

Case Report

<http://dx.doi.org/10.3348/kjr.2013.14.1.81>
 pISSN 1229-6929 · eISSN 2005-8330
 Korean J Radiol 2013;14(1):81-85

Impotence due to External Iliac Steal Syndrome: Treatment with Percutaneous Transluminal Angioplasty and Stent Placement

Serkan Gür, MD¹, Levent Oguzkurt, MD², Bilal Kaya, MD², Güven Tekbas, MD², Ugur Ozkan, MD²

¹Sifa University, Department of Radiology, 35240 Basmane, Izmir, Turkey; ²Baskent University, Faculty of Medicine, Department of Radiology, 01250, Yüregir, Adana, Turkey

We report a case of erectile dysfunction caused by external iliac artery occlusion, associated with pelvic steal syndrome; bilateral internal iliac arteries were patent. The patient stated that he had experienced erectile dysfunction at similar times along with claudication, but he did not mention it before angiography. He expressed that the erectile dysfunction did not last long and that he felt completely okay after the interventional procedure, in addition to his claudication. Successful treatment of the occlusion, by percutaneous transluminal angioplasty and stent implantation, helped resolve erectile dysfunction completely and treat the steal syndrome.

Index terms: *Erectile dysfunction; Pelvic steal syndrome; Percutaneous angioplasty*

INTRODUCTION

Erectile dysfunction (ED) affects 10% of men between the ages of 40 and 70 (1). ED includes multiple negative consequences; it was once believed to be a primarily psychological problem. However, it has been estimated that approximately 70% of ED has a physical origin, with major risk factors being diabetes mellitus (DM), hypercholesterolemia, smoking, and chronic illness. These ailments are also established risk factors for atherosclerosis, the predominant predisposing factor of vasculogenic ED (2). Many of the pathophysiological mechanisms of ED have yet to be determined. Leriche syndrome (aortoiliac occlusion)

and obstructive disease of the penile arteries are two main vascular causes of impotence. Obstructive arterial diseases cause impotence by obstructing blood supply to the penis, and impotence also occurs when the rare entities do not obstruct the blood flow to the penis rather divert blood flow away from it. One example of this rare condition is external iliac artery steal syndrome, which causes secondary ED by shunting blood from the pelvis to the lower extremity.

Percutaneous treatment options of arterial impotence due to occlusive arterial diseases include percutaneous transluminal angioplasty (PTA), stenting of the common iliac artery and the hypogastric artery, and PTA of the pudendal artery (3).

We report a case of external iliac steal syndrome causing vascular impotence and explore its treatment with PTA and stent placement.

CASE REPORT

A 53-year-old man was referred to our interventional radiology unit for claudication on the right leg, after walking 300 m. His symptoms had started three months before admission. He did not experience thigh or buttock

Received September 10, 2011; accepted after revision January 11, 2012.

Corresponding author: Serkan Gür, MD, Sifa University, Faculty of Medicine, Department of Radiology, 35240 Basmane, Izmir, Turkey.

• Tel: (90) 232-4460770 • Fax: (90) 232-4460880

• E-mail: mserkangur@yahoo.com

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

pain while walking. Physical examination revealed a weak pulse in the right groin and ankle and a normal pulse in the left leg. The patient underwent a coronary artery bypass graft operation two years prior to treatment. Hypercholesterolemia was a risk factor, and his other laboratory tests were within normal limits. He did not have DM, hypertension (HT), or chronic renal disease. Color Doppler ultrasonography revealed occlusion of the right external iliac artery and patency of the right common iliac and common femoral arteries. The left iliac artery was patent throughout its course. The distal abdominal aorta was aneurysmal, with an outer diameter of 36 mm. Endovascular treatment of the occlusion was planned as the aneurysmal dilatation of the distal infrarenal aorta was mild (Fig. 1A). The patient did not mention ED, and it was not part of our procedure to question each patient with claudication about ED. Thus, further evaluation for ED, such as urology consultation or penile Doppler ultrasonography examination, was not performed. The procedure was explained to the patient, and written informed consent was obtained.

The procedure was performed under conscious sedation and analgesia with fentanyl citrate and midazolam, as required. Knowing about the occlusion on the right side, we decided to gain access to the artery from the right femoral artery; crossing the occlusion and placing the stent would be simpler on the ipsilateral side. The right common femoral artery was punctured under ultrasonography, and a 6 Fr vascular sheath was placed in common femoral artery. The occlusion was crossed with a 0.035-inch straight hydrophilic guide wire (Radiofocus, Terumo Europa, Leuven, Belgium) with the help of a diagnostic catheter (Vertebral catheter, Cook, Bloomington, IN, USA). Next, a pigtail catheter was placed in the distal aorta, over the wire. Angiograms of the aorta, pelvic arteries (anteroposterior and oblique views) and both lower extremity arteries were obtained. Angiograms confirmed fusiform aneurysmatic dilatation of the distal infrarenal abdominal aorta as well as occlusion of the entire length of the right external iliac artery (Fig. 1A). The right internal iliac artery was patent and was considerably dilated, with a high volume flow on the angiogram (Fig. 1B). The right internal iliac artery was the main feeder or blood supplier for the right common femoral artery and the leg arteries distal to the occlusion. The dilatation of, and very high flow through, the right internal iliac artery was likely a result of the redirection of blood flow to the right leg (Fig. 1B). The left common and

