SEXUAL MEDICINE REVIEWS

Penile Prosthesis Implantation in Priapism

Ömer Barış Yücel, MD, Yaşar Pazır, MD, and Ateş Kadıoğlu, MD

ABSTRACT

Introduction: Priapism is defined as a full or partial erection lasting longer than 4 hours after sexual stimulation and orgasm or unrelated to sexual stimulation. The main goal of priapism management is to resolve the episode immediately to preserve erectile function and penile length. Corporal smooth muscle necrosis is likely to have already occurred, and medically refractory erectile dysfunction is expected in patients with a protracted episode. Penile prosthesis implantation (PPI) in the early or late phase of priapism can restore erectile function.

Aim: To review the literature on PPI in priapism.

Methods: A PubMed search of all English-language articles published before 2017 was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement using the following search terms: *penile prosthesis implantation, priapism,* and *corporal fibrosis*. All publications reporting on PPI during or after priapism episodes were included for review.

Main Outcome Measures: Three types of priapism were reviewed for management using PPI. Surgical techniques, outcomes, and patient satisfaction were reported.

Results: Early implantation (during the episode) is technically easier and has lower complication rates compared with delayed (electively, after the erectile dysfunction is observed) surgery. Immediate PPI also allows preservation of penile length, which is related to higher satisfaction rates.

Conclusions: The paradigm is shifting toward immediate PPI in the management of ischemic priapism. Patients with non-ischemic priapism or recurrent priapism, even without a major ischemic episode, are at high risk for erectile dysfunction and are candidates for PPI. **Yücel ÖB, Pazir Y, Kadıoğlu A. Penile Prosthesis Implantation in Priapism. Sex Med Rev 2017;X:XXX-XXX.**

Key Words: Erectile Dysfunction; Fibrosis; Ischemic Priapism; Penile Prosthesis; Priapism

INTRODUCTION

Priapism is defined as a full or partial erection lasting longer than 4 hours after sexual stimulation and orgasm or unrelated to sexual stimulation. Priapism is categorized into three subgroups: ischemic, stuttering, and non-ischemic priapism.[1]

DEFINITION AND PATHOPHYSIOLOGY OF PRIAPISM

Ischemic Priapism

Ischemic priapism (IP; veno-occlusive, low-flow priapism) is a persistent, rigid, and painful erection with decreased cavernous arterial inflow. IP is considered a compartment syndrome and leads to progressive ischemia, hypoxia, hypercarbia, and acidosis in corporal smooth muscle, resulting in necrosis.[1] If untreated, extensive necrosis (>50%) and complete necrosis of corporal tissue could be observed at the end of 12 and 48 hours, respectively.[2]

The main goal of IP management is to resolve the painful erection immediately before irreversible necrosis occurs and preserve erectile function and penile length. Conservative management consists of corporal blood aspiration and irrigation followed by intracavernosal injection of a sympathomimetic agent, which has a resolution rate of up to 80%.[3] In case of failure, shunt procedures could be performed to resolve the IP. However, in patients with a protracted episode, irreversible smooth muscle necrosis is likely to have already occurred and medically refractory erectile dysfunction (ED) is expected despite the resolution of IP. The duration of the episode is the key point for choosing the treatment modality (Figure 1).

Shunt surgery is not recommended for episodes longer than 72 hours and immediate penile prosthesis implantation (PPI) could be offered to preserve erectile function and prevent penile shortening from corporal fibrosis.[4]

Received April 1, 2017. Accepted August 6, 2017.

