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Discussion of Disease Progression and Novel Treatment of Penile Mondor's Disease

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ABSTRACT

This case details the abnormal presentation, disease course, and definitive treatment of a patient suffering from Penile Mondor's Disease (PMD) secondary to hypothesized hypercoagulable state due to a recent COVID-19 infection. This patient presented to the Interventional Radiology (IR) outpatient clinic after referral due to prolonged and inadequate treatment course of PMD. This patient was diagnosed with PMD after presenting with painful nocturnal erections that disrupted his quality of life through sexual dysfunction, inadequate sleep due to discomfort, painful daytime erections, and overall malpresentation. The patient failed two systemic treatments of systemic heparin after which was then referred to the IR clinic. The patient was treated definitively and experienced complete resolution of symptoms with catheter directed thrombolysis directly inside the affected superficial vein of the penis. The patient was treated in an outpatient setting and was seen at two weeks, one month, and two months follow up post-procedure without regression to previous disease state.

Keywords: Interventional radiology; Minimally invasive; Outpatient procedure; Venous occlusion; Venous thrombosis; Penile mondor's disease

INTRODUCTION

Penile Mondor's Disease (PMD) is a rare condition involving thrombophlebitis of the superficial dorsal vein of the penis. The penis consists of an extensive venous network that begins at the base of the glans, forms the dorsal vein of the penis, and finally drains into the pre-prostatic venous plexus. This venous network is susceptible to

inflammatory processes due to causes such as sexual activity or hypercoagulability, leading to thrombophlebitis[1]. Mondor's Disease was first described as a thrombophlebitis of superficial veins in the chest wall by Henri Mandor in 1939. The first case of Mondor's Disease in the superficial dorsal vein of the penis reported in 1968 Helm et al. Since then, there have been less than 100 reported cases of PMD[2]. The pathophysiology of PMD is not completely understood; most commonly it is suspected to be due to trauma, infection, excessive sexual activity or abstinence, and hypercoagulable states such as in malignancy and systemic vasculitis[1,3]. Factors that lead to PMD all relate back to Virchow's triad of vessel injury, stasis, and hypercoagulable states.

COVID-19 has been identified as a risk-factor for developing a hypercoagulable state, leading to dysfunction of the endothelial lining of vessels due to the release of inflammatory cytokines released in response to virus entry. Though the hyperinflammatory state that the body promotes through cytokine release helps eradicate the body of the virus, it can also cause vessel inflammation and damage that can predispose to clot formation. While every vessel is susceptible to this damage, smaller vessels release excessive von Willebrand factor multimers, which have been found to be elevated in patients who have suffered from COVID-19, thus making smaller vessels, in comparison to larger vessels, more susceptible to inflammation, injury and clot formation due to COVID-19 viral infection[4]. This increased risk of a hypercoagulable state can be long lasting in patients and the increased risk of activating Virchow's Triad cannot be ignored. Balawender et. al described a similar case of PMD as a complication secondary to COVID-19 infection in a 25-year-old man. The case was resolved with systemic heparin treatment and topical heparin cream placed directly on the affected vessel.

PMD most commonly presents with pain and induration of the dorsum of the penis. On exam, the dorsum of the penis will present with a rope-like cord; which is the thrombosed dorsal vein causing the patient pain due to the swelling and erythema that may be surrounding the thrombosis[5]. PMD is diagnosed clinically based on history and physical examination but may also be confirmed by penile Doppler ultrasound. First line therapy includes supportive therapy with warm compresses, nonsteroidal anti-inflammatory medications, and abstinence from sexual intercourse. Most cases of Mondor disease are self-limiting and resolve spontaneously in six to eight weeks. In some cases, patients have been treated with low molecular weight heparin or aspirin, however there is controversy with anticoagulant treatment as it has not been shown to expedite healing and it has not been shown to be necessary for prevention of additional thrombus formation[1]. Few cases require surgical intervention including thrombectomies and superficial penile vein resections[6].

CASE PRESENTATION

A-26-year old caucasian male with a significant past medical history of lyme disease, babesiosis, irritable bowel syndrome, abstinence of seven months and a recent COVID-19 infection, presented to the outpatient IR clinic by referral from a urologic clinic with a diagnosis of Penile Mondor's Disease (PMD). This presentation was believed to be secondary to a hypercoagulable state possibly due to his previous medical history and recent COVID-19 infection[1]. As mentioned above, COVID-19 has been shown to lead to the development of hypercoagulable states in patients who have been infected with the virus. This patient's SARS-Cov-2 infection course consisted of a five day symptomatology of runny nose, fever of 101.5°F, pruritic throat, and headache after which resolved without

complications. The patient then presented to a urology clinic on day 60 post positive PCR COVID-19 test result and was subsequently diagnosed with PMD. With COVID-19 being the only significant risk factor leading to a hypercoagulable state for our patient suffering from thrombosis, as he is an otherwise healthy male, it is hypothesized that SARS-COV-2 infection was what led to our patient developing PMD[1].