external iliac arteries were normal (Fig. 1C). The left internal iliac artery was patent, without stenotic lesions, throughout its course. Based upon angiographic observations, we did not know that this patient may have erectile dysfunction. The lower extremity arteries were normal on both sides.

Primary stent placement with a self-expanding nitinol stent was used, as the lesion was an occlusion. 5000 IU of heparin was administered intra-arterially prior to the placement of the stent. After placement of the vascular sheath, a stiff, 0.035-inch, 180-cm guide wire (Amplatz, Boston Scientific, Miami, FL, USA) was placed through the pigtail catheter, and a 7 × 80 mm self-expanding nitinol stent (ev3, Plymouth, MN, USA) was deployed and dilated with a 6 mm balloon catheter (Ultrathin, Boston Scientific, Galway, Ireland). Angiogram after stent placement showed excellent patency of the occluded external iliac artery (Fig. 1D). There was abrupt decrease of flow velocity in the right internal iliac artery, as if the contrast had been suspended in the artery (Fig. 1D). This occurred due to the large diameter of the artery, as a response to the long-standing occlusive lesion. The late phase of post-stent iliac arteriography shows better internal iliac artery branches (Fig. 1E). The procedure was completed without complications. The patient was discharged the same day, 6 hours after removal of the vascular sheath, and was instructed to take 300 mg of acetyl salicylic acid per day for an indefinite period of time.

The patient was seen in the interventional radiology outpatient clinic a month after the procedure, and intermittent claudication had resolved completely. The patient also stated that he had had ED developing alongside claudication, but he had not mentioned this prior to angiography. He expressed that erectile dysfunction recovered promptly and completely directly following the interventional procedure as did his claudication. The angiograms performed prior to intervention were reevaluated. The diagnosis of external iliac artery steal syndrome, not considered at the beginning of treatment, was established with angiography findings and an understanding of the patient's symptoms. The hypertrophied right internal iliac artery was likely feeding the right lower extremity by diverting blood away from the pelvic arteries, including the right pudendal artery feeding the penis. Although the left internal iliac artery was patent, its contribution to the penile tissues was probably insufficient, and blood flow to the penis could not be compensated for by the left side. We did not take a selective angiogram of

