Immediate penile prosthesis insertion after failed T shunt and snake maneuver in patient with prolonged priapism

Evangelos Zacharakis PhD, FRCS, FECSM, FEAA

Consultant Urological Surgeon
St Peter’s Andrology Centre of London
Priapism – A medical emergency

- Prolonged penile erection in the absence of sexual stimulation and persists despite orgasm.

- Traditionally use 4 Hour time period* but not evidence based.

*Report of AFUD Goldstein et al 2002
Pathophysiology

- Prolonged veno-occlusion
  - Cavernosal smooth muscle anoxia
  - Failure of smooth muscle contraction
  - Persistent erection
  - Continual anoxia
  - Smooth muscle necrosis
  - Cavernosal fibrosis
Histological changes during low flow priapism

- <12 hours: minimal trabecular oedema
- 24-48 hours: widespread endothelial destruction
- >48 hours total endothelial denudation, smooth muscle necrosis, fibrosis of trabeculae, smooth muscle cell transformation.

Spycher and Hauri J Urol 1986
Diagnosis

• Examination
  • Tender bruised penis

• Cavernosal blood gases
  • Dark blood
  • ↓ pH, ↓ pO₂, ↓ pCO₂
Diagnosis

- **Penile Doppler**
  - Low flow

- **MRI penis**
  - T1 and T2 images
  - No signal from corpora
• n=38
• MRI and corpus cavernosum biopsy
• 100% sensitivity MRI : Cavernosal necrosis

Ralph DJ, Minhas S, Muneer A et al
BJU Int. 2010
Initial management

- Exercise

- Needle Aspiration

- Intracorporal Instillation of adrenergic agonist
  - Phenylephrine 500-1000μgr

- Shunt surgery
Shunt Surgery

• Grayhack 1964 : Caverno-saphenous
• Quakles 1964 : Caverno-spongiosal
• Ebbehoj 1974: Scalpel 90°
• Winter 1976 : Trucut needle
• Al-Ghorab 1981 : Excision of tunica albuginea
• Lue 2008 : T-shunt
• Burnett 2009 : Snake procedure
Distal Shunt Surgery

Burnett 2009
Snake procedure
T shunt and snake maneuver using an 8 Hegar dilator and cavernosal muscle biopsy
Over a 36 month period 45 patients presented with ischaemic priapism. The mean age was 40.2 years

### Aetiology

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>No of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>sickle cell disease</td>
<td>n=10</td>
</tr>
<tr>
<td>idiopathic</td>
<td>n=22</td>
</tr>
<tr>
<td>antipsychotic agents</td>
<td>n=10</td>
</tr>
<tr>
<td>PDE5 inhibitors</td>
<td>n=3</td>
</tr>
</tbody>
</table>

### Duration of priapism (hrs) Median duration No of patients

<table>
<thead>
<tr>
<th>Duration of priapism (hrs)</th>
<th>Median duration</th>
<th>No of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;12</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>12-24</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>24-36</td>
<td>32.5</td>
<td>6</td>
</tr>
<tr>
<td>36-48</td>
<td>45.2</td>
<td>5</td>
</tr>
<tr>
<td>&gt;48 (range 48-168)</td>
<td>96</td>
<td>28</td>
</tr>
</tbody>
</table>
Case Series with T shunt procedure and intracavernous tunnelling for the management of the ischaemic priapism

![Success rate of the T shunt and 'snake' manoeuvre](image)

<table>
<thead>
<tr>
<th>Time (hrs)</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>12hrs</td>
<td>100%</td>
</tr>
<tr>
<td>24hrs</td>
<td>92.50%</td>
</tr>
<tr>
<td>36hrs</td>
<td>44%</td>
</tr>
<tr>
<td>48hrs</td>
<td>34%</td>
</tr>
<tr>
<td>60hrs</td>
<td>30%</td>
</tr>
<tr>
<td>72hrs</td>
<td>30%</td>
</tr>
<tr>
<td>84hrs</td>
<td>17%</td>
</tr>
<tr>
<td>96hrs</td>
<td>0%</td>
</tr>
<tr>
<td>&gt; 96hrs</td>
<td>0%</td>
</tr>
</tbody>
</table>
Case Series with T shunt procedure and intracavernous tunnelling for the management of the ischaemic priapism

All patients with duration of priapism > 48 hours had extensive necrosis and fibrosis of their cavernosal smooth muscle.
Case Series with T shunt procedure and intracavernous tunnelling for the management of the ischaemic priapism

The average IIEF-5 score in all of the patients preoperatively was 24. After a median follow-up of 6 months, the IIEF-5 score was 7.7.

The severity of erectile dysfunction was significantly correlated to the duration of priapism (p<0.0005) with all patients developing severe ED when the duration was >48hrs.
### Results of T shunt

<table>
<thead>
<tr>
<th>Study</th>
<th>No of patients</th>
<th>Duration of priapism</th>
<th>Success rate of T shunt</th>
<th>Postop ED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnett et al J Urol 2013; 189: 1025</td>
<td>10</td>
<td>60</td>
<td>80%</td>
<td>40%</td>
</tr>
<tr>
<td>Lue et al J Urol 2009; 181:1699</td>
<td>13</td>
<td>64</td>
<td>92%</td>
<td>38%</td>
</tr>
<tr>
<td>Zacharakis, Ralph et al J Urol 2014</td>
<td>45</td>
<td>96</td>
<td>64%</td>
<td>93%</td>
</tr>
</tbody>
</table>
Immediate prosthesis insertion

- N=50
- Malleable (43), inflatable (7)
- Median follow up 15.7 months
- Satisfaction rate 96%

