

A rare cause of intermittent claudication: recurrence of popliteal artery entrapment syndrome in a 16-years-old boy

İntermitan klodikasyonun nadir nedeni: 16 yaşında erkek çocukta tekrarlayan popliteal entrapment sendromu

Güven Tekbaş,¹ Hatice Gümüş,¹ Faysal Ekici,¹ Selvi Keleşçi,² Celal Yavuz,³ Aslan Bilici¹

¹Department of Radiology, Medicine Faculty of Dicle University, Diyarbakır, Turkey

²Department of Pediatrics, Medicine Faculty of Dicle University, Diyarbakır, Turkey

³Department of Cardiovascular Surgery, Medicine Faculty of Dicle University, Diyarbakır, Turkey

Popliteal artery entrapment syndrome (PAES) is a rare clinical entity which is predominantly seen in young athletic men. The primary symptom of PAES is intermittent claudication. Surgery is the primary treatment of choice. After surgery in adolescence period particularly, these patients should be monitored closely because of risk of recurrence.

Key words: Claudication; entrapment syndrome; non-atherosclerotic vascular disease; popliteal artery; stenosis.

The popliteal artery is the main vessel of the lower legs in which the popliteal fossa is located. The main complaint with popliteal artery stenosis is intermittent claudication. Popliteal artery entrapment syndrome (PAES) is an uncommon clinical entity that presents with claudication, and popliteal arterial diseases are rare causes of intermittent claudication.^[1,2] In this study, we report the case of a 16-year-old boy who presented with lower leg pain which was later identified as PAES.

CASE REPORT

A 16-year-old boy applied to our emergency medicine department with lower leg pain that had started about three months prior to coming to our facility, but within the last week had become progressively worse. The pain increased with effort and decreased with rest. The longest distance he could walk was about 200 meters. The patient was a nonsmoker, and there was no family

Popliteal arter entrapment sendromu, ağırlıklı olarak genç sporcu erkeklerde görülen, nadir klinik bir tablodur. Popliteal arter entrapment sendromunun birincil semptomu intermitan klodikasyondur. Primer tedavi seçeneği cerrahidir. Cerrahi tedavi sonrası özellikle ergenlik dönemindeki hastalar, nüks riski açısından yakından takip edilmelidir.

Anahtar sözcükler: Klodikasyon; entrapment sendromu; aterosklerotik olmayan vasküler hastalık; popliteal arter; stenoz.

history of presenile atherosclerotic disorders. The bilateral crural artery pulsations were weak at the ankles at his physical examination, and both ankle brachial indices (ABI) were decreased (mean of 0.4). Two years previously, he had been admitted to the cardiovascular surgery department complaining of the same symptoms, and Doppler sonography had revealed bilateral popliteal artery stenosis and right popliteal artery thrombosis. A diagnosis of bilateral PAES led to surgery which subsequently relieved his symptoms. Since then, he had experienced no further symptoms until three months prior to this admission to our hospital.

Because of his history and existing symptoms, computed tomography (CT) angiography was performed, and circumferential narrowing was seen at the popliteal arteries; however, there was no thrombosis. The stenosis ratio was approximately 80% for the right and 60% for the left popliteal artery (Figures 1 and 2), and the bilateral popliteal artery was being compressed by the





Figure 1. Computed tomography angiographic volume rendering image showing the narrowing of the bilateral popliteal artery.

medial gastrocnemius tendons. The patient and his parents were informed of all of the findings and of the need for a reoperation. He was then referred to his cardiovascular surgeon.

DISCUSSION

The popliteal artery, a continuation of the superficial femoral artery, normally courses between the medial and lateral heads of the gastrocnemius muscle. In PAES, normal positioned popliteal artery might be entrapped by neighboring muscles and tendons due to variations or abnormal coursed popliteal artery might be compressed by normal positioned muscles and tendons.^[2,3] Although the exact prevalence of PAES is unknown, there have been reports of its existence in young males 0.16% who were entering military service.^[3] Popliteal artery disease is a rare cause of IC of the lower leg; however, the most common cause is PAES in young men. Other causes of IC are adventitial cystic disease, muscular fibrodysplasia, arteritis, and compression of the artery by exostosis of the distal femur in young athletes. Sixty percent of patients with PAES under 30 years old and PAES male/female ratio is seen 15:1.^[1,3,4] Popliteal artery entrapment syndrome presents with calf pain and IC during exercise.^[2,3] Our patient also presented with calf pain and IC which was relieved with rest. In the literature, there have only been a few cases as young as ours.

