

Editorial Comment: Diabetes Is a Risk Factor for Inflatable Penile Prosthesis Infection: Analysis of a Large Statewide Database



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Because of the increase of modifiable risk factors, the incidence of diabetes mellitus (DM) continues to rise.¹ DM may present an increased risk of infection in patients undergoing inflatable penile prosthesis (IPP) implantation. Lipsky et al² studied DM as a potential risk factor for IPP infection using a New York statewide database. The study included 14,969 patients who underwent initial IPP implantation from 1995–2014. About 30% of the cohort were men who had preexisting DM. With a median follow-up of 95.1 months, 2.3% of the study population developed IPP infection requiring surgery during the study period. The difference in infection rates between patients with DM and those without was significant, with 3% of patients with DM developing IPP infections, and 2% of patients without DM developing infection. The authors further divided the study period into 2, one before antibiotic coating was used for IPP implantation (1995–2003) and the other after antibiotic coating was used during IPP implantation (2004–2014). Infection rates declined for patients both with and without DM after the introduction of antibiotic-coated IPP. Infection rates were 4.2% in the pre-antibiotic-coated-IPP period and 1.5% in the antibiotic-coated IPP era. However, even with the decline in infection rates in both groups, the study reported that patients with DM had decreased implant infection-free survival in both the era before the introduction of antibiotic-coated-IPP and the era of antibiotic-coated IPP.

Lipsky et al² present DM as a risk factor for IPP infection in 1 of the largest IPP study cohorts reported. The authors also account for the presence of confounding variables by controlling for age, race, comorbidities, insurance status, and more. This study not only reports the statistically significant difference in infection rates but also highlights the decrease in infection-free survival in patients with DM regardless of treatment era. In addition to the large cohort size, a strength of this study is that it focuses on DM status as a whole rather than just HbA1C values. This allows for the capture of other factors associated with DM, such as tissue, neurologic, and vascular

changes over time. The study also includes a rather long follow-up time of 95.1 months. The study does not, however, distinguish between those patients with controlled vs uncontrolled DM and does not distinguish between implant manufacturers because different manufacturers offer different antibiotic coatings. These limitations are included in the discussion.

Lipsky et al² confirms other similar recent studies showing that a higher HbA1C may be a predictive factor for penile implant infection. A multicenter prospective study of 902 patients undergoing penile prosthesis implantation from 2009–2015 was conducted to determine which HbA1C level can predict increased penile prosthesis infection risk.³ The study determined that patients with penile implant infections had higher HbA1C values than those who did not. Furthermore, when cases were grouped by increasing HbA1C levels, the rate of infection also increased. The authors determined that the threshold HbA1C level of 8.5% predicted penile implant infection with moderate sensitivity of 80% and specificity of 65%. Additionally, in a multivariate analysis, an HbA1c \geq 8.5% corresponded to an odds ratio of 7.34 for penile implant infection.

Osman et al⁴ recently presented data contradicting the previous study's findings. In a cohort of 716 diabetic patients undergoing primary penile prosthesis implantation from 2003–2018, immediate preoperative serum blood glucose levels and HbA1C levels were recorded to determine an association between these values and infection rates. The authors reported that there was no association between preoperative serum blood glucose levels or preoperative HbA1C levels and postoperative infection rates. This study focused on 2 cutoff levels, HbA1C $>$ 6.5% and HbA1C $>$ 8%, neither of which corresponded to higher infection rates. Although this study reports conflicting results to that of the previous 2, it differs from the study by Lipsky et al,² which included a much larger cohort (14,969 vs 716 patients) and a much longer follow-up time (95.1 months vs 7 months). Additionally, Lipsky et al² focused on DM status rather than just HbA1C levels at the time of surgery. DM may cause permanent damage over longer periods of time, which may be masked by a lower HbA1C value in the months leading up to surgery. Additionally, this study did not include a control cohort of patients without DM. The study may have found a similarly significant cutoff level to that of Habous et al,³ if it had investigated a cutoff value higher than 8%.

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Lipsky et al² highlights the predictive nature of DM status for infection in patients undergoing IPP implantation. Although the study shows a decrease in infection rates after antibiotic coating was introduced for IPPs, it still reports a higher incidence of infection in patients with DM than in those without during the antibiotic-coating era of IPPs. This may be due to insufficient antibiotic coverage for pathogens more common in patients with DM, such as fungi and gram-negative bacteria. With a changing landscape of pathogens causing IPP infection, including fungal infections, which are more common in patients with DM,⁵ infection rates may increase in patients with DM undergoing IPP implantation. Patients with DM continue to be at a higher risk for IPP infection, and, although antibiotic coatings have been helpful, they are still not a perfect solution.

With the increase in the number of patients with DM undergoing IPP implantation, this study is relevant to the current concerns regarding IPP infection prevention strategies. We concur with the idea of the changing landscape of IPP infections and the necessity to take even further infection prevention actions for patients with DM. 1 particular strategy we have implanted is the “no-touch technique” for IPP implantation to prevent skin flora contamination. Patients with DM have a propensity for fungal and more uncommon bacterial infections, and, therefore, within our institution, we are investigating the utility of expanded coverage antibiotics, including anti-fungals, into our IPP antibiotic dips. Ultimately, the study warrants further investigation on DM and IPP infection rates and may help shape a more comprehensive antimicrobial prevention strategy for IPP implantation.

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- (b) **Acquisition of Data**
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Category 3

- (a) **Final Approval of the Completed Article**
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