Upon presentation, this patient had a decreased quality of life with symptoms consisting of painful nocturnal erections, decreased sexual desire secondary to painful daytime erections, and increased sensitivity on his penis. He presented with palpable, rubbery, engorged superficial veins on the dorsum of his penis (Figure 1). The patient was treated with two IV doses of systemic heparin at a urology clinic and had no resolution of symptomatology or disease state.

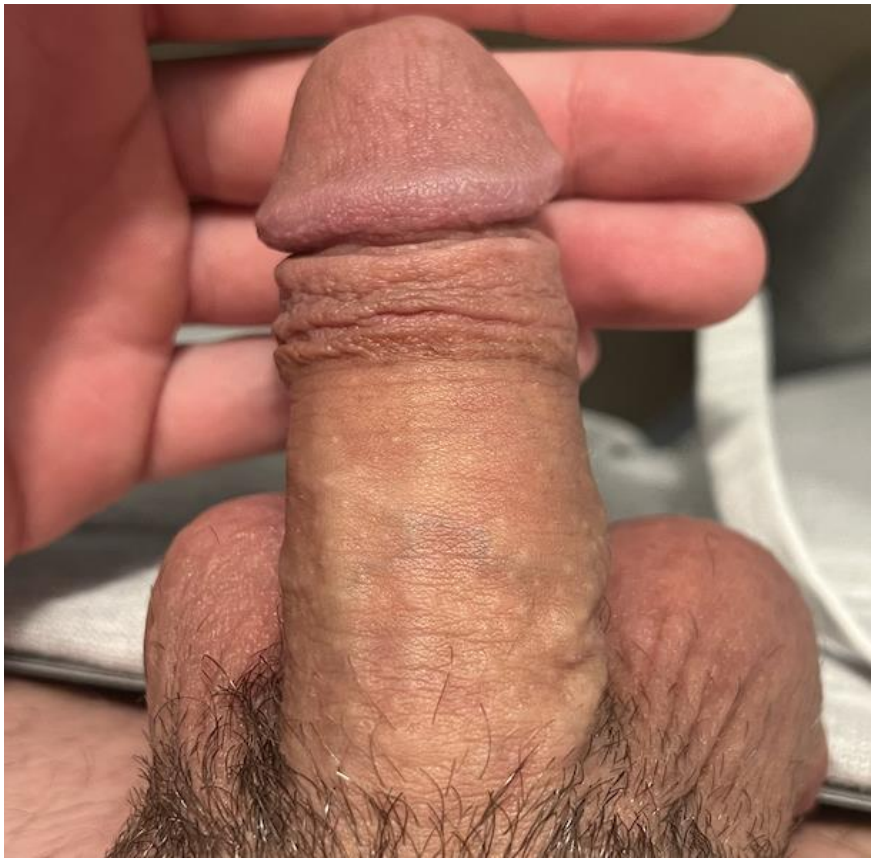

Figure 1: Engorged superficial veins present on the right lateral side of the patient's penis before treatment.

The patient then presented to the Interventional Radiology clinic. Venous involvement with magnetic resonance venogram (MRV) confirmed his diagnosis of PMD on the dorsal vein of the penis which he was then treated with a single catheter directed thrombolysis in an outpatient setting until restoration of the venous blood flow was achieved. This allowed for localized treatment of the vessel, minimal systemic treatment, and definitive treatment of the patient's pathology. The patient had immediate palpable improvement of the venous distension and on follow-up, the patient was noted to have complete resolution of symptomatology (Figure 2).

