# Priapism

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### Keywords:

Priapism, Erection, Aspiration, Corporal Body, Injection

## Common Case Presentation

46-year-old male with a **painful erection** in the emergency department.

Please refer to AUA guidelines: **Priapism**[1]

## I. Receiving the phone call and initial thoughts

a. **How long has the erection been present?**
   An erection lasting longer than 4 hours beyond sexual stimulation or unrelated to sexual stimulation, priapism is the likely diagnosis
b. **Is it painful?**
   Ischemic priapism (veno-occlusive, low flow) is painful while non-ischemic priapism (arterial, high flow) is usually painless
c. **Did the patient take any medications for erectile dysfunction or any medicines at all?**
   Often priapism is secondary to medications
d. **Has this happened before?**
   Could be stuttering (recurrent) priapism
e. **Has there been any trauma to the penis?**
   Non-ischemic (high flow) priapism, is usually secondary to a straddle injury
f. **Any history of blood dyscrasias (sickle cell disease or trait, thalassemia)?**
   These greatly increase the risk of ischemic priapism
g. **Any history of cancer?**
   Invasion of the corpora can lead to malignant priapism
h. **Does the patient have history of prior urological surgery?**
   Indwelling penile prosthesis maybe misdiagnosed as priapism

## II. Etiology

See Reference: 2

a. Ischemic (low-flow or veno-occlusive) is the most common form of priapism, accounting for >95% of all episodes.2 Non-ischemic (high-flow or arterial) priapism is usually caused by blunt perineal trauma. Stuttering Priapism is recurrent priapism over long period of time, typically non-resolving morning erections
b. **Medications**
    i. α-Adrenergic Receptor Antagonists
        1. Prazosin, terazosin, doxazosin, tamsulosin
    ii. Antianxiety Agents
        1. Hydroxyzine
    iii. Anticoagulants
        1. Heparin, warfarin
    iv. Antidepressants and Antipsychotics
        1. Trazodone, bupropion, fluoxetine, sertraline, lithium, clozapine, resperidone, olazapine, chlorpromazine, thoridazine, phenothaizines
    v. Antihypertensives
        1. Hydralazine, guanethidine, propanolol
    vi. Drugs (Recreational)
        1. Alcohol, cocaine (intranasal and topical), crack cocaine, marijuana
    vii. Erectile Agents
        1. Papaverine, phentolamine, prostaglandin E1, oral phosphodiesterase
c. **Blood dyscrasia**
    i. Sickle cell disease/trait, thalassemia, granulocytic leukemia, myeloid, leukemia, lymphocytic leukemia, multiple myeloma, hemoglobin Olmsted variant, hemodialysis, glucose 6-phosphate dehydrogenase deficiency
d. **Malignant infiltration (metastatic or regional infiltration)**
    i. Prostate, urethra, testis, bladder, rectal, lung, kidney
e. **Total Parenteral nutrition**
    i. Fat emboli
f. **IV contrast (related to hyper-osmolar iodinated contrast, very rare now with iso-osmolar contrast)**
g. **Neurogenic**
    i. Spinal cord injury
    ii. Cauda equina compression/syndrome
    iii. Spinal anesthesia
    iv. Disk herniation
    v. Spinal stenosis
    vi. Stroke
    vii. Brain tumors

h. **Hormonal**
    i. Testosterone
    ii. Gonadotropin-releasing hormone
i. **Metabolic Disease**
    i. Amyloidosis
    ii. Fabray Disease
    iii. Gout
    iv. Glucose 6-phosphate dehydrogenase deficiency
j. **Toxin Mediated**
    i. Malaria
    ii. Scorpion sting or spider bite
k. **Trauma/Iatrogenic**
    i. Straddle injury, coital injury (more likely to be non-ischemic priapism)
    ii. Arteriovenous or arteriocavernous bypass surgery
    iii. Urinary retention

