distal level where hypoplasia is most prominent, in the axial section, the left psoas muscle size was measured ap-

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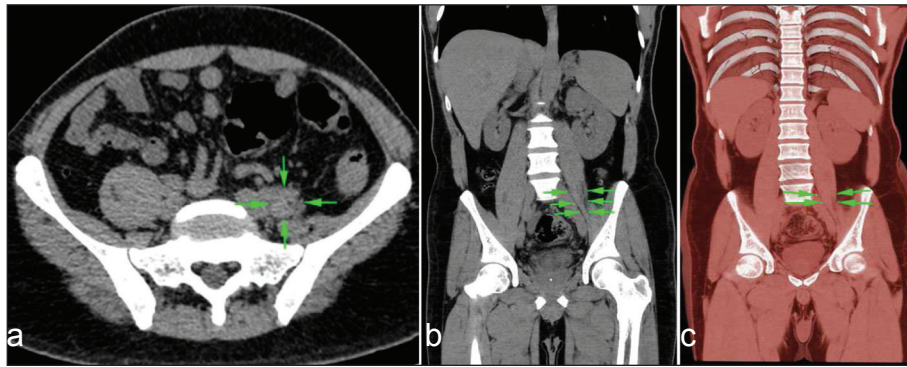


FIGURE 1: Unenhanced axial (a) sagittal (b) and 3D coronal volume rendered (c) abdominal computed tomography image shows hypoplasia of distal part of the left psoas muscle (arrows).

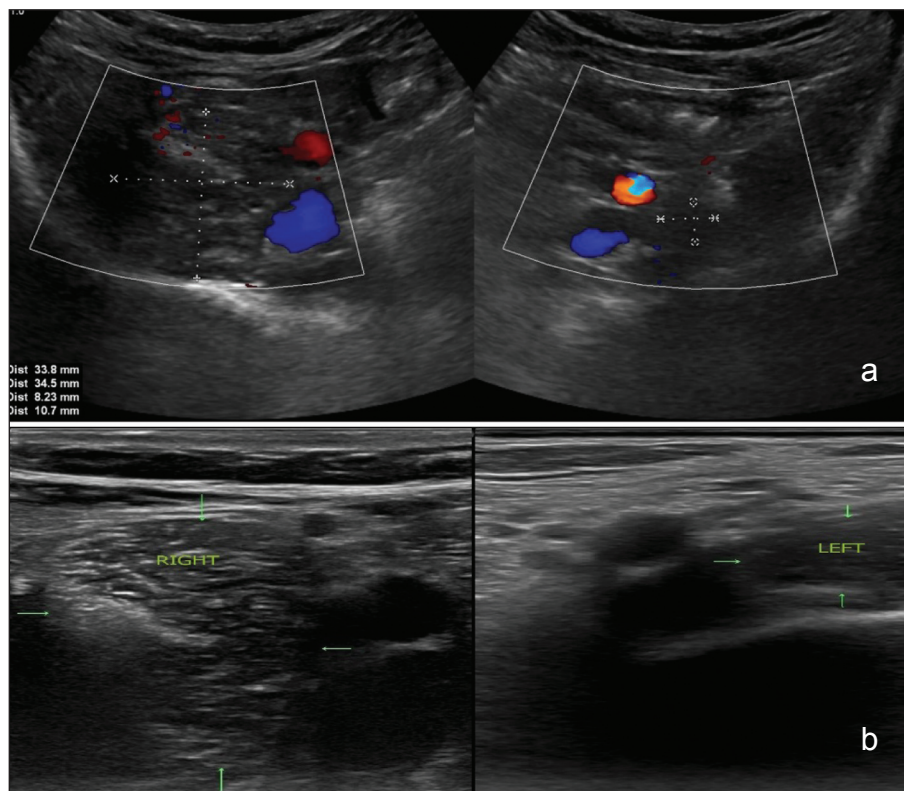


FIGURE 2: (a) Transverse Doppler ultrasonography (US) image of abdomen done with convex probe depicts normal right psoas muscle (measured 33.8x34.5 mm with cursors) and hypoplastic left psoas muscle (measured 8.2x10.7 mm with cursors) lateral to the iliac vessels. (b) Transverse gray-scale US image of abdomen with linear probe reveals normal right psoas muscle and smaller hypoplastic left psoas muscle (arrows).

proximately 1x1 cm and the right psoas muscle size was measured approximately 3x3 cm. There was no other abnormality in the dorsal, abdominal, or pelvic muscles. Pelvic asymmetry, degenerative changes, scoliosis or compensatory hypertrophy were not observed in our patient. The patient's muscle strength

examination was normal, and no pathological reflex was detected. Our patient did not have any other disease that might explain this abnormality. Also, the patient did not exhibit any signs or symptoms secondary to muscle hypoplasia. The patient was diagnosed with congenital isolated UHDPPM.