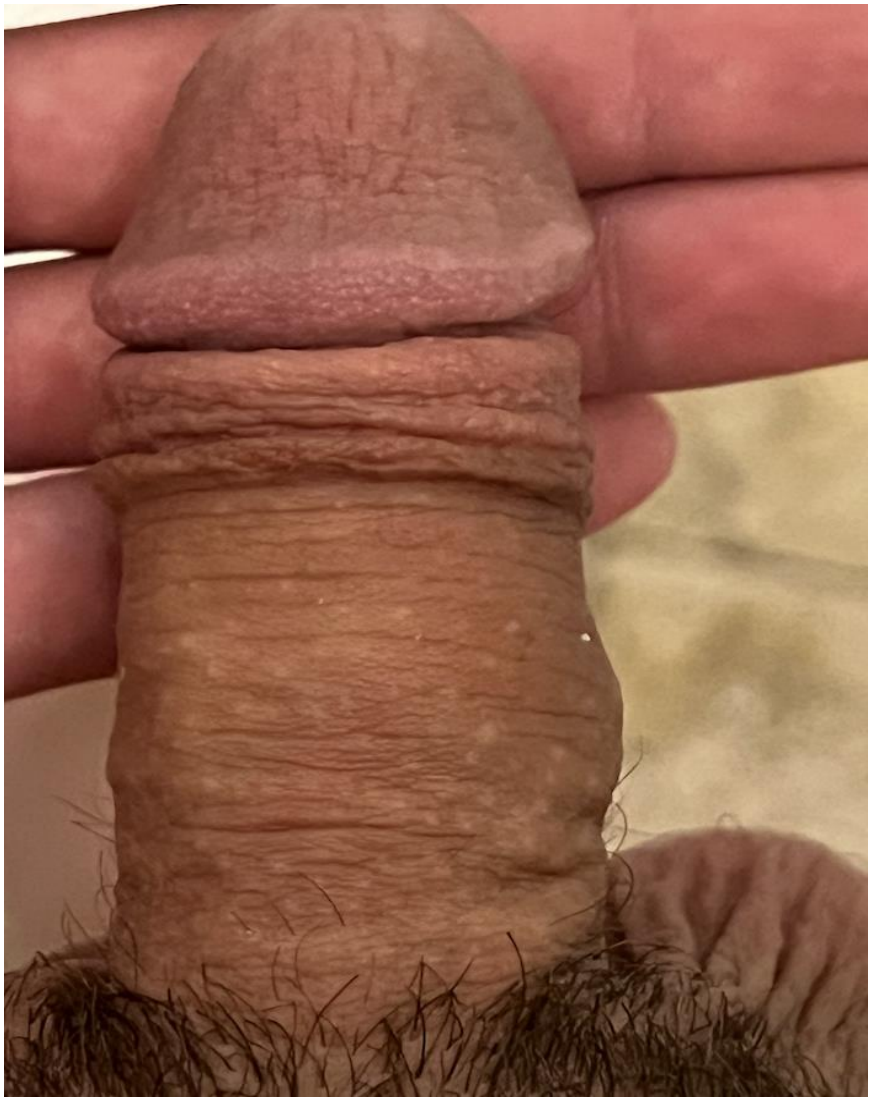

Figure 2: At follow-up superficial venous distension is no longer visualized.

The improved venous blood flow post catheter-directed thrombolysis has completely resolved the patient's painful nocturnal erections, leading to increased sleep quality and duration. The procedure also decreased the patient's painful daytime erections, and led to an improvement in sexual function and mental state in the patient.

DISCUSSION

The clinical presentation and progression of the disease in this patient are within limits for PMD. This patient experienced decreased quality of life that was disabling and common for patients who suffer from this pathology. An early multidisciplinary approach for patients like this including primary care, dermatology, urology, and interventional radiology among others can promote better patient outcomes and quality of life as well as slow the progression of the disease state.

With treatment in an outpatient interventional radiology center with catheter-directed-thrombolysis to achieve improved venous blood flow, patient outcomes will improve markedly. This more aggressive and targeted interventional treatment improved the venous flow, which corrected the abnormal blood flow in the penile venous

system and completely resolved this patient's symptomatology signs of disease. This treatment could be an excellent approach for those presenting with penile mondor's disease that is refractory to systemic treatments and should be considered earlier in the disease course for patients who are suffering from symptoms that interfere with their quality of life.

CONCLUSION

Here, we present a case of superficial venous disruption causing penile mondor's disease that is presenting secondary to a hypercoagulable state in a young patient who experienced great reduction in quality of life. Upon presentation, the patient was unable to sleep due to painful nocturnal erections, and was suffering painful daytime erections and increased sensitivity secondary to the disrupted vasculature.

The patient was treated with a single catheter-directed-thrombolysis of the disrupted vessels in an outpatient interventional radiology clinic and complete restoration of venous blood flow was achieved. The improved venous blood flow has completely resolved the painful erections. This has greatly increased the patient's quality of life and secondary impacts of the presentation. This case emphasizes the importance of an interdisciplinary approach to patient care. In patients who may present with uncomplicated or complicated penile mondor's disease that is unresponsive to systemic anticoagulation treatment are candidates for direct and definitive interventional care.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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