

Proximal Corporal Perforation During Penile Prosthesis Surgery: Prevention, Recognition, and Review of Historical and Novel Management Strategies

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ABSTRACT

Background: Proximal corporal perforation at time of dilation, although rare, may occur due to factors related to patient anatomy, presence of intra-cavernosal fibrosis, and/or surgical technique.

Aim: To describe tools and techniques designed to prevent and identify proximal corporal perforation, and maneuvers to minimize the risk of subsequent cylinder migration once proximal perforation has been recognized, such that the operation may proceed and result in an acceptable outcome.

Methods: We discuss tips for prevention, recognition, and management of proximal corporal perforation by presenting a review of the literature as well as our preferences based on a high-volume experience with penile prosthesis surgery.

Outcomes: Described techniques aim to minimize risk of cylinder migration in the absence of true proximal repair.

Results: Although proximal perforation may be obvious at times, particularly with a sudden loss of resistance during dilation, discrepant corporal measurements and/or dissimilar proximal deflection of the dilator should also increase the index of suspicion. Numerous techniques have been employed to theoretically reduce the risk of cylinder migration in the setting of proximal corporal perforation. These include formal corporal repair (historical), windsock repairs with non-absorbable grafts, absorbable plugs, and suture fixation of the rear tip extender or shod material covering implant tubing.

Clinical Translation: Intra-operative recognition of proximal corporal perforation, coupled with understanding of surgical strategies to minimize the risk of future device migration, may allow completion of an operation that still results in an optimal outcome.

Conclusions: Techniques described to prevent proximal migration are not strongly evidence-based, but rooted in logic and supported by high-volume implanters. Intra-operative perforation of the proximal corpora, although rare, can threaten the success of penile implant surgery, though the techniques described herein have been developed to mitigate the potential for subsequent device migration, allowing surgery to proceed and to achieve the desired clinical result. **Pearlman AM, Terlecki RP. Proximal Corporal Perforation During Penile Prosthesis Surgery: Prevention, Recognition, and Review of Historical and Novel Management Strategies. J Sex Med 2018;XX:XXX–XXX.**

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Key Words: Proximal Corporal Perforation; Penile Prosthesis; Complications; Cylinder Migration

INTRODUCTION AND BACKGROUND

Reconstructive genital surgery for functional restoration is a delicate undertaking and proper training is necessary for optimal outcomes. Despite adherence to proper technique, surgeons may be faced with intra-operative scenarios involving inadvertent

entry of alternative tissue planes. Although injuries to the urethra, bladder, bowel, and vasculature are possible, these are exceedingly rare. A more common scenario, however, involves violation of the corporal bodies during dilation. Depending on patient anatomy, presence of intra-cavernosal fibrosis, and/or surgical approach, resultant disruptions of the tunica albuginea can be heterogenous in nature, occurring proximally, distally, or medially (ie, cross-over). In cases of proximal corporal perforation, several options exist to minimize the risk of cylinder migration, such that the operation may proceed and still result in an acceptable outcome. Awareness of effective technique is

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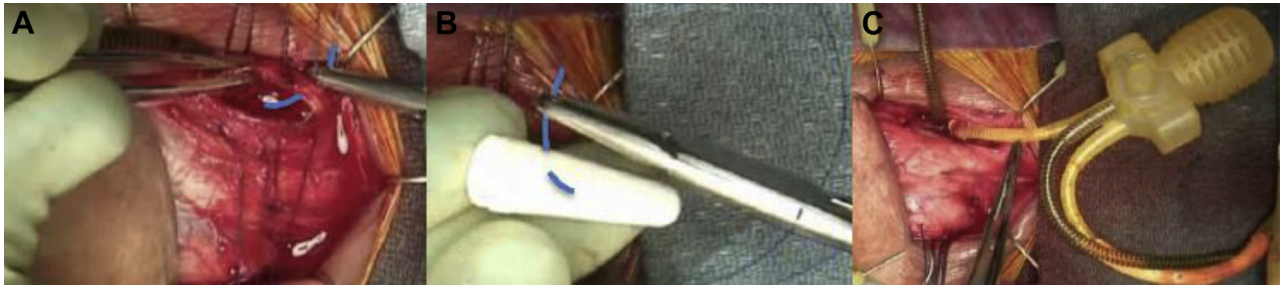


