Surgery for Priapism: Strategies for Optimizing Outcomes

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Surgery for Priapism: Strategies for Optimizing Outcomes

• **Objectives:**

  (Grade C recommendation)¹
  
  - Penile detumescence
  - Resolution of pain
  - To prevent chronic damage to the corpora cavernosa and subsequent ED
  - To prevent loss of penile length

• **Indication:**

  (Grade C recommendation)¹

  - Medical management failure
  - Aspiration/irrigation
  - Intracavernous injection of sympato- mimetic drugs

[Salonia et al. Eur Urol 2014 Feb; 65(2) 480-9]
Surgical options:

**Penile shunt** (Grade C recommendation) ¹

**Penile prosthesis:** (Grade B recommendation) ¹

- In cases of priapism presenting > 36 hours after onset
- In cases for which all interventions have failed
- Erectile dysfunction is inevitable

¹ Salonia et al. Eur Urol 2014 Feb; 65(2) 480-9
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**Penile shunts:** surgical passage to divert blood from the corpus cavernosum to the corpus spongiosum or to a blood vessel

**Corpus cavernosum to the corpus spongiosum**
- **Distal**
- **Proximal**
  - Al- Ghorab
  - Quackels
  - Sacher
  
  (Acta Urol Belg 1964; 32: 5.)
  (J Urol. 1972 Jul;108(1):97-100)

**Corpus cavernosum to vein**
- Corpora to saphenous vein
  - Greyhack (Invest Urol. 1964 Mar;1:509-13.)
- Corpora to dorsal vein of penis
  - Barry (J Urol. 1976 Dec;116(6):754-6.)

AUA guidelines: The distal cavernoglanular (corporo-glanular) shunt should be the first choice of shunting procedures, because it is the easiest to perform and has the fewest complications.

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• Percutaneous distal penile shunts
  – Advantages:
    • Office setting
    • Local/penile block
    • Technically easy
    • Ineffective in many cases

• Surgical distal penile shunts
  – Advantages:
    • Better control in high risk patients (HIV, Hep C)
    • Better success rate in prolonged cases of ischemic priapism
    • Ability to perform other maneuvers

(J Sex Med 2006;3:749–752)
28 patients who penile shunting
Mean age 44 years old

- 14 Winter shunt
  - 13 required reoperation
- 13 Al-Ghorab shunt
  - 1 required reoperation

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Placement of intracavernosal line
Saline infusion to maximize penile rigidity
Easier palpation of corporal tips
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Al Ghorab shunt

Snake technique
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Baseline

Positive Doppler signal

Squeeze
Materials and Methods:

28 patients ischemic priapism >4 hours that required a surgical shunt. Data, including etiology, duration and initial treatment measures, were retrospectively compiled. Follow up erectile function was assessed by clinical notes and a telephone survey using the International Index of Erectile Function.

Results:

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preserved erectile function</td>
<td>10</td>
</tr>
<tr>
<td>Partial erections</td>
<td>15</td>
</tr>
<tr>
<td>Severe ED</td>
<td>75</td>
</tr>
</tbody>
</table>
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Glans ischemias post Al-Ghorab shunt
Erectile function after priapism

Return to Functional Erections
With or without PDE's

Erectile Function Domain
With or without PDE's

Pathophysiology of ischemic priapism

Metabolic changes: Progressive hypoxia, hypercarbia and acidosis.\textsuperscript{1,2} Acidosis and hypoxia decreases erectile tissue contractility. \textsuperscript{3,4} Leading to perpetuation of corporal SM relaxation.\textsuperscript{3,4}

Histologic corporal changes:\textsuperscript{1,2}

12 hours: interstitial edema
> 24 : destruction of sinusoidal endothelium
        exposure of basement membrane
        thrombocyte adherence

48 hours: muscle muscle necrosis
          with fibroblast-like cell transformation

Reperfusion Injury (5-60 minutes after 3 hrs of ischemia)

Generates reactive oxygen species (ROS)
Increased in myeloperoxidase activity.
Increased lipid peroxidation

Penile prosthesis:  (Grade B recommendation) ¹

In cases of priapism presenting > 36 hours after onset
In cases for which all interventions have failed
Erectile dysfunction is inevitable


Multiple series with good outcomes and low complication rates

Most surgeons are more comfortable placing a malleable penile prosthesis than performing a penile shunt

¹ Surgery for Priapism: Strategies for Optimizing Outcomes
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Patients and methods
8 patients presenting with ischemic priapism (mean duration of 91 h)
All had failed conservative management with IC adrenergic agents
4 had undergone shunt procedures elsewhere.

