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Use of BioPatch® (Protective Disk with Chlorhexidine Gluconate) in Closed-Suction Drainage for Penile Implant Surgery

Jacob Khurgin[a] Bruce Garber[b]

[a]Einstein Medical Center; [b]Hahnemann University Hospital, Philadelphia, Pa., USA

Key Words

Penile implant • Penile prosthesis surgery • Closed-suction drain • Chlorhexidine gluconate • Protective disk • Infection • BioPatch®

Abstract

Background: The use of closed-suction drains after penile implant surgery remains controversial. The use of BioPatch®, a protective disk with chlorhexidine gluconate, may reduce the incidence of drain-related infections, one of the feared complications of drains. The aim of this study is to describe a novel use of BioPatch® in penile implant surgery as well as additional techniques that may potentially minimize infection rates. ***Methods:*** A description of operative technique and a review of the literature will be presented. A novel approach to penile implant surgery that may reduce infection rates is described. ***Results:*** A simple technique is described for surgeons considering implementation of closed-suction drains after penile implant surgery. ***Conclusion:*** Although randomized controlled studies looking at drain placement following penile implant surgery are lacking, the addition of BioPatch® and the implementation of surgical techniques as described are potentially helpful in preventing infection following this surgery.

Introduction

Inflatable penile prosthesis has undergone many technical modifications since its introduction in 1973 [1]. It has proven efficacy in treating organic erectile impairment, especially in patients who are refractory to conservative measures. A high rate of patient satisfaction is also reported in the literature [2, 3]. One dreaded complication of this procedure is infection, often necessitating re-operation and possible loss of the implant [4–6].

The scrotum, as a dependent organ, is a source of potential fluid accumulation and possible hematoma formation. Surgical dissection into the corpora cavernosum, rich in vascular supply, often leads to accumulation of blood and other bodily fluids. The routine use of closed-suction drains (CSD) to alleviate this phenomenon has been described since 1994 [7]. Its use, however, has not been without significant controversy [8].

The Case for CSD Use

Proponents of CSD often cite non-urologic literature in which surgeries such as breast implants [9], hepatectomy [10], and others use drainage systems. Despite fears to the contrary, there was no evidence of increased infection rate with CSD use in breast reconstructive surgery [11]. In fact, the orthopedic surgery literature describes

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Jacob Khurgin
Einstein Medical Center
Philadelphia, PA 19141 (USA)
E-Mail jacobkhurgin@gmail.com

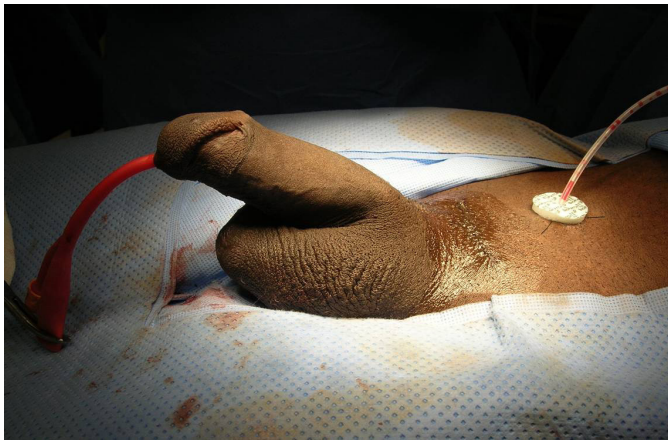

Fig. 1. Placement of a BioPatch® disk around a closed-suction drain.

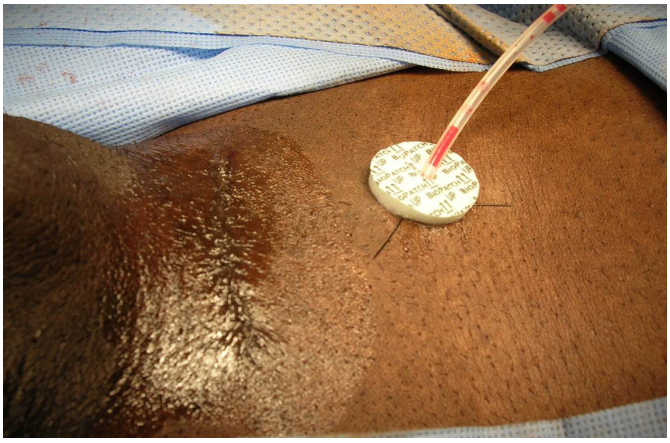

Fig. 2. Close-up of placement of a BioPatch® disk around a closed-suction drain.

