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Revascularization in Erectile Dysfunction due to Pelvic Trauma

Pelvik Travma Sonrası Oluşan Erektil Disfoksiyonda Revaskülarizasyon

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ABSTRACT

Erectile dysfunction is defined as the inability to achieve penile erection necessary for sexual intercourse or to sustain erection sufficiently. Although the treatment options for erectile dysfunction are limited, the most common surgical treatment is penile prosthesis implantation. In addition, penile revascularization of the penis is very effective in the treatment of erectile dysfunction due to different vasculogenic reasons, especially pudendal artery occlusion, after perineal trauma. Modified Furlow Fisher technique including anastomosis of the inferior epigastric artery to the penile dorsal vein is a successful treatment option among the revascularization techniques. Despite invasive preliminary evaluations such as duplex Doppler ultrasound, dynamic cavernosometry, selective internal pudendal arteriography, and the long and difficult surgical procedure, it is highly effective in particularly selected young patients.

Keywords: Erectile dysfunction; revascularization; pelvic trauma.

ÖZ

Erektil disfonksiyon, cinsel ilişki için gerekli olan penil sertleşmeyi sağlayamamak veya ereksiyonu yeterince sürdürememek olarak tanımlanır. Erektil disfonksiyon ile ilgili tedavi seçenekleri sınırlı olmakla birlikte en sık başvurulan cerrahi tedavi yöntemi penil protez implantasyonudur. Bunun yanında vasküler hastalık olmaksızın perineal travma sonrası, başta pudental arter oklüzyonu olmak üzere farklı vaskulojenik sebeplerle gelişen erektil disfonksiyon tedavisinde, penisin yeniden kanlandırılması için yapılan penil revaskülarizasyon ameliyatı oldukça etkilidir. İnferior epigastrik arterin penil dorsal vene anastomozunu içeren Modifiye Furlow Fisher tekniği revaskularizasyon teknikleri içerisinde başarılı bir tedavi seçeneğidir. Revaskularizasyon cerrahisi, dubleks Doppler ultrason, dinamik kavernosometri ve selektif internal pudendal arteriyografi gibi ön değerlendirmelere, cerrahi işlemin uzun ve zorluğuna rağmen özellikle uygun seçilmiş genç hastalarda oldukça etkilidir.

Anahtar kelimeler: Erektil disfonksiyon; revaskülarizasyon; pelvik travma.

INTRODUCTION

Erectile dysfunction (ED) is defined as a permanent inability to maintain an adequate erection for satisfactory sexual performance in men (1). According to the possible etiology of ED, it may occur as physiological, neurogenic, endocrinological, vasculogenic, drug-induced or psychogenic (2). ED may also develop due to pudendal artery occlusion rarely occurring after pelvic trauma without atherosclerotic disease. Penile revascularization is an important and effective surgical option in the treatment of these patients. Penile revascularization surgery was developed by Vaclav Michal who aimed to treat arteriogenic ED due to decreased cavernosal artery perfusion pressure on the basis of increasing arterial blood flow and perfusion

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pressure for the first time (3). Virag et al. (4) reported improvement of erectile function in 69% of patients with arteriogenic ED by his technique based on anastomosis of the inferior epigastric artery and deep dorsal vein. Virag pioneered to development of different modifications of this technique such as Virag1-3, Furlow-Fisher, Lewis, and Carmignani. The basic principle of surgical technique is the microvascular anastomosis of the inferior epigastric artery to the dorsal vein, corpus cavernosum, or dorsal artery. In this article, we aimed to present the successful treatment of ED due to pudendal artery occlusion after trauma by anastomosis of the inferior epigastric artery to the penile dorsal vein (Modified Furlow Fisher Technique).

CASE REPORT

A 36-year-old man admitted to the clinic of urology with complaints of severe ED, occurred after a pelvic trauma due to vehicle accident two years ago. He had normal erections prior to his accident. The patient had no history of hypercholesterolemia, hypertension, diabetes and genitourinary surgery. He was a nonsmoker. The physical examination and basic laboratory tests were unremarkable. Patient's International Index of Erectile Function Score (IIEF-5) was 5 which means severe ED. He received tadalafil 20 mg on demand for two months but there was no improvement in his erection. Penile duplex Doppler ultrasonography (PDUS) revealed the peak systolic flow velocity was determined as 18 cm/sec at the 10th minute and penile angiography showed concentric stenosis in the middle part of the right pudendal artery (Figure 1). These findings were consistent with ED due to arterial insufficiency.