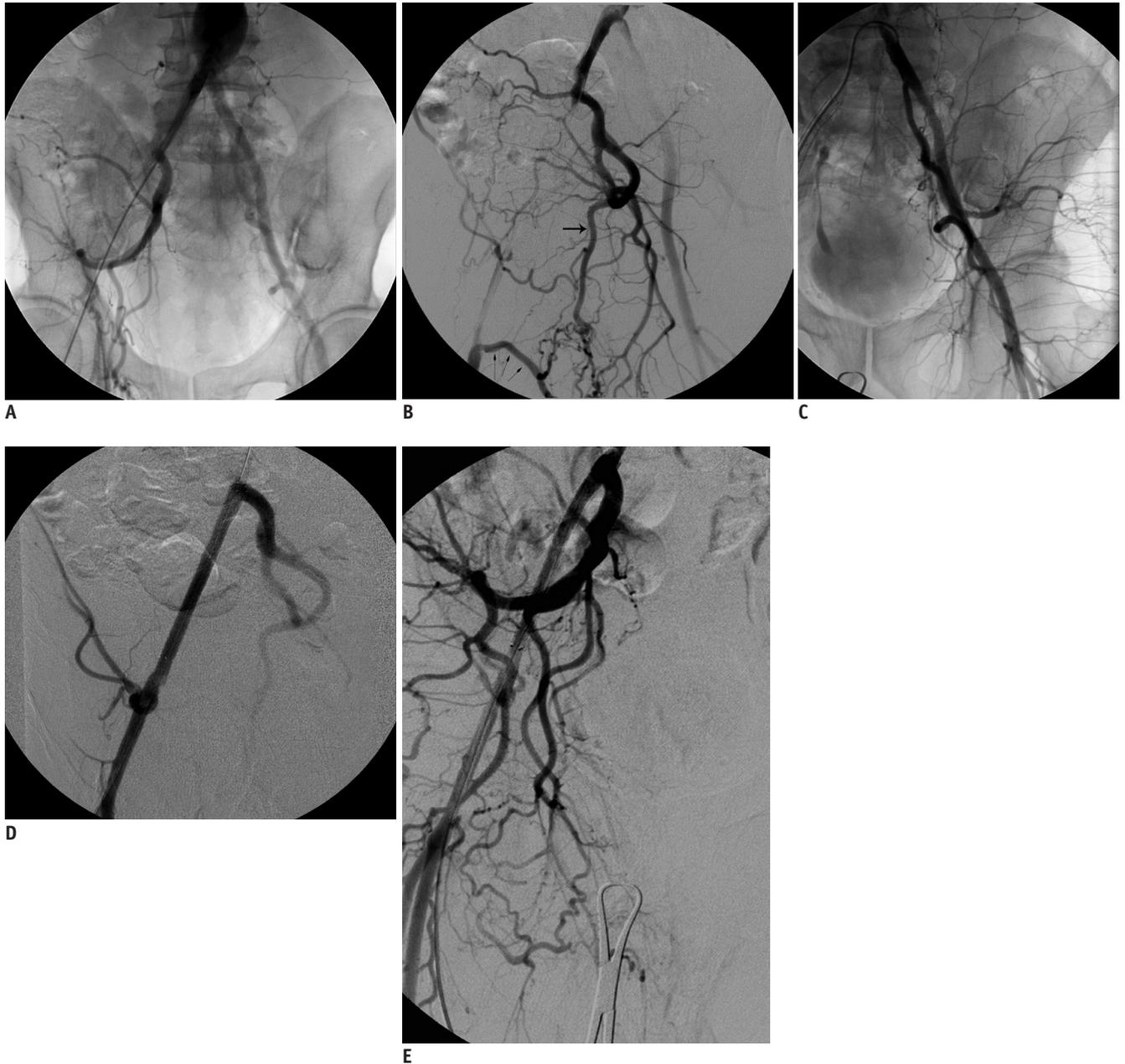


Fig. 1. 53-year old man with right sided claudication and erectile dysfunction. **A.** Anteroposterior diagnostic pelvic angiography shows right external iliac artery occlusion and hypertrophied right internal iliac artery. Distal abdominal aorta was mildly aneurysmatic (3.6 cm in diameter). **B.** Left oblique diagnostic angiography shows right external iliac artery occlusion, hypertrophied right internal iliac artery, and collateral flow via dilated obturator (thick arrow) and medial femoral circumflex arteries (thin arrows) to right common femoral artery. **C.** Right oblique diagnostic angiography shows normal left main, internal, and external iliac arteries. **D.** After percutaneous transluminal angioplasty and stenting, angiogram shows normal calibration and excellent patency of right external iliac artery. Flow through right internal iliac artery slowed immediately, as a result of decreased volume. Right medial femoral circumflex artery was not seen on angiogram. **E.** Late phase of post-stent arteriography shows internal iliac artery branches better.

the left internal iliac before prior to placement and, thus, further discussion would be mere speculation. However, it is possible that the left internal iliac artery also fed the right leg through connections between the right and left internal iliac arteries and the right common femoral artery.

DISCUSSION

Vasculogenic impotence is caused by reduced blood flow to the penis, secondary to proximal obstruction, most commonly involved in Leriche syndrome, isolated common iliac, internal iliac, internal pudendal artery, or the dorsalis

penis artery obstruction itself. Vascular occlusion, or stenosis, is a significant cause of impotence that can occur in men with no other obvious cardiovascular diseases. The incidence of this problem has probably been understated in the past. To our knowledge, external iliac steal syndrome as a cause of vascular impotence has not been reported in the literature over the past two decades. The diagnosis may be missed, or many clinicians are not aware that vascular lesions can result in impotence in men who are not diabetic and who show no other sign of vascular disease, such as angina and claudication.

The external iliac artery steal syndrome is a rare entity of secondary erectile impotence caused by shunting of blood from the pelvis to the lower extremity. The incidence of pelvic steal syndrome leading to impotence was reported to be 27% among a mixed population of patients with urological and vascular lesions, who were being evaluated for impotence (4). Two patterns of external iliac (pelvic) steal syndrome exist that might explain the syndrome of potency at rest and impotence with exercise, such as leg movements, during intercourse. The external iliac artery may be occluded or severely stenosed so that flow is reconstituted by internal or external iliac artery collaterals (5).

It is important to obtain a careful medical history of patients with impotence; information should include comorbidities such as smoking, hypertension, and diabetes mellitus, the character of the impotence, history of trauma, previous surgery, and medication. Wide-spread use of diagnostic and therapeutic methods for pelvic arterial diseases leads to a better understanding of vascular causes of ED. In patients with impotence and suspected arterial occlusive disease, diagnostic arteriographic techniques, such as magnetic resonance angiography (MRA), can reveal an obstruction at the aortoiliac or more distal level; pretreatment planning may be undertaken. Impotence may have multiple causes, and diagnosis of defects such as arterial obstruction does not necessarily indicate that normalization of arterial flow would lead to restoration of potency.

