National Practice Patterns of Treatment of Erectile Dysfunction with Penile Prosthesis Implantation

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Abbreviations and Acronyms

ABU = American Board of Urology

COE = center of excellence

ED = erectile dysfunction

IPP = inflatable penile prosthesis

MP = malleable prosthesis

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Purpose: The increase in medical options to manage erectile dysfunction has changed how urologists approach erectile dysfunction. We reviewed contemporary trends in penile prosthesis implantation in the United States with an emphasis on practice patterns, demographics and temporal changes.

Materials and Methods: Annualized case log data of penile prosthesis surgeries from certifying and recertifying urologists from 2003 to 2012 were obtained from the American Board of Urology. CPT code 54400 was used to identify malleable prosthesis surgeries and CPT codes 54401 and 54405 were used to identify inflatable prosthesis surgeries. To evaluate the association between surgeon characteristics and practice patterns we used the chi-square test.

Results: The surgical cohort included 6,615 urologists who placed a total of 9,558 penile prostheses during the study period. Only 23.9% of urologists reported performing a penile prosthesis operation. Of the prostheses 75% were placed by surgeons who completed 4 or fewer such operations per year. Of urologists who recorded logs 1.5% considered themselves to be specialists in andrology and yet they were responsible for a disproportionate 10% of all prostheses implanted (OR 5.9, $p < 0.0001$). The proportion of inflatable penile prostheses compared to malleable prostheses increased twelvefold in 10 years. The number of logged prosthesis surgeries was skewed toward more implants placed by the most experienced urologists than by new urologists (OR 1.92, $p < 0.0001$).

Conclusions: Although specialists and high volume surgeons perform a disproportionate number of implant surgeries, low volume surgeons place most penile prostheses in the United States. Additional research is needed to determine best practices to achieve optimal patient outcomes in penile prosthesis surgery.

Key Words: penis, penile implantation, erectile dysfunction, physician's practice patterns, outcome assessment (health care)

In the last 15 years medical treatment options for ED have changed significantly.[1,2] The introduction of sildenafil in 1998 followed by improvements in injection therapy transformed the ability of urologists to treat ED nonsurgically. Unfortunately phosphodiesterase-5 inhibitors are not uniformly effective and the failure rate is well described, especially in the post-prostatectomy population.[3] Several studies confirmed that adequate response and long-term compliance are not always achieved with medical interventions for ED.[4,5] Furthermore, as progressive

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ED develops, there is a well-defined population of patients whose response to pharmacological intervention deteriorates with time. Despite the high success rate associated with intracorporeal injection, the compliance rate is as low as 15%[6,7] and patients are increasingly turning to surgical treatment options.[8,9]

Penile prosthesis surgery has the greatest documented patient satisfaction rate of available ED treatments as well as high partner satisfaction rates.[2,3] Several studies suggest that surgeon and facility volumes of prosthesis surgery may influence surgical outcomes.[10,11] However, to our knowledge there has been no contemporary evaluation of the actual surgical practice patterns of penile prosthesis surgery in the United States to date.

We reviewed contemporary surgical trends in penile prosthesis implantation with an emphasis on who is adopting which surgical techniques, what surgeon specific characteristics influence treatment selection and whether surgical specialization or experience influences surgical volume.

METHODS

The ABU was started in 1934 to serve as a surgical specialty board for improving standards, promoting competency and encouraging education in the practice of urology. Urologists may be granted certification by the ABU by completing basic training, thereby demonstrating that they have attained a level of knowledge and expertise required for the care of patients with urological diseases. If certified before 1985, recertification is not mandatory but for all urologists certified after 1985 mandatory recertification must be performed every 10 years. A significant portion of certification is the completion of surgical operative logs describing a 6-consecutive month period before application submission. These logs characterize patient demographics, including age and gender. Surgeon characteristics, including age, certification group and clinical practice location, are also included. In addition, surgeons report self-appointed subspecialization in 1 of 5 areas (endourology, oncology, andrology, pediatrics and female urology).

Diagnoses are logged by ICD-9 code and surgical procedures are coded using the CPT code system. The code 54400 was used to identify MP surgeries, and codes 54401 and 54405 were used to identify IPP surgeries.

Case log reports are received from the ABU in annualized format and represent a 1-year representation of individual surgeon practice volume based on a 6-month operative period. This methodology is consistent with previous reports of practice patterns.[12,13] We analyzed annualized case logs from 2003 to 2012 for trends. The chi-square test and Student t-test were used to evaluate surgeon and practice factors associated with penile prosthesis placement with results considered statistically significant at $\alpha < 0.05$. This study was exempted from institutional review board approval.

RESULTS

The surgical cohort included 6,615 urologists who performed a total of 9,558 penile prosthesis surgeries during the 10-year study period. Of urologists 23.9% logged a penile prosthesis operation (1,587 of 9,558). The single highest volume surgeon logged 244 prosthesis surgeries in 1 calculated calendar year. The top 20 highest volume prosthesis surgeons were responsible for 16.5% of total prosthesis placements in the United States ($p < 0.001$). Also, 7,179 of 9,558 prostheses (75%) were placed by surgeons who performed 4 or fewer prosthesis implantations per year (fig. 1). The median number of prostheses placed by surgeons who performed at least 1 prosthesis implantation was 4 per year and 46.2% of these surgeons placed 2 or fewer prostheses per year (755 of 1,587) (fig. 2).

Of all urologists who submitted case logs only 1.5% specialized in andrology. However, these andrologists were responsible for a disproportionate 10% percent of all prostheses implanted (OR 5.9, $p < 0.0001$). The number of prosthesis surgeries logged was skewed toward the most experienced urologists (second recertification), who performed more implants than new urologists and urologists undergoing first recertification (OR 1.92, $p < 0.0001$ and OR 1.1, $p < 0.01$, respectively).

The overall proportion of IPPs to MPs was 10:1 (8,726 of 832) during this period. There was a twelvefold increase in IPP placement compared to MP placement in this 10-year period (fig. 3). In 2003 the ratio of IPPs to MPs was 2.3:1, which increased to 25:1 by 2012. There was no significant difference

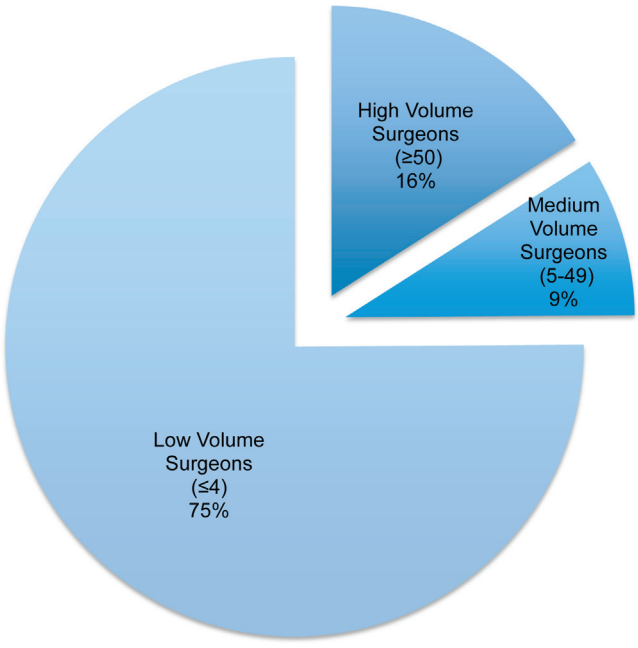

Figure 1. Prosthesis placement by annual surgeon volume