



Incidental ¹⁸F-FDG Uptake of the Pubic Ramus and Abdominal Muscles due to Athletic Pubalgia During Acute Prostatitis

Akut Prostatit Sırasında Ramus Pubis ve Abdominal Kaslarda Atletik Pubaljiye Bağlı İnsidental ¹⁸F-FDG Tutulumu

Oliver Rager¹, Marlise Picarra², Emmanouil Astrinakis², Valentina Garibotto¹, Gaël Amzalag¹

¹University Hospital of Geneva, Clinic of Nuclear Medicine, Geneva, Switzerland

²University Hospital of Geneva, Clinic of Radiology, Geneva, Switzerland

Abstract

A 23-year-old African native male patient presented with fever, lumbalgia and dysuria after returning from a trip to Togo. His physical examination revealed pain over the pubic symphysis and rectal tenderness on digital exam. The C-reactive protein (CRP) level was elevated along with positive blood and urinary cultures for methicillin-resistant *Staphylococcus aureus*. An magnetic resonance imaging that has been performed to rule out arthritis/osteomyelitis in the pubis revealed edema of the symphysis. An ¹⁸F-FDG positron emission tomography/computed tomography supported the diagnosis of prostate infection and showed a focal uptake of the pubic symphysis, with diffuse hyper-metabolism of the insertions of the rectus abdominis and longus adductor muscles, corresponding to athletic pubalgia. Fever and CRP responded rapidly to antibiotherapy.

Keywords: PET/CT, magnetic resonance imaging, athletic pubalgia, sports hernia, prostatitis

Öz

Yirmi üç yaşında Afrikalı erkek hasta Togo seyahati sonrası ateş, lumbalji ve disüri şikayetleri ile başvurdu. Fizik muayenede symphysis pubis üzeri ağrı ve rektal tuşede hassasiyet mevcuttu. C-reaktif protein (CRP) düzeyi yüksekti ve kan ve idrar kültürlerinde metisiline dirençli *Staphylococcus aureus* üremesi saptandı. Pubiste olası bir artrit/osteomyeliti ekarte etmek için istenen manyetik rezonans görüntüleme symphysisde ödem görüldü. ¹⁸F-FDG pozitron emisyon tomografisi/bilgisayarlı tomografi prostat enfeksiyonu tanısını doğruladı. Bununla birlikte atletik pubaljiye uyumlu olarak symphysis pubiste fokal tutulum ve rektus abdominis ve adductor longus kas insersiyolarında diffüz hipermetabolizm görüldü. Antibiyoterapi sonrası ateş ve CRP düzeyi hızla düzeldi.

Anahtar kelimeler: PET/CT, manyetik rezonans görüntüleme, atletik pubalji, sporcu hernisi, prostatit

Address for Correspondence: Olivier Rager MD, University Hospital of Geneva, Clinic of Nuclear Medicine, Geneva, Switzerland

Phone: +41 223727144 E-mail: olivier.rager@hcuge.ch ORCID ID: orcid.org/0000-0002-7030-2878

Received: 27.11.2017 **Accepted:** 10.03.2018

©Copyright 2018 by Turkish Society of Nuclear Medicine
Molecular Imaging and Radionuclide Therapy published by Galenos Yayınevi.

