Salvage Management of Prolonged Ischemic Priapism

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Definition

“Priapism is a pathological condition of a penile erection that persists beyond or is unrelated to sexual stimulation.”

AFUD Thought Leader Panel, IJIR 5:S39, 2001
Significance of Priapism

Medical consequences
May lead to permanent and irreversible erectile dysfunction and psychosocial debilitation

Under-management
Obscure etiology and pathogenesis
Types of Priapism

**Ischemic** (veno-occlusive, low flow)

**Nonischemic** (arterial, high flow)

**Stuttering** (intermittent, recurrent ischemic priapism)

Ischemic Priapism: Characteristics

Occlusion of venous outflow and consequent cessation of arterial inflow

“Similar to a compartment syndrome”

Abnormal cavernous “environment”

Hypoxic
Acidotic

Painful, rigid corpora, glans, corpus spongiosum not involved

This type of priapism is an Emergency

Nonischemic Priapism: Characteristics

Unregulated cavernous arterial inflow
Cavernous blood gases neither hypoxic nor acidotic
Penis neither fully rigid nor painful
Antecedent trauma often reported
Not an emergency
May be difficult to distinguish from ischemic
**Stuttering Priapism: Characteristics**

Recurrent form of ischemic priapism

Often associated with nocturnal erections

This term identifies a patient whose pattern encourages the clinician to seek options for prevention of future episodes
Why considered a urological \textbf{Emergency}?

- Pain
- Irreversible penile ischemia $\Rightarrow$ permanent ED
Management

Goal:
1- Relieve pain.
2- Reverse erection.
3- Prevent damage of the corporal bodies.

Timing: ??

Treatment follows a stepwise approach based on the etiology of priapism.
Management

Time Intervention:

- <12 hours $\rightarrow$ 100% EF preservation
- 12-24 hours $\rightarrow$ 78% EF preservation
- 24-36 hours $\rightarrow$ 44% EF preservation
- > 36 hours $\rightarrow$ No spontaneous erections
Initial Evaluation and Management

- Initial assessment includes History and PE.
- Establishing the presence or absence of corporal blood flow is the key to management.
  - Visual inspection of blood from corporal aspirate
  - Corporal blood gas
  - Color duplex Doppler
  - MRI in select cases of delayed presentation

J Sex Med 2006;3:749-52
Management
ischemic priapism

**First line**
Evacuation of old blood from the corpora cavernosa using a 19 or 21 gauge butterfly needle.

**If unsuccessful:**
Injection of a diluted alpha agonist solution into corporal space.
Management
ischemic priapism

E.g. *phenylephrine* : drug of choice
- pure *alpha*1 agonist
- *minimal* cardiac side effects.

**Dose:** 500 µg per injection repeated every 3-5 min. till detumescence.

**Complications:** headache, acute hypertension, palpitation, sweating, bradycardia, arrhythmias
Management
ischemic priapism

- In patients with high cardiovascular risk, blood pressure and electrocardiogram monitoring are recommended.

- Surgical shunts should be considered only after a trial of intracavernous injection of sympathomimetics has failed.
Management

ischemic priapism

Second line (Surgery):

Rationale: To create various surgical fistulae between the engorged corpous cavernosum CC:
1-Glans,
2-Corpous Spongiosum,
3-Dorsal or Saphenous vein

(hoping that these fistulae will spontaneously close sometime after detumescence).
Management of ischemic priapism

Types of surgery

Distal shunts
- Winter's shunt
- Ebbehoj procedure
- Al-Ghorab shunt

Proximal shunts
- Quackles (cavernoso-spongiosal)
- Grayhack (cavernoso-saphenous)
- Barry (cavernoso-dorsal)
Distal Shunting

- Relieve the compartment syndrome
- Once shunt is established, milk out deoxygenated dark blood.
- See bright red blood prior to closure.
- Close the glans skin not the tunica albugenia.
- Consider
  - Repeating Doppler
  - Observing as inpatient

J Sex Med 2006;3:749-52
Winter’s shunt
Al-Ghorab Procedure
Proximal Shunts

- Quackels (1964) - CC to spongiosum
- Grayhack (1964) - CC to saphenous vein
- Barry (1976) - CC to deep dorsal vein
- Odelowo (1988) - CC to spongiosum with saphenous vein patch to prevent closure

In low flow priapism thrombus forms by 12 hours. All shunting has inherent risk of releasing emboli.
Figure 25.12: Bilateral shunts are staggered. The right and left
Management
ischemic priapism

Post operative care:
- Avoid circular or compressive dressings.
- Intermittent manual squeezing and milking is advisable to keep the shunt open.

