

The Efficacy of the T-Shunt Procedure and Intracavernous Tunneling (Snake Maneuver) for Refractory Ischemic Priapism

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Abbreviations and Acronyms

ED = erectile dysfunction
IIEF-5 = International Index of Erectile Function

Accepted for publication July 17, 2013.

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Purpose: The current management of ischemic priapism that is refractory to conventional medical therapy is a form of shunt procedure that diverts blood away from the corpus cavernosum. We assessed the outcome of the T-shunt and intracavernous tunneling for the management of ischemic priapism.

Materials and Methods: During a 36-month period 45 patients presented with prolonged ischemic priapism. Patients were divided into subgroups according to the duration of priapism. All patients had an unsuccessful primary treatment, and underwent a T-shunt and intracavernous tunneling with cavernous muscle biopsies. All patients completed an IIEF-5 (International Index of Erectile Function-5) questionnaire preoperatively and 6 months postoperatively.

Results: Resolution of the priapism using a T-shunt and snake maneuver occurred in all patients with a priapism duration of less than 24 hours and in only 30% of those with priapism lasting more than 48 hours. After a 6-month median followup the IIEF-5 score was significantly reduced from a mean of 24 (range 23 to 25) preoperatively to 7.7 (range 5 to 24), which was related to the duration of the priapism ($p < 0.0005$). All patients with priapism for more than 48 hours had necrotic cavernous smooth muscle on biopsy and had severe erectile dysfunction requiring the insertion of a penile prosthesis. Those patients with moderate and mild erectile dysfunction were treated with phosphodiesterase type 5 inhibitors.

Conclusions: The success of the T-shunt with snake tunneling is dependent on the duration of priapism. When it is less than 24 hours the results are favorable, although erectile dysfunction is still present in 50% of patients. In those with a priapism duration greater than 48 hours the technique usually fails to resolve the priapism and all patients end up with erectile dysfunction due to smooth muscle necrosis.

Key Words: priapism, ischemia, erectile dysfunction, fibrosis

ISCHEMIC priapism is defined as a prolonged painful penile erection lasting more than 4 hours with penile rigidity and little or no cavernous arterial flow.^{1,2} It is the most common type of priapism, accounting for more

than 95% of all episodes. The underlying pathophysiology of this condition is not completely established, although the result is venous outflow obstruction (veno-occlusive or low flow), with a compartment syndrome

in the corpora cavernosa of the penis.³ As the priapism persists, the metabolic environment becomes more hypoxic, with resultant acidosis and glucope-
nia preventing the smooth muscle from contracting and initiating detumescence. At an undetermined point the smooth muscle dies and is replaced by fibrosis with resultant erectile dysfunction.³

The absolute point at which irreversible damage to the corpus cavernosum smooth muscle occurs is unknown, and may vary according to the etiology of ischemic priapism and the degree of preexisting smooth muscle dysfunction. However, there is evidence that even after 6 hours of ischemia, irreversible changes have already started to occur.⁴⁻⁷ Therefore, ischemic priapism is a urological emergency and, as with any compartment syndrome, should be decompressed urgently.

Traditionally decompression has been achieved by shunting blood away from the corpus cavernosum using a variety of methods. A recently described shunt procedure involves the formation of a distal shunt between the corpus cavernosum and glans penis using a T-shaped incision.⁸ This is followed by dilation of the cavernosa using a 20Fr dilator to form a cavity that allows the stagnant blood to drain. A modification of this procedure was previously described by Burnett and Pierorazio, and involved a transverse glandular incision followed by dilation of both corpora with a narrow size 8Fr dilator.⁹ In this study a series of patients underwent a T-shunt procedure and intracavernous tunneling for the management of ischemic priapism. The aim was to identify the outcome of this surgical technique in terms of resolution of priapism and preservation of erectile function.

MATERIALS AND METHODS

Between October 2009 and October 2012, 45 patients presented with ischemic priapism. Mean patient age was 40.2 years (range 31 to 69). The etiology was idiopathic

(25), sickle cell disease (10), antipsychotic agents (8), and phosphodiesterase type 5 inhibitors combined with an α -blocker and cocaine (2). A history of stuttering priapism was given by 4 patients with sickle cell disease and 1 taking antipsychotic medication, although erectile function was normal in all. The diagnosis of ischemic priapism was based on medical history, physical examination, a hypoxic/hypercarbic/acidotic cavernous blood gas analysis and penile Doppler ultrasound.

All patients had undergone a failed conservative management which involved transglans multiple corporal aspiration with a 19G butterfly needle and intracavernous administration of sympathomimetic phenylephrine up to 1,000 μ g in 200 to 250 μ g aliquots with the patient under local anesthesia (penile block). All patients then underwent a T-shunt procedure using a No. 10 scalpel blade on each side of the glans followed by intracavernous tunneling with a size 8 Hegar dilator to the proximal limit of the corpus cavernosum on each side, with the patient under general anesthesia (figs. 1 and 2). The corporal blood drainage and penile decompression were followed by corporal washouts with 0.9% normal saline and de novo intracavernous administration of phenylephrine. Distal and proximal smooth muscle biopsies from the corpora cavernosa bilaterally were also obtained with a trocar biopsy gun before tunneling (fig. 3). All specimens were fixed in formalin and stained with hematoxylin and eosin (fig. 4). An assessment of the degree of necrosis was made in focal areas, or when the total was greater than 50% of the specimen the necrosis was considered extensive.

To determine a better and more detailed analysis of the results, the patients were divided according to the duration of priapism into groups as shown in table 1. The data were collected retrospectively by review of the medical records. All patients completed an IIEF-5 questionnaire before the shunt procedure, usually on hospital admission or occasionally while awaiting surgery, and at 6 months postoperatively.

RESULTS

The penile Doppler ultrasound showed absent or low systolic velocities. Cavernous blood gas analysis

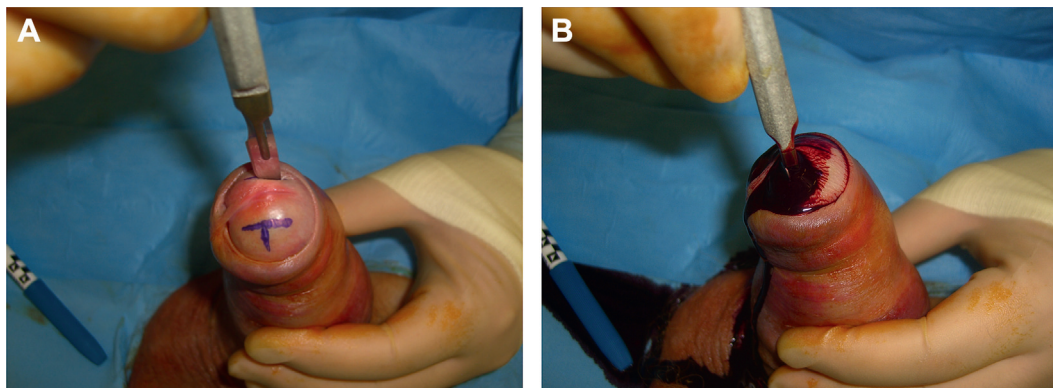


Figure 1. T-shunt performed bilaterally. Scalpel blade is inserted through glans and into corpora cavernosa (A), rotated 90 degrees and withdrawn (B).

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