Because of his isolated right pudendal artery occlusion, the patient underwent microvascular arterial bypass surgery with modified Furlow-Fisher technique in which right inferior epigastric artery anastomosed to the penile dorsal vein. There were no significant complications in the postoperative period and the patient was externed on the third postoperative day. After one month, the patient experienced an immediate recovery of erectile function which allowed for sufficient erections during coitus up to 15 minutes. IIEF-5 score raised to 22. A follow-up PDUS showed the peak systolic flow velocity increased to 31 cm/sec at the 10th minute (Figure 2). Informed consent was obtained from the patient.

Figure 1. Angiogram shows concentric stenosis in the middle part of the right pudendal artery

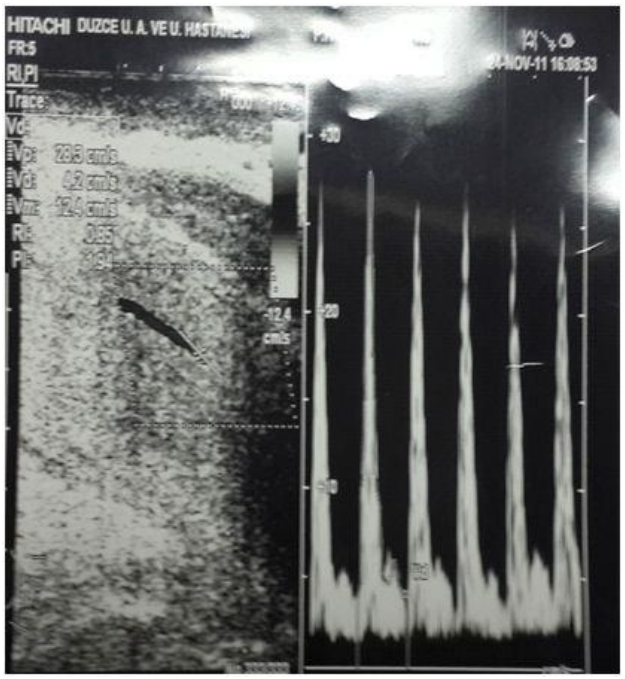

Figure 2. Postoperative penile Duplex Doppler ultrasonography

DISCUSSION

Erection has a complicated neurovascular mechanism. When evaluating the diagnosis of ED, it should be usually considered as multifactorial. The use of validated questionnaires such as the IIEF-5 should be taken account when evaluating the patient for ED (5). PDUS is a reliable and noninvasive diagnostic method for assessing ED for objective measurement of the blood flow of the penis. Maximum smooth muscle relaxation is achieved by pharmacological erection before Doppler ultrasound. It is accepted as arterial insufficiency if the right or left cavernosal artery peak systolic velocities are less than 30 cm/sec. End-diastolic velocity values greater than 5 cm/sec on ultrasound are defined as veno-occlusive dysfunction and exclude the patient from being a candidate for penile revascularization surgery (6).

Penile arteriography is the main component of diagnosis in patients undergoing penile revascularization surgery. Endothelial dysfunction causes focal atherosclerosis in young men with a history of blunt trauma. The plaque formation cascade event begins with the release of inflammatory cytokines, stimulation of smooth muscle proliferation, and infiltration of macrophages with endothelial damage. Endothelial damage may be a result of systemic disorders such as hyperlipidemia or hypertension, but may also be secondary to blunt mechanical trauma (7).

There is a possibility of obstruction of the pudendal artery and common penile artery in patients with ED due to pelvic fracture. Although renal vascularization methods, usually used in the occlusion of penile arteries mostly due

to trauma are difficult procedures, they are quite effective when administered in an appropriate patient. Virag et al. (4) first described the revascularization of the deep dorsal vein in 1980. Furlow et al. (8) modified the dorsal vein revascularization. Later in 1986, Hauri (9) further developed the revascularization technique and described a new method by anastomosing the inferior epigastric artery to the deep dorsal vein. Kawanishi et al. (10) reported a 5-year efficacy of 65.5% in patients with penile revascularization. In addition to conventional microvascular surgery, different techniques have been described for penis revascularization, including small vessel angioplasty, such as stenting or stroking and revascularization of larger donor vessels. (11). In our patient who had arteriogenic ED after trauma-related injury, we performed a modified Furlow-Fisher technique for revascularization surgery. This technique was effective due to raising in patient's IIEF score from 5 to 22 and peak systolic flow from 18 to 31. Despite invasive preoperative evaluations such as, duplex Doppler ultrasound, dynamic cavernosometry, selective internal pudendal arteriography and the long and difficult surgical procedure revascularization surgery is highly effective in particularly selected young patients. Patients with arteriogenic ED after pelvic trauma, revascularization surgery should be kept in mind and it should be applied in appropriate patients for effective results.

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