Department of Urology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

http://dx.doi.org/10.1016/j.sxmr.2017.08.002

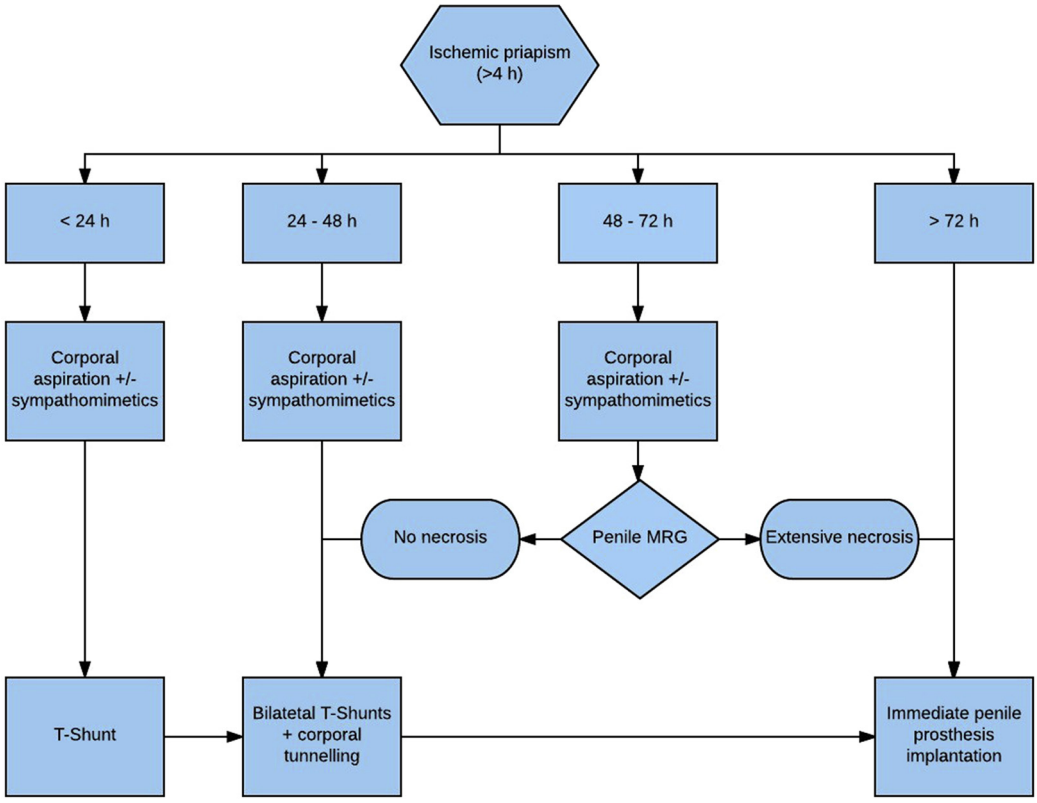

Figure 1. Management of ischemic priapism.

For episodes longer than 36 hours, shunting or immediate PPI could be the treatment option.[3] Priapism lasting continuously for 36 hours is almost invariably associated with permanent ED.[5] Reoxygenation of the corpora with shunt surgery does not change the long-term outcome for the need of a PP if extensive necrosis of smooth muscles has already occurred (Figure 2). In this timeframe, establishing corporal smooth muscle necrosis with gadolinium-enhanced high-definition magnetic resonance imaging or intraoperative corporal muscle biopsy is recommended to predict unrecoverable ED and avoid unnecessary shunt procedures. Ralph et al[6] reported 100% sensitivity for magnetic resonance imaging in predicting non-viable smooth muscle.

For priapism episodes shorter than 36 hours, immediate PPI could be the third-line treatment after failed shunt surgery.

The second point for choosing the treatment modality should be the erectile function of patients before the priapism episode. Patients with existing medically refractory ED should be offered early PPI to avoid unnecessary shunt surgeries.

Recurrent Priapism

Recurrent (stuttering, intermittent) priapism (RIP) is characterized by repetitive, painful, prolonged erections that are self-limiting in contrast to IP. The duration of episodes is generally shorter, but they can progress into a major IP episode.[7] Treatment for an acute episode is similar to that for IP. The primary goal of RIP management is the prevention of further episodes, and multiple medical agents have been shown to be effective in decreasing the duration and frequency of episodes.[8] However, patients with medically refractory RIP require frequent visits to the emergency department and are always at risk of a major ischemic episode, which can be lessened with a PP.[9,10] In 1998 Upadhyay et al[9] reported on the first case of PPI in a 19-year-old patient with sickle cell disease and RIP to prevent further episodes. Nevertheless, PPI for preventing RIP should not be offered before medical treatment, and PPI should be performed only in carefully selected patients as a last resort.

Repetitive priapism episodes with shorter durations also can lead to permanent ED.[11] In a study of 59 patients with RIP, the ED rate was 47.5% for those with sickle cell disease and 21.1% for those without sickle cell disease. The risk factors were duration of RIP, episode duration ($\leq$2 hours), and episode frequency (at least weekly).[12] Medical treatments for ED (phosphodiesterase type 5 inhibitors, intracavernosal injection) are used cautiously in these patients because of the risk of an ischemic episode. Therefore, PPI could be performed with a broader indication.[13] Corporal dilatation in patients with RIP can be difficult even without a major episode.[10,14,15] This needs to be confirmed in a large series of patients. Patients with a major episode should be treated similarly to patients with IP if the episode has reached the critical period for ED.