Complications:
Early ➔ recurrence, bleeding, infection, urethral damage.
Late ➔ fibrosis of the erectile tissue ➔ ED.
 ➔ failure of shunt to close ➔ venogenic ED.
 ➔ pulmonary embolism following cavernoso-saphenous shunt
Management
Nonischemic priapism

* **Goal**: Reassurance and watchful waiting.

**Options**: Selective internal pudendal arteriography followed by selective angioembolization.

Open surgical ligation if repeated embolization fails.
Management
Stuttering priapism

* **Goal**: reduce the incidence of future attacks.

* Treat each attack as for ischemic priapism.

* **Options:**
  - GnRH agonist, antiandrogen.
  - Oral baclofen.
  - PDE5-i → selective vasodil. of corporal blood vessels preventing sickling of red cells.
Feasibility of the Use of Phosphodiesterase Type 5 Inhibitors in a Pharmacologic Prevention Program for Recurrent Priapism

Arthur L. Burnett MD, Trinity J. Bivalacqua MD, PhD, Hunter C. Champion MD, PhD, Biljana Musicki PhD

The Journal of Sexual Medicine 2006

7 patients (age 22-37 y) Sickle cell disease

(N = 4) “Stuttering" priapism

(N = 3) Idiopathic recurrent priapism

Sildenafil 25-50 mg

Tadalafil 10 mg

PDE5 -i : Successful in alleviating or resolving priapism recurrences in six of the seven patients (86%)
Castration for Treating Recurrent Priapism: Can We Do Better?

Burnett, AL  2011  Journal of Andrology

Historically: Androgen Ablation / recurrent priapism

- Failure of conventional treatments
  (Serjeant et al, 1985) - Reduce the occurrences priapism

  (Montague et al, 2003) - Restricts therapy on sleep-related erections with central action.

Negative global impact: young adult population (recurrent priapism)

Molecular Science, with evidence indicating that the mechanisms of erection dysregulation explain the pathophysiology -cGMP (Burnett and Bivalacqua et al, 2011)
Penile prosthesis surgery has been used for acute priapism particularly when shunting is not expected to be successful.

According to the *ISSM Standards Committee*, penile shunting has limited benefit for priapism events lasting 72 hours.

Advantage is that its easier execution when major penile scarring is limited, may reduce the risk of procedural complications (e.g., urethral injury, tunical erosions, infection).

‘End Run’ Around Ischemic Priapism

The Immediate Insertion of a Penile Prosthesis for Acute Ischaemic Priapism

David J. Ralph, Giulio Garaffa, Asif Muneer, Alex Freeman, Rowland Rees, Andrew N. Christopher, Sukhinder Minhas

- 50 cases of ischemic priapism
- Duration 209 hrs. (24-720 hrs)
- All failed alpha-adrenergic washouts
- 43/50 malleable implant
- 3 inflatable implant
- 6/43 later converted to inflatable implant
- 3/50 (6%) removed for infection

IJIR 2003;15(suppl15):S125
Priapism shunting violates basic vascular anastomosis principle i.e. without endothelial-endothelial anastomosis.

Exposed collagen in tunica
Therefore...

--Shunt failure should be regarded as a postoperative thrombotic complication

--Perioperative anticoagulation should be incorporated into all shunting procedure
Last 12 months
5 patients, 5 consultations

Pre-operative:
Aspirin 325 mg by mouth
+ Subcutaneous injection of Heparin 5,000 units

Any Shunting procedure
(T-shunt with or without tunneling preferred)

Post-operative:
Aspirin or Plavix daily for 1 week
Conclusions

Priapism has commonly represented clinical disorder for urologists and clinical practitioners alike because of its profound clinical consequences and its generally limited options for successful management.

Basic principles of early recognition and rational interventions can be applied to address the disorder.

Ongoing basic scientific investigation may reveal new approaches for effectively treating and possibly preventing the disorder.
Thank You
Corporal Burnett “Snake” Surgical Maneuver for the Treatment of Ischemic Priapism: Long-Term Followup

Robert L. Segal,* Nathaniel Readal, Phillip M. Pierorazio, Arthur L. Burnett and Trinity J. Bivalacqua

From the Department of Urology, The James Buchanan Brady Urological Institute, The Johns Hopkins Medical Institutions, Baltimore, Maryland

**Conclusions:** The modified Al-Ghorab corporoglanular shunt using the Burnett snake maneuver is successful in resolving ischemic priapism, particularly in cases refractory to first line management, and in preventing further episodes of priapism.

**Key Words:** fibrosis, erectile dysfunction, penile erection

Ischemic priapism, defined as a persistent nonsexual penile erection, is a true urological emergency. If not treated in a timely fashion, the erectile tissue sustains acidosis and anoxia as a result of the lack of arterial circulation, which can result in permanent penile structural and functional damage. Serious complications including erectile dysfunction, chronic penile pain, megaphallus, penile necrosis and penile gangrene can result, and can cause severely compromised quality of life.

