A Refined Approach to All 3 Types of Priapism

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Definition & Classification

**Definition:** Priapism is a pathological penile erection that persists beyond or is unrelated to sexual stimulation. (duration > 4 hours?)

**Classification:**
- Ischemic (venous, low flow, no flow)
- Non-ischemic (arterial or high flow)

The term low flow is misleading because there is no flow into or out of the corpus cavernosum in ischemic priapism.

Evaluation

- **History:** (trauma, medication, drug abuse, intracavernous injection, sickle cell 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

Characteristics of Priapism

<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, acidic</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>
**Intracavernous blood gases**

- **Ischemic**
  - pH: 6.91
  - pO2: 5
  - pCO2: 111

- **Non-ischemic**
  - pH: 7.34
  - pO2: 65
  - pCO2: 48

**Medical Management**

1. Evacuation of old blood

2. Intracavernous injection of diluted alpha adrenergic agonist

   There is no need for “irrigation”.

**Priapism buster solution**

- Dilute 1 ml (10 mg) of phenylephrine (neosynephrine) with 9 ml of saline to make =1 mg/ml stock solution
- Inject 1/3 ml (older, fragile patient) to 1/2 ml (young, healthy men) every 3-5 minutes till the penis is soft
- Monitoring vital signs prn.

![Priapism buster solution](image)

**Surgical Shunts**

- **Distal**: glans-cavernosum - Trucut-needle (Winter), knife blade (Ebbehoj), excision of tunica (Al-Ghorab)
- **Proximal**: spongiosum-cavernosum (Quackels, Sacher)
- **Cavernosum-Venous**: Saphenous vein (Grayhack), dorsal vein (Barry)
Distal Percutaneous Shunts

Advantage: simple, can be done under local
Disadv: high failure rate due to inadequate shunt, severe cavernosal edema, thrombosis

Distal Open Shunt

Al-Ghorab Procedure
(1960's)

Adv: Higher success rate
Disadv: General or regional anesthesia, time consuming,
cavernositis, urethral injury, fistula

Caverno-Venous Shunts

Adv: Higher success rate
Disadv: General or regional anesthesia, time consuming

Caverno-spongiosal Shunts

C. Cavernosum to Bulb
Quackels (1964)

C. Cavernosum to Spongiosum (more distal)
Sacher (1972)

Adv: Higher success rate
Disadv: General or regional anesthesia, time consuming, cavernositis, urethral injury, fistula
Complications:
Cavernositis
Urethral obstruction
Urethro-cutaneous fistula

QUIZ:
Dees he have a **recurrence**
or **Post-ischemic hyperemia**?

- color duplex ultrasound
- blood gases (takes several hours to change)

Color Duplex ultrasound

- No flow (Recurrence)
- High flow (Post-ischemic hyperemia)

Why shunts fail?

- Shunt is too small and cannot accommodate the large flow increase from post-ischemic hyperemia
- Severe edema/thrombosis of corpora cavernosa prevent blood flow from proximal to distal cavernosum.

Solution
Treatment of ischemic priapism
A 3-step approach
(duration dependent)

1. < 24 hours: Evacuation of old blood + diluted α adrenergic
2. < 2 days: T shunt
3. > 3 days: T- shunt + Tunneling

T-Shunt

Adv: local anesthesia in the clinic
Only takes a few minutes, highly effective
Disadv: not effective in cavernosal edema or thrombosis

Step 2 (If necessary)

