

## Post Surgical Shunting Related Hypermia Status Mimic Ischemic Priapism: A Case Report with Review of Literature

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### ABSTRACT

Priapism is a rare but time-sensitive emergency that requires immediate intervention to prevent corporeal hypoxia-related tissue ischemia. The duration of priapism is an important factor in determining the appropriate surgical intervention options. Options include aspiration, injection with alpha-adrenergic agents, surgical shunting, tunneling, and penile prosthesis. However, post-operative refractory priapism hyperemia can mimic ischemic priapism, making it difficult to determine the need for further intervention. We presented the case to investigate the occurrence of post-operative refractory priapism hyperemia and its potential mimicry of ischemic priapism. Confirmatory examinations, such as corporeal blood gas analysis and color doppler ultrasound, are recommended prior to repeat surgical intervention to prevent unnecessary procedures and to ensure proper management of the condition.

**Keywords:** Refractory ischemic priapism; Priapism hyperemia

### INTRODUCTION

Priapism is a prolonged and painful erection lasting longer than 4 hours, occurring without any sexual desire or stimulation. It is classified into three types: ischemic(low flow), non-ischemic(high flow) and stuttering(recurrent).<sup>[1,2]</sup> Its incidence is 0.9 cases per 100,000 person-years.<sup>[3]</sup> Ischemic priapism is more common and is caused by a decrease in venous outflow and vascular stasis. It is also an emergency that requires immediate treatment to prevent corporeal hypoxia related tissue ischemia and permanent erectile dysfunction.

The initial presentation of priapism usually happens in the emergency department, and immediate intervention is suggested after diagnosis. Factors such as embarrassment can lead to delays in initial treatment. It is important to explore the patient's history of priapism episodes, including baseline erectile function, duration of erection, pain level, previous priapism history with or without treatment, trauma history, malignancy history, and medication history.<sup>[4]</sup>

The most common way to the diagnosis of acute ischemic, non-ischemic or stuttering priapism is through a corporeal blood gas analysis. Ischemic priapism typically present with PO<sub>2</sub> level less than 30mmHg, PCO<sub>2</sub> level above than 60mmHg and PH level less than 7.25.<sup>[5]</sup> If conservative treatment such as aspiration of old blood and injection of diluted alpha-adrenergic agents fail, more invasive intervention may be necessary to prevent ischemic damage. The American Urological Association (AUA) and European Association of Urology guidelines on priapism state surgical intervention is not considered as a first line treatment and is done after non-surgical treatment have failed.<sup>[2,6]</sup> Intracavernosal injection is less effective for priapism lasting more than 48 hours because of ischemia and acidosis related impairment and also has a lower success resolution beyond 72 hours.

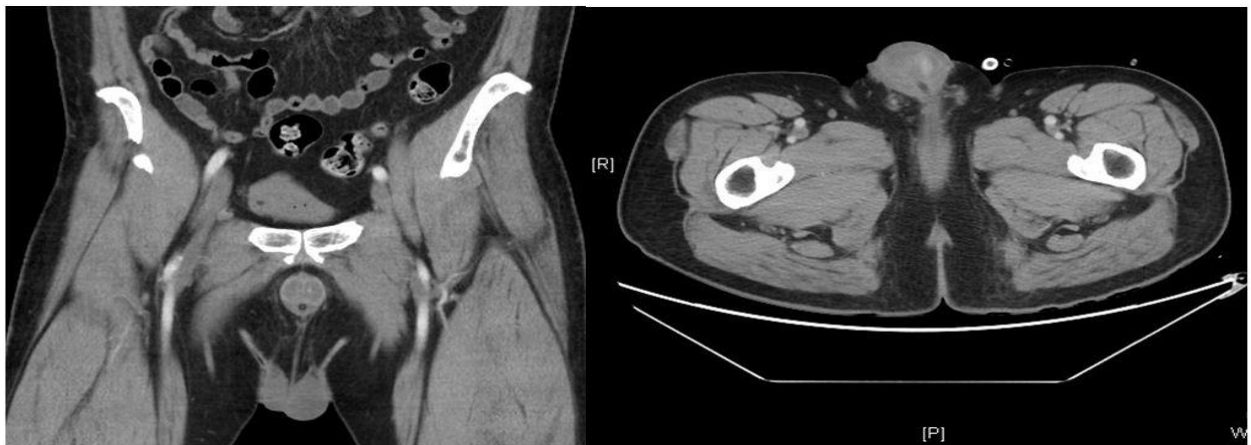
The optimal treatment of shunting for acute ischemic priapism is not well defined, but distal corporoglanular shunt may relieve the corpora compartment syndrome.<sup>[7]</sup> If it fails, corporeal tunneling may be done to evacuate ischemic blood clots and re-establish blood flow. In this paper, a case of ischemic priapism with persistent hyperemia following shunting is reported. A vascular study of penile duplex doppler ultrasonography confirmed intracorporeal arterial blood flow and no evidence of ischemic status, but mimicking ischemic priapism was present. The current literature is reviewed to explore further evaluation and treatment options for post-shunt hyperemia.

### **CASE PRESENTATION**

A 43-year-old unmarried male presented to the emergency department complaining of a persistent erection of the penis for more than 20 hours, with no reported trauma or sexual stimulation and no mention of drugs use. His medical history revealed that he had experienced similar self-limited episodes several years ago.