a trend towards lower infection rates with CSD (4.8% without drainage, 4.1% with drainage), although not at a statistically significant rate [12]. In hip and knee arthroplasties, drained wounds appear to have improved wound healing outcomes and a relative risk of 0.7 of prosthetic infection rate, compared to their non-drained counterparts [13, 14]. Dr. Sadeghi-Nejad et al's 2007 review of the complications following prosthetic penile surgery concluded that drain cultures are infrequently positive, at a rate of 6% [15]. Furthermore, the rate of infection development was not related to drain culture findings. Studies describing definitive benefits to CSD are lacking in the urological literature.

The Case against CSD Use

Detractors of CSD use in penile prosthesis surgery refer to data showing that the infection rate is no different with placement of CSD than those accepted in the literature: 3.3% versus the reported 2–5% [16]. Additionally, the formation of hematoma has not been proved to be statistically significantly lower with CSD [17]. Bacterial retrograde migration through drains has also been studied in rabbit models, with up to 20% demonstrating bacterial migration after 72 hours [18]. Another study of 63 patients with CSD after penile implant surgery showed positive drain tip cultures at the drain tip or near the skin surface in 7 patients [19]. Together, this information may be extrapolated to demonstrate that CSD increases the risk of infection.

Proven Benefits of BioPatch®

BioPatch® (Ethicon, Inc., Somerville, NJ) is a polyurethane foam disk impregnated with chlorhexidine gluconate (CHG). It ranges 1.9–2.5 cm in radius with a 1.5–7.0 mm central slit designed to fit around medical catheters such as central and peripheral intravenous catheters, arterial lines, epidural catheters, chest tubes and others [20].

Studies have shown that BioPatch® is the only dressing proven to reduce the rate of catheter related blood stream infections (CRBSI), the 10th leading cause of death in the United States. A randomized controlled study of 1,699 central venous or arterial catheter sites showed a 44% reduction in the incidence of local infections. This is a statistically significant reduction, as is the reported 60% reduction in the incidence of CRBSI [21]. BioPatch® provides a continual release of CHG over 7 days, which has proven efficacy even in the presence of blood and serum [22]. Multiple other studies, mostly in the field of vascular surgery, have discussed its potential benefits [23–26].

BioPatch® Use in Penile Implant Surgery

To our knowledge, the use of BioPatch® in penile implant surgery has not been described in the literature. The BioPatch® disk is easily applied around CSD such as a Jackson-Pratt drain, adding mere seconds to total operative time (fig. 1, 2). Additionally, the presence of the disk at time of CSD removal does not change the process. At an average of approximately $6 per disk [20], it is a modest price compared to the potential costly complications it may be minimizing.

Additional Surgical Techniques to Minimize Infection

We place the CSD at a puncture wound separate from the initial incision site. The drain is carefully placed in an in-to-out orientation to avoid introduction of skin flora into the surgical wound. Meticulous attention to sterile technique is maintained from start to finish. This includes preoperative scrubbing of the surgical site, waiting for CHG to dry prior to draping and frequent changing of outer gloves, especially after potential contact with urine. We also follow the established techniques of watertight closure of defects in the corpora, partial inflation of the prosthetic device at the conclusion of the procedure and proper wound dressing techniques. The hematoma rate has been showed to decrease from 3 to 0.7% when combining the use of pressure dressing, drainage and partial inflation [17]. This is not surprising in light of data showing an average drainage volume of 65 ml when using CSD [16].

Conclusion

Minimizing infection rates is critical to successful penile implant surgery. A combination of appropriate preoperative and postoperative antibiotics, sterile technique, decreasing operative time, and minimizing hematoma formation are beneficial. The addition of a BioPatch® disk around CSD as well as an in-to-out technique of drainage placement may help minimize infection rate and decrease rates of re-operation and prosthetic failure. Further studies may be helpful in comparing the use of CSD with and without placement of a BioPatch® disk.

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