

# A Case of Prolonged Erection Treated with Subcutaneous Terbutaline

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**Abstract** Prolonged erection is a relatively uncommon phenomenon and can become a medical emergency if it progresses to priapism. Even though appropriate management of priapism and prolonged erection supports early involvement of urologists, this may not always be feasible due to unavailability of these specialists. In such scenarios, conservative non-surgical methods must be attempted. However, very few guidelines and evidence-based treatment modalities exist in the literature making management of prolonged erection conjectural and challenging. Here we describe a case of prolonged erection successfully resolved with subcutaneous terbutaline.

**Keywords:** *prolonged erection, priapism, terbutaline, urologic emergencies, painful erections*

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## 1. Introduction

Prolonged erection is an uncommon, abnormally persistent, painful or painless, penile erection that usually lasts for less than four hours. Once prolonged beyond four

hours, this condition is known as priapism. Not only can such penile erection extend hours beyond sexual stimulation but may also be completely unrelated to sexual arousal [3,4]. Most common causes of prolonged erections are: physical or psychologic stimulation, blood disorders, medications, local injuries, or neurologic disorders as classified in Table 1 [4,13].

Table 1. Most Common Causes of Prolonged Erection [4,13]

Common Causes of Prolonged Erection	
Idiopathic or physical or psychologic stimulation	
Blood disorders (e.g. sickle cell disease, leukemia, thalassemia, multiple myeloma)	
Toxin mediated (e.g. spider bites, malaria, scorpion sting)	
Medications	Vasoactive treatments for erectile dysfunction (e.g. oral or intracavernous treatments: alprostadil, papaverine)
	Alpha Blockers (e.g. prazosin, terazosin, tamsulosin)
	Antidepressants (e.g. fluoxetine, bupropion, sertraline, trazodone)
	Anxiolytics (e.g. hydroxyzine)
	Antipsychotics (e.g. risperidone, olanzapine, lithium, clozapine, chlorpromazine)
	Anticoagulants (e.g. warfarin, heparin)
	Antihypertensives (e.g. hydralazine, propranolol)
	Hormones (e.g. gonadotropin releasing hormone, testosterone)
	Illicit and recreational agents (e.g. alcohol, marijuana, cocaine)
	Neoplasms (e.g. prostate cancer, testicular cancer, metastasis)
Neurologic disorders (e.g. neurosyphilis, spinal cord injury, stroke)	
Injury to penis, pelvis or perineum	

Abnormally persistent erections can be classified based on their duration. If erection lasts less than four hours, it is known as prolonged erection; on the other hand, if erection lasts for greater than four hours it is known as priapism. Priapism can be further divided into two types: 1) ischemic, veno-occlusive and low flow and 2) nonischemic, arterial and high flow [2,3,4,8]. Ischemic priapism is frequently painful and occurs due to little or no cavernous blood flow; thus, as a compartment syndrome, it is deemed a medical emergency [13]. Nonischemic priapism, commonly painless, occurs due to unregulated cavernous arterial flow and is not considered a medical emergency. A detailed history and physical exam are essential in differentiating between prolonged erection and priapism; additionally, penile blood gas analysis and penile doppler scan can be conducted for further accurate diagnosis [2,3,4,8,13]. While dark blood with hypoxia, hypercapnia and acidosis in penile blood gas analysis indicates ischemic priapism, bright red blood with penile blood gas values corresponding to arterial blood gas values indicates nonischemic priapism and prolonged erection. In a Doppler ultrasound, ischemic priapism manifests with sluggish or non-existent blood flow; conversely, nonischemic priapism and prolonged erection manifest as normal or turbulent blood flow [13].

Treatment of prolonged erection and priapism involves drainage of the corporal bodies and irrigation with sympathomimetics; however, lack of availability of these resources demands general internists to identify and treat these conditions non-invasively while awaiting referral and transfer to facilities with comprehensive urologic services, as necessary. Only occasionally has subcutaneous terbutaline been previously explored for the treatment of prolonged erection [5,6,8,9,12]. It can be a valuable addition to the treatment modalities of prolonged erection in the future. The exact mechanism of action of terbutaline in prolonged erection is unclear; nonetheless, as a beta-2 adrenergic agonist, it may increase venous outflow from engorged corpora through relaxation of venous sinusoidal smooth muscles [12].