# III. Evaluation

a. **Physical Exam**
    i. Rigid and tender corpora cavernosa with soft glans is pathognomonic for ischemic priapism
    ii. Often exquisitely tender
    iii. Partially erect non-tender with soft glans is indicative of non-ischemic
b. **Laboratory Data**
    i. CBC, WBC with blood cell differential, platelet count and coagulation profile
    ii. Cavernosal blood gas will accurately diagnose ischemic vs non-ischemic priapism. The cavernosal blood gas is obtained by placing a 22g needle directly into the corpora and aspirating into a ABG syringe
    iii. If the blood aspirated is dark, ischemic priapism is likely, and treatment should NOT be delayed for the results of the blood gas. Treatment should commence immediately
    iv. See Table 1
c. **Imaging**
    i. **Do not delay intervention to obtain imaging**
        1. The diagnosis can be made with history and exam and early intervention is critical to recovery of erectile function
    ii. Doppler ultrasound of the penis and perineum
        1. Will show no or minimal flow in the cavernosal artery for ischemic priapism
        2. Non-ischemic priapism will demonstrate good flow in the corpora
    iii. Arteriogram is the gold standard study to diagnose *non-ischemic* priapism, but is often not necessary

iv. MRI can access smooth muscle viability, malignant infiltration and cavernosal thrombosis

**Table 1**

| Cavernosal blood gas | p02 | p CO2 | pH |
|---|---|---|---|
| Ischemic | <30 | >60 | <7.25 |
| Non-Ischemic | >90 | <40 | 7.40 |
| Normal mixed venous blood | 40 | 50 | 7.35 |

# IV. Management

See References: 3,4

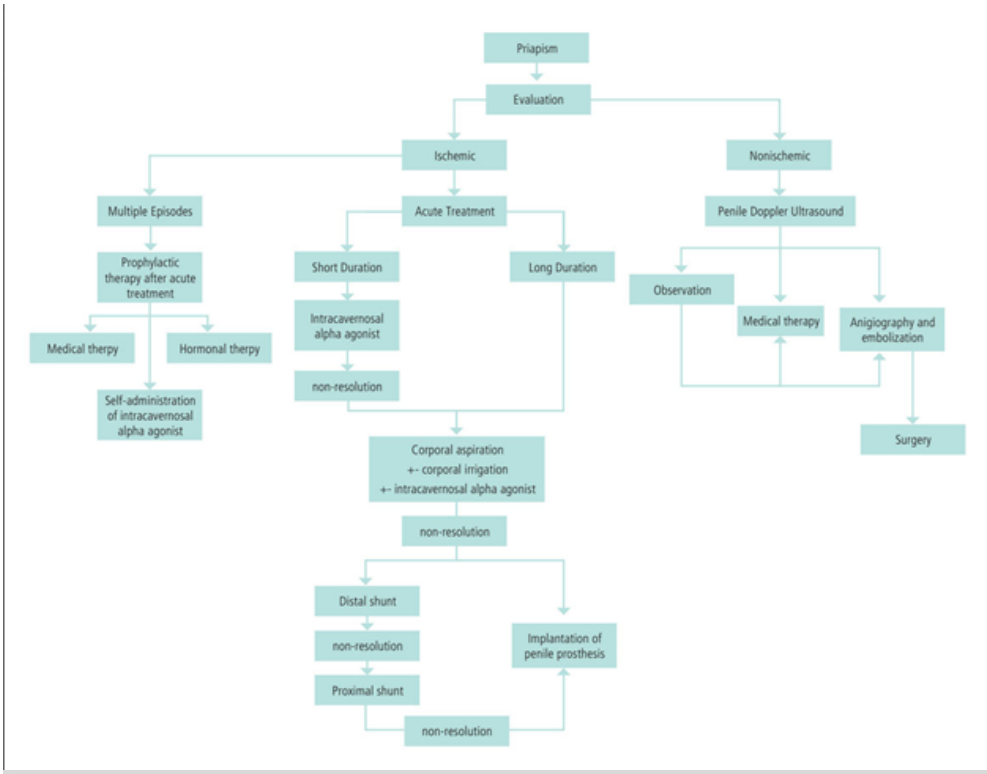


Figure 1: Report of the American Foundation for Urologic Disease (AFUD) Thought Leader Panel for evaluation and treatment of priapism. [5]