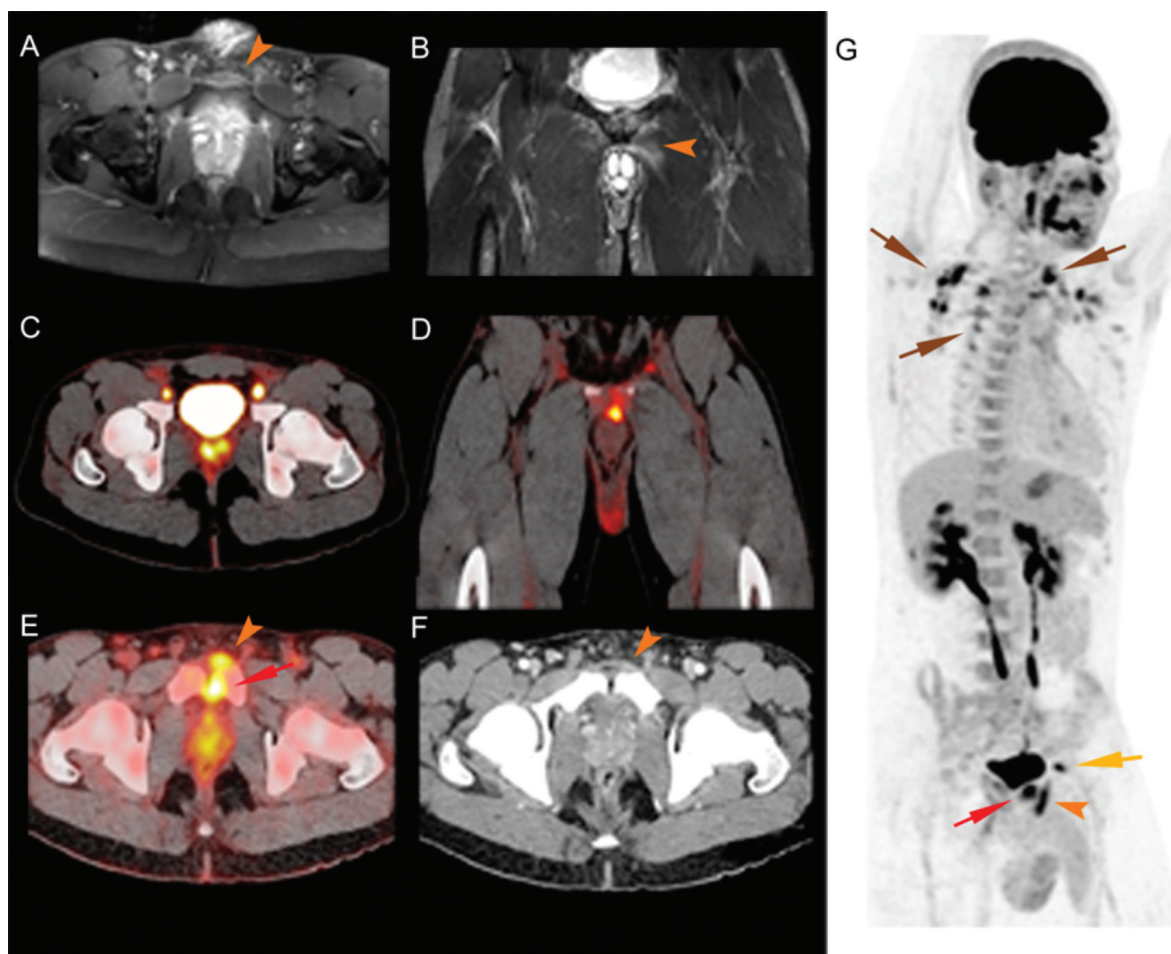


Figure 1. We present the case of a 23-year-old male African native patient presenting with fever, lumbalgia and dysuria after returning from a trip to Togo. The patient is a professional athlete (soccer player) with a known history of malaria during childhood. On palpation, there was pain over the pubic tubercle and the digital rectal exam was tender and sensitive. The blood formula was normal except elevated [C-reactive protein (CRP): 118 mg/L]. Recurrence of malaria had been excluded by repeated thick blood smears. Both blood and urinary cultures were positive for methicillin-resistant *Staphylococcus aureus*. Computed tomography (CT) with nephrographic contrast and dedicated ultrasound ruled out pyelonephritis. A pelvic magnetic resonance imaging (MRI) was performed to rule out arthritis and osteomyelitis that revealed a thickening of the aponeurosis of the left rectus abdominis muscle on T1-weighted axial sequence after injection of gadolinium (A, arrow head), a hyper-signal of the symphysis on the STIR-weighted sequence corresponding to marrow edema without articular effusion, and a hyper-signal corresponding to a strain of the left adductor longus muscle (B, arrow head) characteristic of athletic pubalgia (1,2). ^{18}F -FDG positron emission tomography/CT (PET/CT) found an increased prostatic tracer uptake along with bilateral external iliac lymph nodes hyper-metabolism (C), and also showed hyper-metabolism of the insertion of the left longus adductor (D) and of the left rectus abdominis (E and G, orange arrow) with a focal uptake in the pubic symphysis (E and G, red arrow) that were in concordance with the MRI findings. Increased ^{18}F -FDG uptake on the molecular inversion probe sequence (G) in the supraclavicular, latero-cervical and para-vertebral regions corresponded to activated brown adipose tissue (brown arrow), the yellow arrow corresponds to the left iliac node; the right iliac node and the prostate were masked by the bladder. The CT scan (F) with contrast media confirmed the findings (thickening of the aponeurosis of the left rectus abdominis, arrow head). A prostatic origin of the infection was presumed and antibiotic therapy was initiated (intravenous vancomycin, then co-trimoxazole per os). Regression of fever, normalization of CRP and clearing of the cultures were observed rapidly. Sports hernia/athletic pubalgia is an activity-related lower abdominal and proximal adductor-related pain seen in athletes (3,4,5,6). Symptoms are most often unilateral but are not uncommonly bilateral. This pattern with hyper-metabolism of the muscles associated with uptake in the pubic symphysis due to inflammation should be recognized on imaging not to be mistaken for a muscle abscess (7,8). To the best of our knowledge, this specific feature in ^{18}F -FDG PET/CT had not been previously described in the literature.

Ethics

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: O.R., M.P., G.A., Concept: O.R., G.A., Design: O.R., G.A., Data Collection or Processing: M.P., E.A., V.G., Analysis or Interpretation: O.R., V.G., G.A.,

Literature Search: O.R., M.P., E.A., V.G., G.A., Writing: O.R., M.P., G.A.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. McArthur TA, Narducci CA, Lopez-Ben RR. The role of pubic symphyseal CT arthrography in the imaging of athletic pubalgia. *AJR Am J Roentgenol* 2014;203:1063-1068.
2. Brennan D, O'Connell MJ, Ryan M, Cunningham P, Taylor D, Cronin C, O'Neill P, Eustace S. Secondary cleft sign as a marker of injury in athletes with groin pain: MR image appearance and interpretation. *Radiology* 2005;235:162-167.
3. Larson CM. Sports hernia/athletic pubalgia: evaluation and management. *Sports Health* 2014;6:139-144.
4. Minnich JM, Hanks JB, Muschaweck U, Brunt LM, Diduch DR. Sports hernia: diagnosis and treatment highlighting a minimal repair surgical technique. *Am J Sports Med* 2011;39:1341-1349.
5. Munegato D, Bigoni M, Gridavilla G, Olmi S, Cesana G, Zatti G. Sports hernia and femoroacetabular impingement in athletes: A systematic review. *World J Clin Cases* 2015;3:823-830.
6. Ellsworth AA, Zoland MP, Tyler TF. Athletic pubalgia and associated rehabilitation. *Int J Sports Phys Ther* 2014;9:774-784.
7. Reyhan M. Post-traumatic psoas abscess diagnosed by 18F FDG PET/CT. *Rev Esp Med Nucl Imagen Mol* 2014;33:314-315.
8. Alqahtani SM, Jiang F, Barimani B, Gdalevitch M. Symphysis pubis osteomyelitis with bilateral adductor muscles abscess. *Case Rep Orthop* 2014;2014:982171.