

CORRESPONDENCE



Distal erosion of an inflatable penile prosthetic as a complication of prone positioning in a COVID-19 respiratory supported patient

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TO THE EDITOR:

Patients with SARS-CoV-2 (COVID-19) infection may develop acute respiratory distress syndrome (ARDS) requiring intubation and mechanical ventilation. Studies suggest that these patients may benefit from prone positioning, a practice established for patients with ARDS that demonstrates improvement in oxygenation and ventilation and reduction in mortality when employed early [1].

Increased duration of prone positioning is often complicated by pressure injuries at pressure points on the anterior side of the body [2]. Facial, ocular, and brachial plexus injuries have been reported in patients with prolonged prone positioning. Medical devices contribute additional mechanical load and shear stress resulting in increased risk of pressure injuries. These medical device related pressure injuries (MDRPI), have been noted during the COVID-19 pandemic, primarily as a result of respiratory care devices [3].

Efforts to reduce pressure injuries focus on prevention through skilled training, proper technique, offloading of high pressure areas, and interval skin assessments. Despite these efforts, pressure injuries remain the most common complication of prone positioning and have significant consequences including possible need for surgical intervention [4].

The literature regarding urologic complications from prolonged prone positioning in patients with COVID-19 ARDS is currently limited to a single case report describing Fournier's gangrene in a prone patient with ARDS [5]. We describe the first reported instance of a patient with COVID-19 ARDS who developed penile glans necrosis and erosion of an inflatable penile prosthetic cylinder secondary to prolonged prone positioning.

CASE PRESENTATION

The patient is a 71-year-old male with a history of insulin-dependent diabetes mellitus and erectile dysfunction who was admitted to the hospital after presenting with shortness of breath requiring supplemental oxygen, found to have COVID-19 infection without prior vaccination. The patient had undergone removal of a malfunctioning inflatable penile prosthetic and uncomplicated replacement with a Coloplast Titan® (Humlebaek, Denmark) prosthetic approximately 3 months prior. His post-operative course was uneventful and the prosthetic was noted to be in appropriate position at the eight week post-operative appointment.

The patient was started on intra-muscular Baricitinib, Dexamethasone and Remdesivir based on the institution's COVID-19 treatment algorithm. Despite this, he developed worsening respiratory status with imaging consistent with COVID-19 ARDS and was transferred to the medical intensive care unit. He was intubated on hospital day 3 and ventilated with a lung protective strategy. On hospital day 4, he was started on neuromuscular blockade due to dyssynchronous respiration and placed in intermittent prone positioning for 16 hours daily.

On hospital day 6, the patient developed oliguria with a rise in his creatinine to 1.6 and urology was consulted for acute kidney injury. His catheter was exchanged by urology with drainage of 1200cc of urine following replacement. His penis was normal in appearance and the prosthetic was noted to be in a deflated state. His creatinine subsequently returned to baseline without evidence of obstruction on ultrasound of the kidneys and bladder.

Over the following week, the patient developed multi-organ failure requiring vasopressors, ongoing hypoxemic respiratory failure and oliguric acute kidney injury requiring continuous venovenous hemofiltration.

On hospital day 13, the patient was noted to have glans necrosis with erosion of the right corporal cylinder of the inflatable penile prosthetic through the glans penis and fossa navicularis (Fig. 1). Due to high risk of mortality from COVID-19 ARDS, he was not a candidate for surgical intervention and was managed with local wound care and broad spectrum antibiotic therapy. On hospital day 16, the patient ultimately succumbed to worsening respiratory acidosis secondary to ARDS from COVID-19 infection and passed.

DISCUSSION

Prolonged proning in patients with COVID-19 can lead to injury in unexpected areas compared to patients who are immobilized supine. Medical devices increase the risk of pressure injuries, however the existing literature surrounding MDRPIs focus on temporary lines and tubing that may be adjusted once a pressure injury is noted. In contrast, penile prosthetics are internal and fixed and often require surgical removal, which may not be feasible in critically ill patients.

Techniques to reduce prone positioning related pressure injuries are employed in the operating room, where patients are placed in a specifically designed Allen or Jackson table to help offload pressure on the anterior prominences. Additional polyurethane foam rings and pillows are employed to minimize pressure on the abdominal wall and pelvis. Similar considerations need to take place for patients with a penile prosthetic that are undergoing prolonged surgeries in prone positioning.

The current case highlights the need for additional considerations in prone patients with fixed internal medical devices, such as penile prosthetics. Similar to the proposed mechanism of



Fig. 1 Distal glans erosion of the penile prosthetic. Erosion of the right corporal cylinder through the distal glans with associated glans necrosis in a COVID-19 patient with ARDS that was undergoing prone positioning.

MDRPIs, this patient's prosthetic likely provided an internal compressive force on the penis that, in the setting of prolonged proning, led to necrosis of the penile glans. Other possible contributors to this presentation include presence of a urinary catheter, administration of vasopressors, class I obesity and critical illness. Although this patient ultimately passed from his illness, many patients will survive and hence preventive measures should be employed to avoid such complications.

The following recommendations may minimize pressure injuries in patients with penile prosthetics:

- (1) Providers involved in proning should be aware of the existence and type of penile prosthetic.
- (2) If applicable, providers should ensure that the penile prosthetic is deflated prior to proning the patient.
- (3) Care should be taken to offload pressure from the genitalia and penile prosthetic using foam padding and pillows. A polyurethane ring cushion can be applied to the external genitalia involving the penis and the scrotum.
- (4) The urinary catheter tubing should not rest along the penile shaft and rather be positioned to rest on the bedding in a tension free manner.
- (5) Upon supination, the patient should be examined for pressure injuries of the genitalia and if such, early urologic consultation be made.

CONCLUSION

We describe a patient with multi-organ failure who developed penile glans necrosis and erosion of an inflatable penile prosthetic cylinder secondary to prone position ventilation for ARDS. This case highlights the need for proper attention and care of penile prosthetics during proning to reduce the risk for this uncommon but serious complication.

Mursal Gardezi¹, Ankur U. Choksi¹, Soum D. Lokeshwar¹,
Jamil Syed¹ and Stanton C. Honig¹✉

¹Department of Urology, Yale School of Medicine, New Haven, CT, USA. ✉email: Stanton.honig@yale.edu

DATA AVAILABILITY

Data available on request.

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AUTHOR CONTRIBUTIONS

MG, AUC and SDL were responsible for drafting the manuscript. AUC was responsible for designing the graphical abstract. SDL and JS were responsible for development of the recommendations for avoiding pressure injuries. SDL, JS and SCH were involved in the clinical care of the patient. SCH was responsible for oversight of the publication.

COMPETING INTERESTS

The authors declare no competing interests.

ETHICAL APPROVAL

The Institutional Review Board and HIPAA Officer reviewed the case and Consent to Publication was obtained from the patient's family in line with their recommendations.

ADDITIONAL INFORMATION

Correspondence and requests for materials should be addressed to Stanton C. Honig.

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