Management consisted of placement of:
- Malleable prosthesis in 6/8
- Inflatable prosthesis in 2/8

Results
No complications except for 1 case of penile deformity caused by fibrosis
All patients were satisfied with the end result
7 having sexual intercourse.

Ress RW et al. BJU International. 2002,90,893–897
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METHODS:
50 patients with prolonged unresponsive to conventional treatment
Unsuccessful shunt surgery had been performed in 13 patients

RESULTS:
Median follow-up 15.7 mo (4–60 mo)
Malleable penile prosthesis 43
  Subsequent exchange of a MPP for IPP 6
Inflatable implant 7
Successful sexual intercourse 42
Prosthesis infection 6%
  Managed by explantation and delayed reinsertion.
Revision surgery 6
Penile pain or shortening 0
Overall satisfaction rate 96%.

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**OBJECTIVE:** To compare the long-term results of early (median 7 days) and delayed (median 5 months) insertion of a penile prosthesis (PP) in men with refractory ischemic priapism (IP).

<table>
<thead>
<tr>
<th></th>
<th>Early insertion group (n 68; MPP 64; IPP 4)</th>
<th>Delayed Insertion group (N 27; MPP 12; IPP 15)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection %</td>
<td>7</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Erosion %</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Penile curvature %</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Malfunction %</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Penile shortening</td>
<td>3</td>
<td>40</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Satisfaction %</td>
<td>96</td>
<td>60</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Revision rate %</td>
<td>9</td>
<td>27</td>
<td>&lt;0.03</td>
</tr>
</tbody>
</table>

Zacharakis E, e al. BJU Int. 2014 Oct;114(4):576-81
Penile MRI
Indications and limitations

METHODS
Single institution academic center
Correlation of T2-weighted gadolinium- enhanced MRI with CC biopsies in the same pts. The scans were reported by two dedicated uroradiologists
Graded the MR images as showing viable or nonviable erectile tissue.
One pathologist assessed the CC biopsies for necrosis.

RESULTS
Total patients with priapism and MRIs 38
Patients with a CC biopsy and MRI 23
Patients with MRIs but no biopsy c/w SM necrosis 10
Patients with viable SM and return of EF by MRI 5

Sensitivity of MRI in predicting nonviable smooth muscle 100%.

CONCLUSIONS: Penile MRI provides an accurate imaging method to assess smooth muscle viability in patients presenting with priapism.

Ralph et al. BJU Int. 2010 Dec;106(11):1714-8
Penile MRI
Indications and limitations

T2-weighted image after gadolinium, showing no enhancement

Patchy perfusion showing distal CC smooth muscle viability.

Segmental perfusion of the penis showing viable CC in 1 corpora and nonviable in the other.

Ralph et al. BJU Int. 2010 Dec;106(11):1714-8
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Methods. Retrospectively reviewed of patients receiving MPPs for refractory ischemic priapism (2007-2013)

Data analyzed included:
- Duration of erection
- # of ER visits
- Hospital admissions and days of hospitalization
- Postoperative course.
- Costs were estimated using standard Medicare reimbursement rates.

Results.

Men receiving MPPs: 14
Average duration of RIP: 82 hours
Health-care average cost: $83,818
Discharged within 24 hours of MPP: 100%

Conclusions. The management of RIP is associated with multiple ER visits, prolonged hospital admissions, and significant resource utilization. MPP insertion is efficacious for the immediate resolution of refractory priapism, with potential cost and resource benefits.

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- Limited data on penile shunt outcomes and complications
  Most publications are case reports, small series or technique papers

- Limited data, but larger series on penile prosthesis in the setting of refractory priapism

- Penile MRI provides an accurate assessment of smooth muscle viability in patients presenting with priapism

- Penile shunts.
  75% or more of patients developed permanent ED and loss of penile length
  Percutaneous shunts have a higher need for reoperation
  The distal penile shunts should be the first choice of shunting procedures, because it is the easiest to perform and has the fewest complications

- Penile prosthesis
  Effective, easy to place and are probably more cost effective than penile shunts
  Early PP implantation is technically easier, has less complications and allows greater preservation of penile length than delayed penile prosthesis placement in the setting of priapism induced corporal fibrosis
Corpus cavernosum to the corpus spongiosum
Proximal Penile Shunts

- Quackels (1964)
- If created distal, higher risk of urethral injury and ineffective shunt.


- Bilateral cavernosospongiosum shunts