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## Priapism treatments and outcomes

<table>
<thead>
<tr>
<th>Treatment</th>
<th>(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation/no treatment (incl. neurogenic)</td>
<td>20</td>
</tr>
<tr>
<td>Embolization</td>
<td>1</td>
</tr>
<tr>
<td>Irrigation only</td>
<td>22</td>
</tr>
<tr>
<td>Irrigation followed by shunt</td>
<td>36</td>
</tr>
</tbody>
</table>

Number of separate shunt procedures per patient:

- (1): 18
- (2): 15
- (3): 2
- (4): 1
## Priapism treatments and outcomes

<table>
<thead>
<tr>
<th>Immediate complications procedure</th>
<th>Complication and treatment (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation and injection</td>
<td>Atrial fibrillation → cardioversion (1)</td>
</tr>
<tr>
<td>Distal shunt</td>
<td>Wound infection → antibiotics (1)</td>
</tr>
<tr>
<td>Proximal shunt</td>
<td>Urethral injury → prolonged catheter (2)</td>
</tr>
<tr>
<td></td>
<td>Perineal hematoma → evacuation (1)</td>
</tr>
<tr>
<td></td>
<td>Perineal wound infection → wound care (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Long-term outcomes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number with follow-up</td>
<td>35</td>
</tr>
<tr>
<td>Median follow-up (months)</td>
<td>3, range 0.25-60</td>
</tr>
<tr>
<td>Chronic pain</td>
<td>5</td>
</tr>
<tr>
<td>Further surgery</td>
<td></td>
</tr>
<tr>
<td>Prosthesis placement</td>
<td>3</td>
</tr>
<tr>
<td>Shunt closure</td>
<td>5</td>
</tr>
<tr>
<td>Intermittent priapism</td>
<td>1</td>
</tr>
<tr>
<td>Erections inadequate for intercourse</td>
<td>29</td>
</tr>
</tbody>
</table>
**Recommendation: Stuttering Priapism**

Management should follow the specific recommendations for ischemic priapism. The goal is prevention of future episodes. Gonadotropin-releasing hormone (GnRH) agonists or anti-androgens may be used in the management of patients with recurrent (stuttering) priapism (not prior to puberty). Self-injection of phenylephrine should be considered in patients with either fail or reject systemic treatment of stuttering priapism.

Sickle Cell Priapism

**Prevalence: North America**

Accounts for 28% of all cases

0.15% of African Americans have sickle cell anemia

42% of males will have priapistic episode

Two thirds of priapism cases occur in children

**Signs/symptoms**

Persistent painful erection

77% initiated during sleep

<20% with sexual activity
## Characteristics of Priapisms

<table>
<thead>
<tr>
<th></th>
<th>Ischemic</th>
<th>Non-ischemic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td>Sickle cell, drug use, ICI</td>
<td>Perineal or penile injury</td>
</tr>
<tr>
<td><strong>Physical exam</strong></td>
<td>Painful rigid erection</td>
<td>Painless, not rigid</td>
</tr>
<tr>
<td><strong>Blood gases</strong></td>
<td>Hypoxic, acidotic</td>
<td>well oxygenated</td>
</tr>
<tr>
<td><strong>Color Doppler</strong></td>
<td>No flow</td>
<td>High flow</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Urgent</td>
<td>Not urgent</td>
</tr>
</tbody>
</table>
Recurrent (Stuttering) priapism

Common in PTs with sickle cell disease or trait
Also described in PTs with non ischemic priapism.

Mechanism:

- exactly unknown
- theories: alteration of nerve terminals
  - scarring of intracavernous venules.
Management

- In order to initiate appropriate management, the physician must determine whether the priapism is ischemic or nonischemic.

*AUA Practice Guideline, 2003*
Evaluation

- **History** (trauma, medication, drug abuse, intracavernous injection, sickle cell disease etc.)
- **Physical exam**: rigid & painful (ischemic); partial & non-painful (nonischemic)
- **Cavernous blood gases**: 
- **Color duplex ultrasound**: 
- **Others**: urine for toxicology screen, sickle cell prep, reticulocyte count
Management ischemic priapism

- A cavernoglanular shunt should be the first choice because it is the easiest to perform and has the fewest complications.

- Proximal shunting using the *Quackels* or *Grayhack* procedures may be warranted if distal shunting procedures have failed to relieve the priapism.
Penile Prosthesis Surgery

- Penile prosthesis surgery after resolved ischemic priapism is indicated for the patient who is unable to perform sexual intercourse because of his erectile impairment.

- In this scenario, the purpose of the intervention resembles that for any man who has severe erectile dysfunction.

- The plan and approach for execution of penile prosthesis surgery for this indication is generally consistent with standard procedures.