During the physical examination, his genitalia showed a fully erected penis without discoloration or pallor. A corporeal blood gas analysis showed pH 6.33, pCO<sub>2</sub> 94.4 mmHg, PO<sub>2</sub> 9.6 mmHg, indicating that ischemic priapism was highly suspected due to acidosis with hypoxemia and hypercapnia. Therefore, the patient underwent an intracavernous aspiration and injection of diluted epinephrine into the corpora cavernosum under intensive blood pressure and EKG monitoring. Despite this, his priapism persisted. The patient then underwent a Winter's shunt procedure for drainage and biopsy of corpus cavernosum and T-shunt procedure. His priapism subsequently resolved, and the corporeal blood gas analysis returned to normal. Besides, anti-coagulation medication of aspirin and clopidogrel were prescribed after procedure.

However, four hours later, the patient's penis became erect again and there was bleeding from the surgical wound. A corporeal blood gas analysis revealed acidosis with hypoxemia and hypercapnia. An emergent procedure of snake maneuver for tunneling was performed through the transglanular corporeal incision to the base of the penis to drain out the dark ischemic blood with blood clots. Through persisted hyperemia, the blood gas analysis returned to normal range. The patient underwent CT scans of abdomen and pelvis (Figure 1), which revealed no evidence of tumors and contrast pooling over corpus cavernosum, and color duplex ultrasonography of the penis was performed, which showed intracorporeal arterial blood flow. (Figure 2) No further episodes of priapism occurred, and the patient was discharged the following day.



**Figure 1:** Priapism post shunt procedure. Focal contrast pooling at left corpus cavernosum



**Figure 2:** Color duplex ultrasonography of the penis showed intracorporeal arterial blood flow on post-op refractory priapism hyperemia status.

## DISCUSSION

Priapism is a rare but challenging condition that requires time-sensitive management. The duration of ischemia time is an important factor in the development of corporeal ischemia and fibrosis, which can lead to permanent erectile dysfunction due to impaired venous outflow. History taking and physical examination are also important in assessing the cause of priapism. The risk factors include penile trauma, prior episode, recreational drugs, hematological disease or malignancy.<sup>[4,8]</sup>

In this case, the patient had a self-limiting episode of priapism several years ago. According to the American Urological Association (AUA) and European Association of Urology, the treatment of priapism depends on the type of priapism.<sup>[2,6]</sup> The first-line treatment for acute ischemic priapism is aspiration of blood from the corpora cavernosa, followed by injection of an alpha-agonist agent. This usually resolves the condition. However, if treatment fails and there is acidemia in the corporeal blood gas, Winter's shunting should be performed to create a channel or fistula that allows the deoxygenated blood to drain from the corpora cavernosa. Unfortunately, our

patient's priapism persisted after four hours of surgery, which required a repeat of the distal shunting of transgranular T-shunt. After the procedure, the corporeal blood gas analysis returned to normal although the glans hyperemia persisted. Additionally, normal blood flow was observed on color duplex ultrasonography and CT scans of the abdomen and pelvis revealed contrast pooling over corpus cavernosum.

Ischemic priapism occurs when there is a decrease in venous outflow and vascular stasis, leading to a penile compartment syndrome. Prolonged ischemic time can cause irreversible damage to the corporeal smooth muscle and erectile tissue. If corpora ischemia lasts less than 12 hours, there is typically interstitial edema and erectile function may recover. The effect of endothelium destruction and erectile dysfunction increases with time. However, if ischemia persisted for more than 36 hours, the corporeal smooth muscle undergoes necrosis with fibroblast-like cell transformation.

Conservative treatments are considered the first choice in ischemic priapism management. A systemic review was conducted and P. Capogrosso et al. described a success rate of 70-100% with intracavernosal sympathomimetic injection along with corporeal aspiration.<sup>[9]</sup> From the literature, a distal cavernoglanular shunt procedure may be performed if first-line treatment fails. If priapism persisted, distal shunt plus corporeal tunneling may be recommended. U. Milenkovic et al described a success rate of 77.7 -100% for ischemic priapism lasting less than 36 hours with Winter's shunt, and a success rate of 70% with T shunt for ischemic priapism lasting 48-96 hours.<sup>[7]</sup> Additionally, erectile dysfunction is associated with the duration of ischemic priapism.

If there is refractory erection hyperemia following shunting, further intervention may be necessary. Nixon et al. studied 28 men who underwent shunt procedure and 12 patients required a second shunt procedure.<sup>[10]</sup> According to AUA guidelines, confirmatory examination should be performed to assess penile hemodynamic characteristics. Cavernosal blood gas analysis and penile doppler ultrasonography should be performed before further intervention.<sup>[6]</sup> In our case, the patient had refractory erection hyperemia following shunting but presence of blood flow from doppler ultrasonography. Reed-Maldonado et al. described reactive hyperemia after successful shunting procedure in response to the extended hypoxic and acidosis state.<sup>[11]</sup> The hyperemia condition may be painless. Once the shunt closed, the hyperemia status subsided.

## CONCLUSION

Surgical options should be considered based on the duration of ischemia and the patient's preferences. However, after surgical shunting, the hyperemia may be the result of a reactive response to initial hypoxia and acidosis. It is important to consider the ischemic status in order to prevent further unnecessary surgical intervention.

## ACKNOWLEDGEMENTS

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## CONFLICT OF INTEREST DISCLOSURES

All authors declared no conflict of interest disclosures

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