See **Update Series (2016) Lesson: 16 Management of Priapism**

See **AUA Guideline Management of Priapism (2010)**

a. **Immediate intervention** is warranted for ischemic priapism as it is a urologic emergency
    i. The most common complication of priapism is ED. Goal is to reduce the priapism and therefore return oxygenated blood to the corpora
    ii. Following reversal of priapism, mild penile tumescence may exist rather than complete flaccidity
    iii. Ischemic priapism can evolve into non-ischemic priapism, especially after a cavernoglanular or proximal shunt
    iv. In cases where the examination may be equivocal, color Doppler ultrasonography or cavernous blood gas is recommended resolution of ischemia
    v. Priapism related to **spinal cord injury, while it is ischemic, it is usually self-limited**. If the priapism does not resolve after 4 hours, treat it as a standard ischemic priapism
    vi. Please see below for detailed ischemic priapism management paradigm
b. **Non-ischemic priapism is not an emergency and is self-limited in 60% of cases**[6]
    i. Observation

ii. If it does not resolve, angiography with embolization is the next step of treatment
iii. Persistent high flow priapism is treated with surgical ligation of AV fistula[7]

c. **If related to Sickle Cell Disease or Trait, the following things should be done in addition to standard treatment**
   i. IV hydration and alkalization with sodium bicarbonate
   ii. Pain control
   iii. Supplemental oxygen
d. **Oral therap**y is not effective and **no longer recommended**
e. **Stuttering Priapism**
   i. Manage the prolonged erections in the same way as ischemic priapism
   ii. Long-term treatment aimed at preventing future episodes[8]
      1. Daily α-adrenergics
      2. Daily PDE5 inhibitors
      3. GnRH agonists
      4. Home administration of phenylephrine

# V. Ischemic priapism treatment paradigm

See Reference: 9

a. **Immediately put patient on telemetry to monitor blood pressure, pulse and cardiac rhythm**
   i. View **T-shunt for Priapism step-by-step** on YouTube
b. **Medication**
   i. Phenylephrine diluted in saline 100-500 µg/mL and given in 1 mL dosages every 3-5 mintues over the course of an hour
   ii. **Verify the correct concentration an amount with the pharmacist; incorrect dosing can be fatal**
   iii. 1% Plain Lidocaine (20mL)
   iv. 500 mL **injectable** saline (NOT irrigation saline or sterile water)
   v. Administration of α-adrenergic agonists is contraindicated in patients who have malignant or poorly controlled hypertension or are concurrently using monoamine oxidase inhibitors
c. **Aspiration set up**
   i. 16g angiocatheters for placing into the corpora
   ii. 5mL syringes (for the phenylephrine)
   iii. 10 mL syringes (for the lidocaine)
   iv. 20mL syringes (for injectable saline)
      1. ** by strictly using these syringes for these solutions, you will know what is in each syringe
      2. The mnemonic “Big is Benign” refers to the size of syringe and the danger of its contents

v. 18g needles for drawing up solutions
vi. Arterial Blood Gas syringe (for obtaining a cavernosal blood gas)
vii. 25g needles for penile block
viii. Sterile basin
ix. 3 pack towels
x. Betadine prep
xi. 4x4 gauze
xii. 2-inch Coban dressing
xiii. 500 ml injectable saline
xiv. 30 ml 1% lidocaine