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

DISCUSSION

The psoas muscle consists of two parts; psoas major and minor. Psoas major muscle is a long spindle-shaped muscle arising from the bodies, transverse processes, and intervertebral discs of the T12-L5 vertebrae. It joins the iliacus muscle at the level of the L5 to S2 vertebrae to form the iliopsoas muscle. The iliopsoas muscle inserts directly on the lesser trochanter. The psoas major muscle attains its largest diameter at a level between L5 and S2 and tapers caudally. Its innervation is provided by the ventral rami of L1 to L3 nerves.¹⁻³ The psoas muscle has deep and superficial parts. The deeper part arises from the first four lumbar vertebrae. The superficial part originates from the lateral surface of the distal thoracic vertebrae and neighboring intervertebral discs. The lumbar plexus lies between the deep and superficial layers. The embryology of the psoas muscle has not been elucidated in detail in the literature. A 3D study of 8-week embryos shows that the muscles of the iliac region are well distinguished in their spatial structure and orientation, similar to adult anatomy.^{3,4}

The psoas minor muscle is a long fine muscle that arises from the vertebral bodies of T12 and L1 and is only found in 60% to 65% of population. Caudally, it fuses with the psoas major tendon and iliac fascia, and in 90% of people, it adheres tightly to the iliopectineal eminence.³

The psoas major is the primary flexor muscle of the hip joint. It is the largest muscle in the transverse plane in the lower abdomen. It connects the upper body to the lower body. Although there are some conflict and ambiguity about its function in the literature, the function of the psoas complex muscle is to flex and externally rotate the hip, and to adduct the femur. Also, the unilateral contraction of the psoas muscle helps to make lateral movements, and the bilateral contraction helps to raise the trunk while lying down. In addition, it works in conjunction with other flexor muscles of the hip to raise the upper leg towards the body when the body is stationary or to tract the body

towards the leg when the leg is in a constant status. It helps to stretch the spine, flex it ipsilaterally and rotate it towards the opposite side. It provides stability of the lumbar spine in the sitting position.²⁻⁷

Psoas muscles are an important guide of the retroperitoneum in abdominal radiography and CT. Its appearance differs according to general physical status and specific pathological situations of the persons. Local pathologies including atrophy, bleeding, abscess, metastasis, tumor, neurologic and musculoskeletal pathologies may cause asymmetric appearance of the psoas muscles. Also, local change in muscle contour is an important finding for detecting pathologies involving the psoas muscle.^{1,2}

Our case was asymptomatic, like Goldfeld's five cases. Grgić reported a symptomatic one case who admitted with low back pain. After physical examination and radiological imaging, Grgić found that there were degenerative changes of the spine, hyperextension of the left hip joint, scoliotic posture, compensatory hypertrophy of the right psoas muscle and pelvic asymmetry. Ultimately, Grgić concluded that all findings were due to the long-term consequences of UHDPPM. When considering the functions of the psoas muscle described above, it can be claimed that UHDPPM may play a role in the etiology of these pathologies. However, it needs to be proven in more cases. Also, a detailed musculoskeletal investigation may be reasonable to screen for possible malformations of other muscles or long-term consequences of hypoplasia. Our patient had no loss of muscle strength, compensatory hypertrophy, pathological reflexes, spine pathology, and pelvic asymmetry, similar to Goldfeld's cases. It was noteworthy that the hypoplasia was in the distal part of the psoas muscle and unilateral in all reported cases. Furthermore, we could not find any information about the incidence of this anomaly in the literature.

In this case report, we present a patient who had abdominal CT due to nonspecific abdominal pain, and were determined to have UHDPPM, which was not resulting from any disease and not leading to any clinical distress. We aim to make the reader aware of recognizing UHDPPM, a rare possibly congenital anomaly, which can be incidentally detected on cross-

sectional imaging. The radiologist should be familiar with this abnormality in order not to consider the normal contralateral side as a pathology. We consider UHDPPM as a benign anatomic abnormality that might be recognized in radiological imaging and should be differentiated from pathological conditions. However, a more accurate decision can be made with long-term follow-up of more cases with UHDPPM anomaly.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Muammer Akyol, Mehtap Çiçekçi; **Design:** Muammer Akyol; **Control/Supervision:** Mehtap Çiçekçi; **Data Collection and/or Processing:** Muammer Akyol; **Analysis and/or Interpretation:** Mehtap Çiçekçi; **Literature Review:** Mehtap Çiçekçi; **Writing the Article:** Muammer Akyol; **Critical Review:** Muammer Akyol; **References and Fundings:** Mehtap Çiçekçi; **Materials:** Muammer Akyol.

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