## 2. Case Summary

A 19-year-old male with past medical history of severe depression was admitted to an inpatient psychiatric unit with suicidal ideation. He presented with no somatic medical complaints. He reported significant history of childhood emotional and physical abuse by his biological parents and sexual abuse by a family-friend. He reports significant tobacco use (1 pack-per-day for 7 years), occasional marijuana utilization, and social alcohol consumption. He used opiates and heroin for couple of years between 16 to 18 years of age. Patient's paternal grandmother had hypertension and paternal grandfather had coronary artery disease. Patient was taking sertraline at home, which he stopped due to sexual dysfunction including decreased libido and erectile dysfunction. Patient was a student and was sexually active with multiple partners. His physical examination was unremarkable and labs including complete blood count and basic metabolic panel were normal. Patient was started on bupropion hydrochloride for severe depression,

trazodone for insomnia and hydroxyzine for anxiety. On the evening of day 4 of hospitalization, patient complained of persistent erection lasting for 3 hours that resolved spontaneously. He then woke up next day with erection that lasted close to 4 hours and was painful, at which point medical consult was requested. Further history did not reveal any evidence of perineal trauma or history of sickle cell disease. Physical exam was unremarkable except persistent erection. Medication review suggested trazodone as the possible culprit, which was discontinued. As patient had recurrent episodes of priapism and urology service was not available, non-invasive options were researched and patient was given 0.5 mg of terbutaline subcutaneously. The patient was also given 2 tablets of oxycodone/acetaminophen 5/325 mg for pain management. The patient had relief of symptoms within 5 minutes and emergent transfer for urologic intervention was deferred. Patient's vitals were monitored every 15 minutes for first hour, then hourly for next 3 hours. His blood pressure and pulse was transiently elevated which returned to baseline within 2 hours. Patient did not have any recurrence of symptoms throughout the hospitalization.

## 3. Discussion

All cases of prolonged erection should be evaluated emergently. History should include duration of erection, presence and severity of pain, previous episodes of prolonged erection and method of treatment, past medical history, list of medications, history of alcohol and illicit drugs use, and trauma or surgery to perineal region. Physical exam should be focused on identifying any underlying etiology and should include detailed examination of penis, perineum and abdomen. Laboratory work up should include complete blood count, and penile blood gas. Other work up should be guided based on history. Color duplex ultrasound of penis and perineum is mainly indicated to identify ischemic priapism, which is a medical emergency.

The risk factors that may have led to prolonged erection in this patient include use of antidepressants, mainly trazodone, as well as the history of illicit drugs (marijuana, heroin) and alcohol use. The patient likely had nonischemic and prolonged erection as it was largely painless. The patient did not have a previous history of prolonged erection, and denied any history of trauma or injury to perineum.

American Urologic Association (AUA) and European Association of Urology have published guidelines on treatment of priapism with little focus on prolonged erection. Both guidelines do not recommend systemic therapy in the treatment of ischemic priapism, however in prolonged erection and non-ischemic priapism, they do not recommend against using systemic therapy. According to AUA guidelines on treatment of priapism published in 2003, terbutaline may carry some benefits in the treatment of prolonged erection caused by self-injection therapy for impotence. European association of Urology guidelines on treatment of Priapism in 2014 suggests use of oral terbutaline to treat ischemic priapism lasting more than 2.5 hours following intracavernosal injection of vasoactive agents. Terbutaline should be used cautiously in patients

with coronary artery disease, hypokalemia and volume overload. Since this patient experienced recurrent symptoms lasting greater than 3 hours, eventually developed penile pain, and had no terbutaline contraindications, he was deemed an appropriate candidate for a trial of subcutaneous dose of 0.5 mg of terbutaline. The therapy immediately alleviated the symptom of prolonged erection with significant improvement in patient's status. Had the symptoms persisted or recurred despite terbutaline therapy, patient would have been transferred to a facility with urologic services. While observation alone is recommended for the treatment of prolonged erection and nonischemic priapism, terbutaline was used to improve the patient's discomfort and anxiety. Accurate distinction between prolonged erection, ischemic priapism, and nonischemic priapism is mandatory as ischemic priapism is a medical emergency [2,4,11,13]. If suspicion is high for ischemic priapism, urology services should be involved at the earliest, as intracavernous injection of phenylephrine is the most important initial step in the management of such patients. They may require intracavernous irrigation and aspiration of pooled old blood to prevent fibrosis and impotence in the future. However, prolonged erection and non-ischemic priapism can be evaluated by watchful waiting alone. [2,4,11,13].

In the absence of urology services, the internist assumes the responsibility of managing cases of prolonged erections and priapism. Presence of established and evidence-based noninvasive treatments would increase the confidence of internists while enhancing patient safety should they need emergent urologic interventions.

#### 4. Conclusion

Prolonged erection is a fairly uncommon medical condition that requires special attention to decrease future sequelae including progressive fibrosis of cavernosal tissues and erectile dysfunction. Accurate differentiation between prolonged erection and priapism is essential for appropriate management. Ischemic priapism is a medical emergency and is preferably treated with intracavernosal administration of phenylephrine. Prolonged erection and nonischemic priapism, while not medical emergencies, can unduly cause discomfort and anxiety. Any medication with the potential to relieve such abnormal erection can provide a huge benefit.

While this is a single case report, we are presenting this with the aim to help other physicians in the management of prolonged erection and nonischemic priapism, and potentially to perform more research to either validate or discourage this treatment option.

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#### Conflict of Interest

The authors declare no conflict of interest in preparing this article.

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