d. **Prep and drape the penis in a sterile fashion**
e. **Perform a penile block with 1% plain lidocaine**
f. **Corporal aspiration and irrigation**
    i. Place a 18g angiocatheter into the mid-penile shaft at 3 or 9 o'clock to avoid piercing the dorsal neurovascular bundle
    ii. Remove the needle leaving the angiocatheter in place
    iii. Use the 20cc syringe to aspirate the corpora repeatedly until bright red blood is returned
    iv. Compress the corpora to help express the dark blood
    v. Alternate aspirations with injecting saline
g. **If corporal aspiration and irrigation fail, proceed to phenylephrine injection**
    i. Verify the patient is on telemetry and the vitals can be monitored
        1. Serial monitoring of blood pressure and pulse should be performed during and immediately following intracavernous injection of sympathomimetic drugs
        2. Potential side effects of intracavernous sympathomimetics include headache, dizziness, hypertension, reflex bradycardia, tachycardia, and irregular cardiac rhythms
    ii. Prepare a two 5mL syringes that contain a solution of 100-500 µg phenylephrine/mL
    iii. Inject 0.5 - 1 mL of solution into the corpora every 3-5 minutes until detumescence is achieved
        1. Follow each injection with a saline injection flush the medication into the corpora
        2. Continue to irrigate and aspirate corpora in between medication dosages
        3. Monitor vitals and heart rhythm after each injection
    iv. If detumescence occurs, dress the penis with gauze and then the Coban dressing, the Coban will apply pressure to the injection site
        1. Monitor patient on telemetry for at least 1 hour, observe for recurrence of erection
        2. A penile hematoma will invariable occur
    v. If detumescence is not achieved after approximately one hour or after injection of the entire 1mg of phenylephrine, proceed with shunting

# VI. Corporal Shunting: If priapism fails to respond to corporal

## irrigation and/or phenylephrine within one hour, shunting is recommended

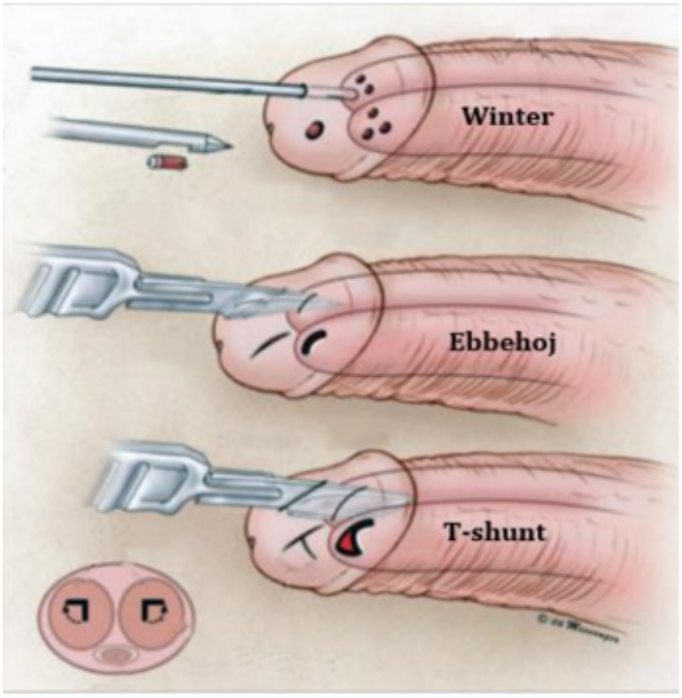


Figure 2: G.A. Broderick, A. Kadioglu, T.J. Bivalacqua, H. Ghanem, A. Nehra, R. ShamloulPriapism: pathogenesis, epidemiology, and management J Sex Med, 7 (2010), pp. 476-500

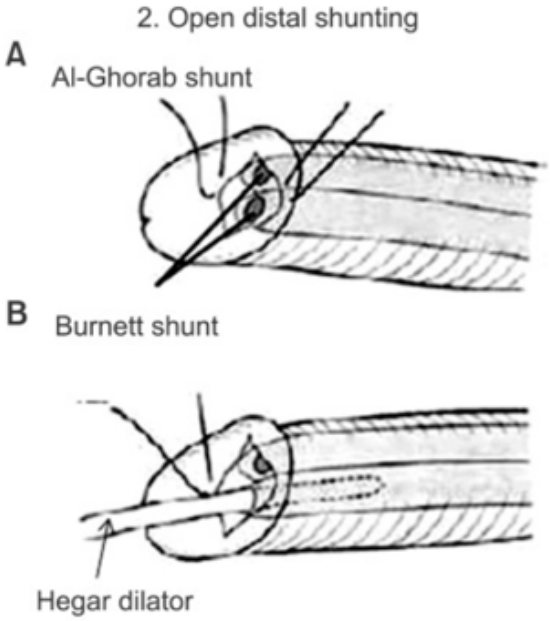


Figure 3: Shigehara K, Namiki M. Clinical Management of Priapism: A Review. The World Journal of Men's Health. 2016 Apr;34(1):1-8. DOI: 10.5534/wjmh.2016.34.1.1. PMID: 27169123;

PMCID: PMC4853765.