Vascular reconstructive procedures include aortoiliac endarterectomy, aortoiliac bilateral bypass preserving the continuity of the external-to-internal iliac arteries, and avoiding perivascular sympathectomy for aortoiliac occlusion and femoral-femoral suprapubic bypass, both for unilateral common iliac obstruction, and direct common iliac endarterectomy (6). Hypogastric endarterectomy and

small vessel implants directly into the corpora cavernosa have been used in the management of vascular impotence but tend to have poor results; these are less popular and less reliable methods (7). Direct treatment of the internal iliac or internal pudendal artery via endarterectomy or bypass is technically impossible because the pelvic and gluteal regions cannot be adequately exposed (8). To date, few studies have reported the results of the iliac endarterectomy for external iliac steal syndrome. Due to high failure rates of reconstructive vascular procedures, use of endovascular treatment methods in the management of patients is particularly attractive. PTA in the management of vascular impotence is most useful in aortoiliac occlusion or stenosis but is of less value in the management of pudendal arteries and probably has no value in the management of penile artery obstructions (7). Angelini and Fighali (8) stated that patients with bilateral significant internal iliac-pudendal obstruction and total impotence improved dramatically after successful balloon dilation of at least one side, but patients with mixed (vasculogenic and psychogenic) or drug induced impotence only improved partially successful balloon dilation of the internal iliac arteries and external iliac artery stenosis that causes pelvic steal syndrome is seldom reported in the literature (5, 7-9). Severe stenosis, or occlusion of the external iliac artery, may cause diversion of blood flow from the pudendal arteries to the femoral arteries, causing impotence. This may not necessarily be complete in all cases. Steal syndromes in other parts of the arterial tree usually present as a spectrum of findings, from very mild to complete steal, as in the case of subclavian steal syndrome. Therefore, it is likely that many patients with unilateral or bilateral external iliac artery occlusive disease might have a different degree of diversion of blood from the penile arteries. It should also be remembered that both open aorto-iliac surgery and iliac angioplasty alone are associated with ED (10). Protection of the internal iliac artery origin during PTA or stenting of the iliac arteries is important.

While a firm conclusion cannot be drawn about the overall incidence of vasculogenic impotence and external iliac steal syndrome in the impotent population, this is probably more frequent than is generally appreciated and should be considered in patients presenting with occlusive disease of the external iliac artery, even in the presence of patent internal iliac arteries on both sides. Simple PTA or stenting can restore blood flow to the leg arteries and could prevent diversion of blood from penile arteries. Significant

prospective studies, including those with patients with impotence and iliac artery obstructive disease, are required in order to further explore the degree of contribution of iliac artery occlusive diseases to impotence, in the form of obstruction to flow or diversion of blood from the pelvic arteries.

REFERENCES

1. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. *J Urol* 1994;151:54-61
2. Yassin AA, Saad F. Testosterone and erectile dysfunction. *J Androl* 2008;29:593-604
3. Valji K, Bookstein JJ. Transluminal angioplasty in the treatment of arteriogenic impotence. *Cardiovasc Intervent Radiol* 1988;11:245-252
4. Goldstein I, Siroky MB, Nath RL, McMillian TN, Menzoian JO, Krane RJ. Vasculogenic impotence: role of the pelvic steal test. *J Urol* 1982;128:300-306
5. Goldwasser B, Carson CC 3rd, Braun SD, McCann RL. Impotence due to the pelvic steal syndrome: treatment by iliac transluminal angioplasty. *J Urol* 1985;133:860-861
6. Kholoussy AM, Gain T, Matsumoto T. Impotence after aortoiliac surgery: current concepts. *Angiology* 1981;32:589-594
7. Castaneda-Zuniga WR, Smith A, Kaye K, Rusnak B, Herrera M, Miller R, et al. Transluminal angioplasty for treatment of vasculogenic impotence. *AJR Am J Roentgenol* 1982;139:371-373
8. Angelini P, Fighali S. Early experience with balloon angioplasty of internal iliac arteries for vasculogenic impotence. *Cathet Cardiovasc Diagn* 1987;13:107-110
9. Van Unnik JG, Marsman JW. Impotence due to the external iliac steal syndrome treated by percutaneous transluminal angioplasty. *J Urol* 1984;131:544-545
10. Karkos CD, Wood A, Bruce IA, Karkos PD, Baguneid MS, Lambert ME. Erectile dysfunction after open versus angioplasty aortoiliac procedures: a questionnaire survey. *Vasc Endovascular Surg* 2004;38:157-165