Love and Whelan^[5] developed most useful PAES scheme in 1965 and Rich et al.^[6] were modified this scheme in 1979. According to this scheme PAES categorized in to six subtypes:

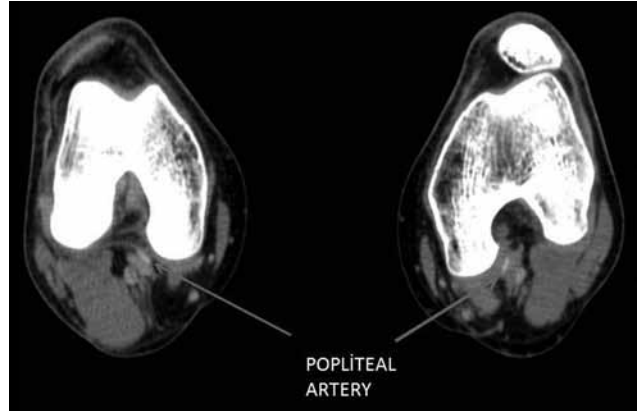


Figure 2. Axial computed tomography angiographic image showing the bilateral compressed popliteal artery.

Type 1: Medial head of gastrocnemius muscle is normal; popliteal artery is deviated medially and has an aberrant course.

Type 2: Medial head of gastrocnemius muscle is located laterally; no deviation of popliteal artery.

Type 3: Abnormal muscle bundle from medial head of the gastrocnemius muscle surrounding the popliteal artery.

Type 4: Popliteal artery is located deeply and entrapped by the popliteus muscle or a fibrous band.

Type 5: Popliteal vein is also entrapped with any type of popliteal artery.

Type 6: Popliteal artery is normally positioned and entrapped by a normally positioned, hypertrophied gastrocnemius muscle.^[3,6]

Color Doppler sonography is the primary imaging method used in the diagnosis of PAES, and it may also reveal popliteal artery stenosis, changes in color flow, or increased peak systolic velocity. Furthermore, this type of imaging also sometimes show the popliteal fossa anatomy and poststenotic aneurysms. Computed tomography angiography and magnetic resonance imaging (MRI) can show arterial stenosis, poststenotic dilatation, and the popliteal fossa anatomy. However, MRI is the best choice for evaluating the popliteal fossa anatomy and vascular compromise without the use of ionizing radiation or iodinated contrast material.^[3,7]

Symptomatic PAES if not treated, eventually progresses the luminal narrowing, thrombosis and total occlusion. Because chronic microtrauma of the vessel wall can result in intimal damage and fibrosis that make the vessel susceptible to thrombosis.^[8] The primary treatment method for PAES is surgery that involves extracting the muscle or tendons which causing the

entrapment and also if necessary vessel lumen should be restored with endarterectomy or bypass grafting. The endovascular treatment of PAES not preferred choice without removing the underlying reason for the vessel entrapment however combined therapy-endovascular and surgical- had been performed.^[8,9] Our patient had been operated two years before being admitted to our facility, and the popliteal arteries had been released via a myotomy and tenotomy. That surgery had alleviated the symptoms until three months prior to this admission when the symptoms had returned. A growing period or an inadequate release may have played a role in the recurrence of PAES in our patient.

In conclusion, PAES is usually seen in patients who are less than 30 years old and may also be found in teenagers, as in our case. Therefore, the pediatrician has to look for the presentation of claudication, which is the primary symptom of PAES. After surgery, teenage patients should be followed up closely to check for recurrence of this syndrome.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Gaeta M, Minutoli F, Mazziotti S, Visalli C, Vinci S, Gaeta F, et al. Diagnostic imaging in athletes with chronic lower leg pain. *AJR Am J Roentgenol* 2008;191:1412-9.
2. Tercan F, Oğuzkurt L, Kizilkiliç O, Yeniocak A, Gülcan O. Popliteal artery entrapment syndrome. *Diagn Interv Radiol* 2005;11:222-4.
3. Hai Z, Guangrui S, Yuan Z, Zhuodong X, Cheng L, Jingmin L, et al. CT angiography and MRI in patients with popliteal artery entrapment syndrome. *AJR Am J Roentgenol* 2008;191:1760-6.
4. Wright LB, Matchett WJ, Cruz CP, James CA, Culp WC, Eidt JF, et al. Popliteal artery disease: diagnosis and treatment. *Radiographics* 2004;24:467-79.
5. Love JW, Whelan TJ. Popliteal artery entrapment syndrome. *Am J Surg* 1965;109:620-4.
6. Rich NM, Collins GJ Jr, McDonald PT, Kozloff L, Clagett GP, Collins JT. Popliteal vascular entrapment: its increasing interest. *Arch Surg* 1979;114:1377-84.
7. Elias DA, White LM, Rubenstein JD, Christakis M, Merchant N. Clinical evaluation and MR imaging features of popliteal artery entrapment and cystic adventitial disease. *AJR Am J Roentgenol* 2003;180:627-32.
8. Ozkan U, Oğuzkurt L, Tercan F, Pourbagher A. MRI and DSA findings in popliteal artery entrapment syndrome. *Diagn Interv Radiol* 2008;14:106-10.
9. Papaioannou S, Tsitouridis K, Giataganas G, Rodokalakis G, Kyriakou V, Papastergiou Ch, et al. Evaluation of popliteal arteries with CT angiography in popliteal artery entrapment syndrome. *Hippokratia* 2009;13:32-7.