See Reference: 9, 10

a. **First a distal shunt is attempted, if that fails, perform another distal shunt or proceed to proximal shunt**
b. **Distal shunts (corporal-glandular shunts)**
    i. Percutaneous distal shunts
        1. Winter shunt: a Tru-cut biopsy needle is inserted into the glans and through the corpora. Several cores between the distal corpora and the glans are excised
        2. Ebbehoj shunt: stab incision with an 11 blade in the glans and into the distal corpora, rotate the blade to create a communication between the corpora and the glans
        3. T Shunt: Modified Ebbehoj using #10 blade scalpel and turning scalpel 90° when pulling out creating 'T-shaped' openings in tunica albugenia
        4. See Figure 2[11]
    ii. Open distal shunts
        1. Al-Ghorab shunt: transverse incision is made in the dorsal glans penis just distal to the coronal sulcus. Through this incision, the distal portion of tunica albuginea is excised from each corpus
        2. Burnett Snake Maneuver:[12] a 7/8 Hegar dilator is used to cannulate the corpora cavernosa bilaterally through the amputated distal tips of the corpora. The dilator is passed to the proximal limit of the corpora repeatedly until oxygenated blood is seen
        3. See Figure 3[13]
c. **Proximal shunts (Proximal shunts have a higher rate of erectile dysfunction than distal shunts)**[14]
    i. Barry shunt (corporo-deep dorsal venous shunt)[15]: anastomosis of a proximal corporotomy to the ipsilateral deep dorsal vein of the penis
    ii. Quackel's shunt (corporal-spongiosum shunt): through a perineal incision, the corpus spongiosum and corpus cavernosum are incised and anastomosed to one another. The shunt should be performed as proximal as possible to minimize risk of urethral fistula
    iii. Grayhack shunt (corporal-saphenous): the saphenous vein is anastomosed to the corpus cavernosum at the base of the penis

# VII. If this management paradigm fails, some have suggested performing immediate penile prosthesis implantation

See Reference: 16

a. **Delayed prosthesis implantation can be made more difficult by corporal fibrosis and**

**penile shortening associated with refractory ischemic priapism**

# VIII. Complications

a. **Even with a penile block, treatment of priapism is a painful procedure, and this should be discussed**
b. **Phenylephrine is a dangerous medication**
    i. Serial monitoring of blood pressure, pulse, and cardiac rhythm should be performed during and following injection of phenylephrine
    ii. Potential side effects of sympathomimetics include headache, dizziness, hypertension, reflex bradycardia, tachycardia, and irregular cardiac rhythms
c. **Natural history of untreated or treatment refractory ischemic priapism is severe fibrosis, penile length loss, and complete erectile dysfunction**
    i. Erectile function outcomes decline significantly when ischemic priapism has lasted longer than 24 hours
    ii. Complete erectile dysfunction is all but certain if ischemic priapism persists for longer than 36 hours
d. **After shunting, follow up with the patient on erectile function and any subsequent ED therapies**

# Key Takeaways

Ischemic priapism is a urological emergency

Phenylephrine can be a dangerous medication. Use with caution and ensure it is correctly dosed

Ensure patients with blood dyscarias are being treated with IV hydration, supplemental oxygen

# Videos

Bedside Priapism Reduction

Priapism Al-Ghorab Shunt

Evidence-Based Guideline for Management of Priapism: Perspectives from AUA/EAU Guideline Panel

# Presentations

Priapism Presentation 1

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