**Ischemic Priapism Secondary to COVID-19 Infection versus Anticoagulant-induced Priapism: A Case Report**

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**Abstract**

Priapism is considered a rare disorder, and even rarer when it occurs as a complication of COVID-19. To the best of our knowledge, there are only five studies reported priapism as a complication of COVID-19. Here we report a 66-year-old male infected with COVID-19 and presented with neglected priapism for three days. On local examination, penile erection was noticed associated with black areas on the glans penis extending to mid penile shaft denoting penile gangrene. A clear line of demarcation was noticed at mid penile shaft. Penile duplex was performed and showed no blood flow in both cavernosal arteries.

Penile aspiration was performed and the cavernosal blood sample showed criteria of ischemic priapism. Given the presence of penile gangrene extending to the mid shaft of the penis and the bad general condition the decision was to perform partial penectomy and supra pubic tube placement. We recommend the establishment of a guideline for diagnosis and prevention of thrombotic diseases in patients with COVID-19 infection as there are increasingly growing evidence of COVID-19-related thrombotic manifestations.

**Keywords**: COVID-19, Coagulopathy, Priapism, Thromboembolism, Thrombosis

**Introduction**

A novel coronavirus (CoV) emerged in Wuhan, China at the beginning of December 2019, named "COVID-19" by the World Health Organization (WHO). (1) It causes a range of respiratory and gastrointestinal symptoms, starting from fatigue, cough and fever and may complicate to severe respiratory failure (2). Other life-threatening complications include venous and arterial thromboembolism (3). Pulmonary embolism (PE) is recognized to be the most common thrombotic manifestation, while arterial events were reported less frequently. (4) Priapism is considered a rare disorder, (5) and even rarer when it occurs as a complication of COVID-19. To the best of our knowledge, there are only five studies reported priapism as a complication of COVID-19 (6–10). Here we report a case of a 66-year-old male infected with COVID-19 and presented with neglected priapism for three days.

**Case presentation**

 A 66-year-old male patient presented to the emergency room (ER) with shortness of breath, cough, and generalized fatigability for 2 days, he was tested positive for covid-19 infection. However, he had a stable O2 saturation, and he was discharged accordingly. Five days later after his discharge, the patient presented again to the ER with shortness of breath and neglected priapism of 3 days duration.

 On his last ER visit, his O2 sat was 78% on room air, 92-93% on 15 L/min. non-rebreather mask, blood pressure 126/81 mmHg, respiratory rate 21/min, pulse rate 110 beats per minute, and body temperature was 36.9 oC. GCS score was 15 out of 15. On examination, the patient was conscious distressed. A priapism was noticed associated with black areas on the glans penis extending to mid penile shaft denoting penile gangrene. A clear line of demarcation was noticed at mid penile shaft. The patient's medical history includes; type 2 diabetes mellitus (DM), hypertension (HTN), ischemic cardiomyopathy, chronic kidney disease (CKD) stage 3b with baseline creatinine 1.5-1.6mg/dl, atrial fibrillation, old cerebrovascular accident (CVA) with no residual weakness apart from baseline expressive aphasia, depression.

 The patient's medications include; Amlodipine, Insulin Novomix, Hydralazin. He was also treated with Warfarin 7.5 mg once daily, Risperidone 0.25 mg once daily as needed through the last 5 years.

 Laboratory findings upon admission showed; leukocytes of 10.70, hemoglobin 11.1, platelet count 220, prothrombin time (PT) 90, INR 7.19, and CRP 219.50, Creatinine 244.20 (umol/L) , Urea in serum 23.50 (mmol/L), D-Dimer 20.0 (mg/L), and positive Covid 19PCR .

Penile duplex was performed and showed no blood flow in both cavernosal arteries. Magnetic Resonance Imaging (MRI) for the penis was requested to assess the possibility of necrosis but it was not available in the hospital and the patient cannot be transferred as he was desaturated.

**Therapeutic intervention**

 On admission, warfarin was held, and the patient was given vitamin K 10 mg IV along with 4 units of fresh frozen plasma (FFP) for the correction of INR. He also received dexamethasone 6 mg IV and Ceftriaxone 2 gm IV infusions. The patient then was admitted under ICU/IM for further management of COVID-19 infection and warfarin toxicity. Suprapubic tube was placed to relieve urinary retention by the urology team. Moreover, they recommended penile aspiration/surgical intervention after INR correction. Later in the same day, the patient developed hypoxia and he was connected to HFNC: FLOW 60, FIO2 100% and stabilized. His INR was adjusted from 7.14 to 1.70 and anesthesia consultation was done for surgical approval.

 The patient was taken to the OR, he was very agitated, and trial of local penile block was not applicable. Therefore, general anesthesia was introduced. Penile aspiration was performed and the cavernosal blood sample showed criteria of ischemic priapism. However, penile aspiration was not successful to alleviate the erection. Given the intraoperative findings and the bad general condition of the patient, the decision was directed to perform partial penectomy. Post-operatively, he was kept intubated and put into mechanical ventilation for 3 days and then ex-tubated successfully. Eventually, he was discharged with O2 maintained on room air.

**Discussion**

 Priapism is a penile erection that lasts four hours or longer and is unrelated to sexual stimulation (11). Priapism is divided into three types: ischemic type (which requires immediate clinical intervention), non-ischemic type, and stuttering (recurrent) priapism. Ischemic priapism (also known as veno-occlusive priapism) is characterized by a painful penile erection which persists for a prolonged time leading to no or little blood flow to the corporal bodies. (12) Priapism can result from conditions associated with increased blood viscosity such as sickle cell disease and hematological malignancies. (13) It was reported in the literature that COVID-19 patients had a state of hypervisocisty. (14,15,16) This could explain why COVID-19 patients develop priapism.

 Moreover, COVID-19 is known to cause hypercoagulability status, the mechanisms behind this are not well identified. Hypotheses include cytokine storm, complement activation, shutdown of fibrinolysis and COVID-19 itself activating the coagulation cascade. Excessive release of cytokines causes thrombosis through a variety of processes, including activation of monocytes, neutrophils, and the endothelium. All of these mechanisms can contribute to the prothrombic state. (4,17) It is documented that COVID-19 patients can develop thrombotic events even when they are anticoagulated. Therefore, screening for thromboembolic events is essential in such patients. (18)

Priapism progressing to penile gangrene secondary to use of anticoagulant is still rare with only few cases being reported in the literature. Herein we report an unusual complication of penile gangrene after the use of anticoagulants.(19)

 In our presented case, there were many risk factors for developing priapism other than COVID-19 infection, including unopposed warfarin action and anti-depressant medication. However, it is only COVID-19 that has a recent onset with our patient compared to long term use of antidepressant and warfarin. Other studies also suggested that priapism was most likely induced by COVID-19 infection rather than other factors. (6–8) All of this growing evidence strongly suggests the need for diagnosis and prevention of thrombotic diseases in patients with COVID-19 infection.

**Conflict of interests**

The authors declared no conflict of interests

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