ORIGINAL RESEARCH—SURGERY

Hospital-Based Trends in Penile Prosthetic Surgery

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ABSTRACT

Introduction. We examined national and regional trends in hospital-based penile prosthetic surgery and identified patient-specific factors predicting receipt of inflatable vs. semi-rigid penile prostheses.
Aims. To improve our understanding of the surgical treatment for erectile dysfunction (ED).
Methods. We utilized the Nationwide Inpatient Sample (NIS) from 1998 to 2010 in the United States and the California Office of Statewide Health Planning and Development (OSHPD) database from 1995 to 2010. Total number of penile implants performed and proportions of inflatable vs. semi-rigid prosthesis were examined. Multivariate analysis (MVA) was performed to identify factors associated with selection of inflatable vs. semi-rigid prostheses.
Main Outcome Measures. Primary outcome measure is the total number of hospital-based penile prosthetic surgeries performed in the United States over a 12-year period (1998–2010). Secondary outcome measures include proportion of inflatable and semi-rigid prosthesis implantations and factors influencing receipt of different prostheses.
Results. We identified 53,967 penile prosthetic surgeries in the NIS; annual number implanted decreased from 4,703 to 2,338. Inflatable prostheses incurred higher costs but had a similar length of stay (LOS). In MVA, Caucasian race, Peyronie's disease, and private insurance were independently associated with receipt of an inflatable prosthesis. We identified 7,054 penile prostheses in OSHPD; annual number implanted decreased from 760 to 318. The proportion of inflatable prostheses increased significantly from 78.4% to 88.4% between 2001 and 2010. Inflatable prostheses incurred higher costs but had similar median LOS. In MVA, Caucasians and men without spinal cord injury were more likely to receive inflatable prosthesis.
Conclusion. Hospital-based penile prosthetic surgery has decreased substantially both nationwide and in California. In the United States, Caucasian race, Peyronie's disease, and private insurance were independently associated with receipt of an inflatable penile prosthesis. California population data correlated with national trends and can be utilized to further study surgical management of ED. **Mirheydar HS, Palazzi KL, Parsons JK, Chang D, and Hsieh T-C. Hospital-based trends in penile prosthetic surgery. J Sex Med 2015;12:1092–1098.**

Key Words. Erectile Dysfunction; Penile Prosthetic Surgery; Population Trends

Introduction

Erectile dysfunction (ED) is estimated to affect up to 30 million men in the United States [1]. Available treatment options include vacuum erection device, phosphodiesterase type 5 (PDE5) inhibitors, intracavernosal injections, and penile prosthetic surgery. Satisfaction rates of men undergoing penile implants are reportedly quite high, as are partner satisfaction rates [2–4]. Continued improvement in the design of antibiotic coated penile implants has been associated with reduced infection rates of such implants [5–7].

Constant refinement in the development of antibiotic coated penile implants and improvements in surgical technique have led to decreased

infection rates [5,6]. High patient and partner satisfaction regarding penile implants have consistently been reported to be superior to both oral PDE5 inhibitors and intracavernosal injectable agents [8]. The awareness of ED has improved since FDA approval of alprostadil in 1997 and of Viagra in 1998, which led to an increase in the number of men seeking treatment. Furthermore, many hypothesized that the number of men seeking penile prosthetic surgery would also increase in the future; however, no validated administrative data sets have specifically examined this hypothesis.

Prior trends in the utilization of penile prosthetic surgery have been reported using Healthcare Cost and Utilization Project (HCUP) data, single institution, single surgeon, or industry-sponsored data [1,9,10]. No studies to date have included validated national or regional population data to report modern trends in the implantation of penile prostheses. We examined both national and California data to report hospital-based trends in surgical management of ED.

Methods

The Nationwide Inpatient Sample (NIS) and The State of California Office of Statewide Health Planning and Development (OSHPD) data sets were utilized to study trends of penile prosthesis surgery. Both data sets were utilized to capture any surgery performed in a hospital, regardless of whether they are admitted overnight or whether they are admitted for only a 23-hour observation.

The NIS database is part of the HCUP, sponsored by the Agency for Healthcare Research and Quality, and includes 20% of U.S, community hospitals. Hospital records include clinical and resource use information typically available from discharge abstracts. Hospital and discharge weights are provided to generate national estimates. Discharges from 1998 through 2010 were included in the analysis. All data were weighted using discharge level values, based on the relative proportion of the total U.S. hospital patient population accounted for by that record, to produce national estimates.

We identified adult patients (≥50 years old) with International Classification of Diseases, Ninth Revision (ICD-9) procedural codes for penile prosthesis implant from 1998 through 2010. Similarly, the OSHPD was used to capture California state trends in penile implantation between 1995 and 2010. OSHPD provides a 100% sample of surgeries performed at nonfederal hospitals in California. Penile prosthetic surgeries were captured using ICD-9 codes in patients ≥50 years old. In both data sets, the primary end point was the total number of prosthetic surgeries performed and the proportion of inflatable vs. semi-rigid prosthesis, which was calculated annually. Binary logistic regression analysis was used to examine patient factors associated with the selection of inflatable vs. semi-rigid penile prosthesis.

Using both NIS and OSPHD data sets, patient age, race, gender, insurance type (Medicare, Medicaid, private), Charlson comorbidity index score, comorbidities (hypertension, diabetes mellitus, obesity), history of Peyronie's disease, history of spinal cord injury, history of prostate cancer, and hospital cost were abstracted. Comorbidities were documented using records from ICD-9 coding, and Appendix S1 summarizes the ICD-9 codes utilized.

Chi-squared and Mann–Whitney *U*-tests were used to compare demographics, disease-specific variables, comorbidities and cost between inflatable and semi-rigid implants. Linear regression was used to compare rates of surgery over time, P value < 0.05 was considered significant.

Results

Between 1998 and 2010, there was a significant decrease in the total number of hospital-based penile prosthetic surgeries performed in the United States (Figure 1). The number of cases decreased from 4,703 (1998) to 2,338 (2010). The proportion of inflatable penile prosthetic surgery significantly increased during this same time period (Table 1). In univariate analysis (Table 2), the proportion of Caucasians, men with Peyronie's disease, or men with private insurance was higher among those receiving inflatable penile prosthesis. In contrast, the proportion of men with spinal cord injuries was significantly higher in semi-rigid prosthesis group. No differences were observed in rates of hypertension, diabetes mellitus, obesity, coronary artery disease, peripheral vascular disease or prostate cancer among patients receiving inflatable vs. semi-rigid prosthesis in the hospital setting.

Between 1995 and 2010, there was also a significant decrease in the total number of penile implants performed in California hospitals (Figure 2). The proportion of inflatable penile implants significantly increased (Table 3). In uni-