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Original Article

Penile Gangrene Following Implantation of Penile Prosthesis in Renal Transplant Patient: Report of a Case

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Erectile dysfunction (ED) etiology in patients with uremia and kidney transplant recipients may be multifactorial. Conservative therapies fail in these patients at rates as high as or higher than the general population. This leaves these patients with the limited options of abandoning sexual rehabilitation or undergoing placement of a penile prosthesis. However, underlying factors are associated with high complication rate, which preclude these patients from receiving penile prosthesis. Penile prosthesis infection in renal transplant patients is still a major challenge. We report a renal transplant patient with severe complications following implantation of penile prosthesis.

Key words: erectile dysfunction, penis, prosthesis

Introduction

Erectile dysfunction (ED) is a common problem in the general population. Many patients with end stage renal disease (ESRD) present with deterioration of erectile function due to vascular, neurological or psychological factors. An association between ESRD and ED was first reported in 1975.[1] Some studies have shown that 25% to 72% of renal transplant recipients continue to suffer from ED, although some do regain potency after kidney transplantation.[2] Conservative therapies (intraurethral therapy, intracavernosal injection, and vacuum device) fail in these patients at rates as high as or higher than the general population[3]. This leaves these patients with the limited options of abandoning sexual rehabilitation or undergoing placement of a penile prosthesis. However, there have been isolated and anecdotal reports of increased risk of infection in transplant patients who have undergone implantation of penile prosthesis.[4]

Prosthetic implant-associated infections have been documented for all types of implants produced from artificial materials. Such infections comprise the most devastating complications of surgical implantation of prosthetic devices. Genital gangrene with extensive tissue loss is the most severe and dreaded result of infection.[5], and occurs nearly exclusively in diabetic mellitus (DM) patients, presumably secondary to decreased peripheral perfusion. Prompt diagnosis, removal of the prosthesis, early excision of necrotic tissue and repeated aggressive debridement with or without the use of hyperbaric oxygen therapy (HBO) are warranted for treatment of this condition.

We present a case of penile gangrene in a renal

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transplant patient with several accumulated risk factors who received penile prosthesis.

Case Report

A 57-year old man presented with a 5-year history of ED. He was known to have non-insulin dependent DM which had been treated with oral hypoglycemic agent for 10 years. Four-year history of cerebrovascular disease with mild left side hemiparesis was also noted without activity limitation. DM nephropathy with ESRD developed 5 years previous, at which time cadaveric kidney transplantation was performed in China. Mild benign prostate hypertrophy with lower urinary tract syndrome was treated with alpha-one blocker. He underwent implantation of semirigid penile prosthesis in a medical center in southern Taiwan. He was discharged with oral antibiotics and Foley catheter indwelling due to acute urinary retention 3 days after implantation procedure. He began to suffer from suprapubic pain with concomitant low grade fever after discharge. He visited our outpatient clinic for regular immunosupressive medication (tacrolimus and cyclosporine) and surgical wound consultation. A physical examination revealed erythema around the coronal sulcus wound site and dark discoloration over urethra meatus. Laboratory examination disclosed fasting blood sugar of 110 mg/dl. Glycosylated hemoglobin (HbA1C) was 8.5%. Complete blood cell count disclosed 9020/mm3 white blood cell count. C- reactive protein was 5.56 mg/dl, serum creatinine was 1.2 mg/dl and blood urea nitrogen (BUN) was 20 mg/dl. The blood level of tacrolimus was 9.1 mg/ml and that of cyclosporin was less than 25 ng/ml at the time of infection. Intravenous cefazoline and gentamycin were immediately administered. Implant removal was suggested, but the patient was unwilling to undergo this procedure. Therefore, only cystostomy for urine diversion and debridement of penile shaft necrosis tissue was performed. Unfortunately, he presented with purulent, foul smelling discharge from the wound the next day. He was taken to the operating room and the implant was removed through the original incision, at which time necrosis of the skin and part of the corporeal bodies was noted. Debridement of the gangrenous tissue was performed. Irrigation system was left in the corporeal bodies with normal saline irrigation. Additional surgeries were required for debridement when gangrene persisted despite adequate intravenous antibiotic coverage. HBO was also administered for five days with one session per day at 2.0 atmospheres. The patient was brought back to the operating room twice during this period for further debridement of the necrotic wound. Subsequent partial amputation of the shaft was performed due to poor control of wound condition.

Discussion

ED is defined as the inability to achieve or maintain a sufficient erection for satisfactory sexual performance.[6] A variety of vasculogenic, neurogenic, hormonal, and psychogenic factors have been implicated. ED may be caused by alteration of these factors, as well as pharmacological alterations at the cellular level, involving nitric oxide, cyclic guanosine monophossphate, or cyclic adenosine monophosphate pathways.[7] ED etiology in patients with ESRD and in recipients of kidney transplant may be multifactorial, including uremia, hypertension, endocrine factor, and non-organic factors such as depression. Many physicians consider organ transplant patients poor candidates for penile prosthesis, as multiple risk factors (immunosupression, poor tissue healing, and neuropathy) predispose them to complications due to foreign body insertion. Rowe et al. reported 2 infections, 1 cylinder leak, and 1 episode of sepsis in a series of 7 patients undergoing placement of penile prosthesis before and after renal transplantation. Walther et al. reported 1 case of Fournier's gangrene as a complication of implantation of penile prosthesis in a renal transplant patient.[4] Other investigators have suggested that implantation of prosthesis in this population is safe. Sidi et al. reported no infections in 13 transplant patients after placement of penile prosthesis. Cellular also reported that the incidence