- T-Shunt + Tunneling

7 mm straight sound

Total: 16 patients/2.5 years
Follow up obtained in 10 patients

<table>
<thead>
<tr>
<th>Age</th>
<th>Duration</th>
<th>Failed Therapies</th>
<th>Detumescence</th>
<th>F/U</th>
<th>Potency</th>
<th>Time to Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TT Shunt (Bilateral Tunneling)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>14 days</td>
<td>Phenyl/Winters</td>
<td>P</td>
<td>21 mo.</td>
<td>40 %</td>
<td>3 mo.</td>
</tr>
<tr>
<td>55</td>
<td>4 days</td>
<td>Phenylephrine</td>
<td>P</td>
<td>11.2 mo.</td>
<td>90 %</td>
<td>4 mo.</td>
</tr>
<tr>
<td>54</td>
<td>2 days</td>
<td>Phenylephrine</td>
<td>C</td>
<td>19 mo.</td>
<td>95 %</td>
<td>4 mo.</td>
</tr>
<tr>
<td>32</td>
<td>3.5 days</td>
<td>Winters/Unilat. T</td>
<td>P</td>
<td>22 mo.</td>
<td>40 %</td>
<td>3 mo.</td>
</tr>
<tr>
<td>26</td>
<td>4 days</td>
<td>Phenylephrine</td>
<td>C</td>
<td>6.5 mo.</td>
<td>40 %</td>
<td>2 mo.</td>
</tr>
<tr>
<td>39</td>
<td>2.75 days</td>
<td>Phenyl/Winters</td>
<td>P</td>
<td>7.3 mo.</td>
<td>100 %</td>
<td>1.5 mo.</td>
</tr>
<tr>
<td><strong>T Shunt</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>1 day</td>
<td>Phenylephrine</td>
<td>C</td>
<td>0.3 mo.</td>
<td>90 %</td>
<td>0.25 mo.</td>
</tr>
<tr>
<td>52</td>
<td>1.5 days</td>
<td>Phenylephrine</td>
<td>C</td>
<td>5 mo.</td>
<td>100 %</td>
<td>1.5 mo.</td>
</tr>
<tr>
<td>44</td>
<td>2 days</td>
<td>Phenylephrine</td>
<td>C</td>
<td>10 mo.</td>
<td>95 %</td>
<td>3.5 mo.</td>
</tr>
<tr>
<td>32</td>
<td>2 days</td>
<td>Phenylephrine</td>
<td>C</td>
<td>4.5 mo.</td>
<td>100 %</td>
<td>5 mo.</td>
</tr>
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- If duration is over 3-4 days
- Failed to respond to other shunts
- No failure so far in 21 cases (duration: 2 days-2 weeks)
Patient with Sustained Erection

Ischemic “No Flow” Priapism

Evacuate old blood, dilute alpha agonists

Shunt Procedures

< 2 days: T Shunt
> 3 days: TT Shunt

Non-ischemic “High Flow” Priapism

Conservative Management

≤ 6 months:
Angioembolization
≥ 6 months:
Ligation of ruptured artery

History & Exam
+/- blood gas
+/- Doppler US

Non-ischemic (High flow) Priapism

• Cause -- blunt perineal or penile trauma.
• Onset -- delayed until nocturnal or sexual erection “blow out” the injured arterial wall.
• Vary from mild tumescence to almost full rigidity
• The erections are compressible(bendable) because venous channels are open.
• Pain is rare because the tissue is not ischemic.

Patient - bicycle trauma

• 47 y.o. man
• Normal pre-injury erectile function

Embolization

• Embolization of ruptured cavernous artery
• Impotent since embolization 2 years ago
Suture ligation of the ruptured artery

3-step approach

1. Conservative: watchful waiting, compressing, ice pack etc.
   The best: antiandrogen or GnRF agonist for 3-6 months

2. Angiographic embolization with coil or blood clots

3. Open suture ligation (only for cases of >5 months) with a well-defined capsule
   
But, 2 & 3 may no longer be necessary
**Stuttering Priapism**

- **Rx:** diluted $\alpha$ adrenergic agent
- **Prevention:**
  - GnRH agonist (e.g. Lupron x 6 mons)
  - Antiandrogen (Flutamide, Casodex)
  - baclofen (10-40 mg qhs)
  - ketoconazole (200 mg, qd)+ prednisone
  - Digoxin
  - PDE 5 inhibitor

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**Long-term oral phosphodiesterase 5 inhibitor therapy alleviates recurrent priapism.**

Small dose of PDE 5 inhibitor (Vagra 25 mg, cialis 5 mg) q am continuously for months.


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**Priapism Management: A refinement**

- **Ischemic priapism:**
  - When to intervene: ASAP
  - How to evaluate: detailed Hx, PE, blood gases, color ultrasound
  - How to Rx: diluted $\alpha$ adrenergic
  - If medical Rx fail then what?: T or TT shunt
- **Non-ischemic priapism**
  - When to intervene: not an emergency
  - How to Rx: androgen suppression

Prevention of stuttering priapism:
- Sickler: PDE5I
- Idiopathic: androgen suppression