*Ralph, Garaffa, Muneer et al, Eur Urol 2008*
Early insertion of a malleable penile prosthesis

- N=10 patients
- median upsize in exchange of 1 cm in either one or both corporal bodies (range 0–3 cm)
- N=5 patients had deliberate downsizing at the initial operation owing to a previous shunt.
- 3 months after the initial insertion satisfaction rate was 80%.
- 3 months after the exchange the satisfaction rate increased to 90%

group S, patients that had undergone a distal shunt procedure

<table>
<thead>
<tr>
<th>Patient</th>
<th>Right corporal cylinder 1st operation</th>
<th>Right corporal cylinder at exchange</th>
<th>Right length gained</th>
<th>Left corporal cylinder 1st operation</th>
<th>Left corporal cylinder at exchange</th>
<th>Left length gained</th>
<th>Shunt procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19</td>
<td>19</td>
<td>0</td>
<td>18</td>
<td>19</td>
<td>1</td>
<td>Winter</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
<td>23</td>
<td>2</td>
<td>21</td>
<td>23</td>
<td>2</td>
<td>Winter T Shunt+ Snake Maneuver</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>21</td>
<td>3</td>
<td>19</td>
<td>21</td>
<td>2</td>
<td>Winter T Shunt+ Snake Maneuver</td>
</tr>
<tr>
<td>7</td>
<td>22</td>
<td>23</td>
<td>1</td>
<td>22</td>
<td>23</td>
<td>1</td>
<td>T Shunt+ Snake Maneuver</td>
</tr>
<tr>
<td>9</td>
<td>20</td>
<td>22</td>
<td>2</td>
<td>20</td>
<td>22</td>
<td>2</td>
<td>T Shunt+ Snake Maneuver</td>
</tr>
<tr>
<td>median</td>
<td>20</td>
<td>21.6</td>
<td>1.6</td>
<td>21.6</td>
<td>1.6</td>
<td>1.6</td>
<td></td>
</tr>
</tbody>
</table>
group NS, patients that had not undergone a distal shunt procedure

<table>
<thead>
<tr>
<th>Patient</th>
<th>Right corporal cylinder 1st operation</th>
<th>Right corporal cylinder at exchange</th>
<th>Right length gained</th>
<th>Left corporal cylinder 1st operation</th>
<th>Left corporal cylinder at exchange</th>
<th>Left length gained</th>
<th>Shunt procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>21</td>
<td>22</td>
<td>1</td>
<td>20</td>
<td>22</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
<td>23</td>
<td>1</td>
<td>22</td>
<td>23</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>22</td>
<td>1</td>
<td>21</td>
<td>22</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>23</td>
<td>23</td>
<td>0</td>
<td>22</td>
<td>23</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>21</td>
<td>22</td>
<td>1</td>
<td>21</td>
<td>22</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>median</td>
<td>21.6</td>
<td>22.4</td>
<td>0.8</td>
<td>21.2</td>
<td>22.4</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Penile prosthesis in patients with ischaemic priapism
n=95 pts

Group1
Immediate insertion
n=68 pts
- Malleable prosthesis
  n=64
  Median time of priapism 171 hrs (range 24-408)
  Mean age 42 yrs
- Inflatable prosthesis
  n=4

Group2
Delayed insertion
n=27 pts
- Malleable prosthesis
  n=12
- Inflatable prosthesis
  n=15
  Median time of priapism 5 months (range 2-14)
  Mean age 54 yrs

Zacharakis, Ralph et al BJU Int 2014
Corporotomy

A Dream

A Nightmare
Dilatation

“Straightforward”

“Impossible”
Complication rate of penile implantation in both groups of patients

<table>
<thead>
<tr>
<th>Group</th>
<th>Infection</th>
<th>Erosion</th>
<th>Penile Curvature</th>
<th>Malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>7%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Delayed</td>
<td>19%</td>
<td>4%</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

The outcome of surgery in each group

<table>
<thead>
<tr>
<th></th>
<th>Group 1 Early</th>
<th>Group 2 Delayed</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penile shortening</td>
<td>3%</td>
<td>40%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>96%</td>
<td>60%</td>
<td>&lt;0.0004</td>
</tr>
<tr>
<td>Revision rate</td>
<td>9%</td>
<td>27%</td>
<td>&lt;0.03</td>
</tr>
</tbody>
</table>

Zacharakis, Ralph et al BJU Int 2014
Management algorithm for acute ischemic priapism

Aspiration

Intracavernous inj of sympathicomimetics

<36h

Distal corpoglandular shunt

Distal corpoglandular shunt with Corporal cannulation

>72h

Penile prosthesis

Burnett J Sex Med 2012;9:114–120
ISCHEMIC PRIAPISM

- History, FBC, auto-immune & haemoglobinopathy screening, corporal blood gas, penile duplex and MRI penis

Aspiration, corporal washout, phenylephrine

- < 48hrs
- 48-72 hrs
- > 72 hrs

- T shunt and Snake manoeuvre, corporal washouts with smooth muscle biopsy
- If MRI and penile duplex shows perfusion
- If MRI and penile duplex shows No perfusion

- Recommend early penile implant insertion

- If shunt procedures unsuccessful or biopsy demonstrates necrosis plan for insertion of implant at least 3 weeks later

Idiopathic priapism requires chest X-ray and CT Abdomen and Pelvis

Zacharakis, Ralph et al BJU Int 2014
Take home message…

Patients with refractory ischemic priapism should be offered immediate implantation of a penile prosthesis as this:

• Treats the initial condition
• Preserves penile length
• Superior functional results and satisfaction rate