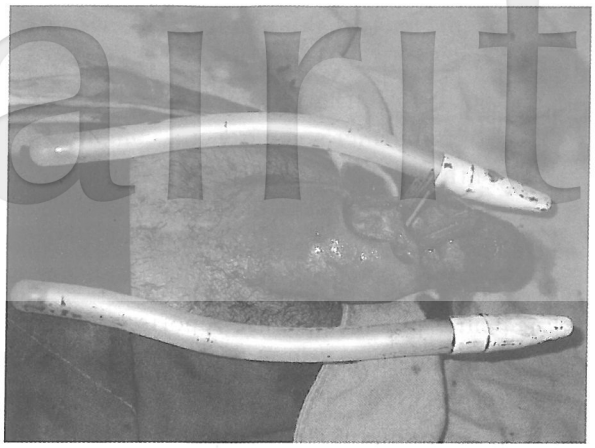

Figure.1. The appearance of the wound after surgical debridement and removal of the prosthesis.

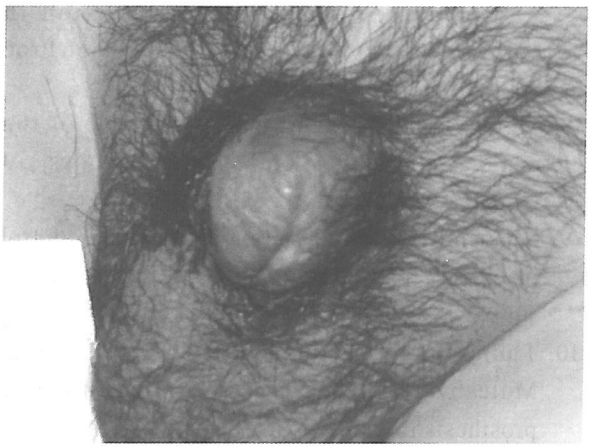

Figure.2. The reconstructed penis one month after partial penectomy.

of infection is comparable to that of the general population. Despite the controversy, satisfactory psychological benefit is achieved with penile prosthetic implantation as the primary therapeutic modality, even in higher risk diabetic transplant population.

It has been estimated that more than 15000 penile prosthesis operations are carried out in the United States annually. Prosthesis-associated infections often result in removal of the device, severe disability, loss of function, loss of tissue, and difficulty with subsequent implantation. Genital gangrene with extensive tissue loss is the most severe and dreaded manifestation of infection.[8] Risk factors for penile prosthesis infection include patient and facility factors. Same day admissions are helpful for decreasing wound infections. The most controversial risk factor is that of DM. Fallon and Ghnem reported that DM increases infection risks from penile prosthesis by more than three-fold when compared with other causes of ED.[9] The combination of long-standing DM and advanced atherosclerotic vascular disease may be considered an indicator of risk of penile gangrene, and this risk should be explained to the patient. Bejany et al. reported 3 cases of penile gangrene after implantation of prosthesis with all 3 exhibiting elevated fasting glucose levels preoperatively. Bishop et al. demonstrated a higher incidence of periprosthetic infection in poorly controlled DM, with an infection rate of 31% versus 5% in those exhibiting long-term DM control. Long-term glucose control was assessed using HbA1C level. The HbA1C level in our patient was 8.5% after admission. Unfortunately, preoperative HbA1C level was unavailable from prosthetic implant hospital. Multiple surgical procedures at the time of implantation and repeat implantation have also been reported to increase infection risk.[10]

Organ transplant recipients in whom traditional conservative therapy for ED fails should be considered candidates for penile prosthesis. Cellular and Sklar reported that multiple component penile prosthesis should be avoided in organ transplant recipients, as these patients are best served with prostheses that do not require a retroperitoneal reservoir and that have lock-out valves to prevent autoinflation.

There is no question that the penile prosthesis has revolutionized the treatment of ED and many men have benefited from this medical advance, even high risk patients. The decision to implant a prosthesis should not be taken lightly, especially in DM, immune-suppressive patients. There were 3 predisposing factors (cerebrovascular disease, DM, and renal transplantation) for prosthesis infection in our patient. Even prompt removal of prosthesis, HBO in conjunction with aggressive debridement of necrotic tissue, and antibiotic irrigation did not prevent the need for partial penectomy. Tracing back this patient's history, the risk of penile

gangrene might have been reduced by using suprapubic catheter rather than urethral catheter and applying looser penile bandage for a shorter time period.

Penile prosthetic surgery is an established method of treating organic impotence. However, it should only be considered for selected and well-informed patients to avoid complications. A review of the literature has suggested that prompt diagnosis, removal of the implant, early excision of necrotic tissue and repeated aggressive debridement with HBO are essential in the resolution of gangrene and maximal preservation of the penis.

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