Figure 1. Rear tip extender fixation. (A) Nonabsorbable suture passed out-to-in through inferolateral edge of corporotomy. (B) Suture passage through the superolateral aspect of the outermost RTE before being sent back through the tunica from in-to-out, again at the inferolateral aspect of the corporotomy. (C) In the setting of an inflatable device and in the absence of fixation, migration would be limited to the distance between the exit site of the ipsilateral corporal tubing and its junction with the pump (denoted by forceps).

critical, as aborting a case after corporal dilation has been performed could have devastating consequences for patients. Although the complication discussed here is uncommon, it is likely under-recognized and under-reported, and not all instances may become clinically evident with time. The approaches described are not strongly evidence-based, but rooted in logic and supported by high-volume implanters.

Most reports regarding proximal perforation have involved delayed recognition in recipients of malleable rods or formerly available self-contained inflatable devices, such as the AMS Hydroflex (American Medical Systems, Minnetonka, MN, USA). In numerous instances, cylinder migration was identified after descending into the buttocks.^{1,2} In these situations, the device should be removed and it would be left to surgeon discretion as to whether a concomitant replacement would be reasonable. Much of the literature regarding proximal perforation in recent years has focused on strategies to prevent future issues when intra-operative recognition has occurred during placement of an inflatable device. There is little evidence to support a significant occurrence of delayed proximal migration of modern inflatable devices due to failed recognition of perforation at initial placement. The angulation of the exit tubing has been felt to be a protective feature by noted experts.²

PREVENTION AND RECOGNITION

Prior to discussion of techniques for managing intra-operative complications, it seems prudent to discuss tips for prevention. It is important to recognize the anatomical configuration of the corpora cavernosa. Although the portions located within the penis have a parallel longitudinal lie, the proximal portions flare out to follow the ipsilateral inferior pubic rami down toward the ischium. Rather than performing a series of escalating dilations of the corpora, we perform single, gentle passage of a 13-mm Brooks dilator, directing the tip laterally as it is passed proximally, pausing if resistance is encountered. The Brooks dilator is preferred in our practice as the widest element is located solely at the bullet-shaped tip and the nature of the handle seems to afford greater control compared to the Hegar dilator, even though the Hegar may theoretically be positioned to better mimic the

natural curve of the corpora. We recommend against using narrow caliber dilators, or involving other non-standard instruments such as the Yankauer suction tip or the Furlow insertor, as they may be more likely to cause perforation.^{1,3,4} In the setting of device removal and replacement for malfunction, it seems unnecessary in our opinion to perform dilation at all, as gentle measurement should suffice and the tissue may be attenuated from use of the prior device. Should significant fibrosis preclude ease of passage of the 13-mm dilator, we proceed carefully with gradual dilation that may also involve the use of Metzenbaum scissors, cavernotomes, a Dilamezinsert (Cooper-Surgical, Trumbull, CT), and/or a nasal speculum. It is essential to avoid being overly aggressive with instrument passage in these types of cases. Although some may debate otherwise, we feel that the peno-scrotal approach allows for greater control of proximal dilation based on location of corporotomy and ergonomics of dilator passage.

In patients with normal bony pelvic anatomy, the junction of the inferior pubic rami and ischial rami provides tactile feedback of the proximal extent of each corporal body. Although proximal perforation may be obvious at times, particularly with a sudden loss of resistance during dilation, in other instances it may be subtler. Discrepant corporal measurements should provoke consideration of incomplete dilation of the shorter side, aberrant pelvic anatomy (eg, prior fracture), fibrotic conditions (eg, Peyronie disease), or proximal perforation of the longer side. Dissimilar proximal deflection of the dilator should also increase the index of suspicion.

IDENTIFICATION AND MANAGEMENT

Once proximal perforation has been identified intra-operatively, the prosthetic urologist has multiple options to consider. The reader is advised, however, that it is not possible to declare any of the described techniques as superior due to the low reported incidence of the scenario addressed and the absence of comparative data. Formal repair involves a perineal incision, often necessitating re-positioning the patient from supine to lithotomy, identifying and then closing the corporal defect, which may be rendered difficult due to lack of sufficient adjacent

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