

PRIAPISM

Risk Factors for Priapism Readmission



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ABSTRACT

**Introduction:** Priapism is a urologic emergency with a tendency to recur in some patients. The frequency of, time to, and risk factors for priapism recurrence have not been well characterized.

**Aim:** To identify predictors of priapism readmission.

**Methods:** We used the New York Statewide Planning and Research Cooperative System database to identify patients presenting to emergency departments with priapism from 2005 through 2014. Patients were tracked up to 12 months after initial presentation. Proportional hazards regression was used to identify risk factors for priapism readmission.

**Main Outcome Measures:** Readmissions for priapism.

**Results:** The analytic cohort included 3,372 men with a diagnosis of priapism. The average age at first presentation was  $39 \pm 18$  years and 40% were black. Within 1 year, 24% of patients were readmitted for recurrent priapism, 68% of whom were readmitted within 60 days. On multivariate analysis, sickle cell disease (hazard ratio [HR] = 2.5, 95% CI = 2.0–3.0), drug abuse or psychiatric disease (HR = 1.9, 95% CI = 1.6–2.2), erectile dysfunction history (HR = 1.9, 95% CI = 1.5–2.3), other than commercial medical insurance (HR = 1.2, 95% CI = 1.0–1.4), and inpatient admission for initial priapism event (HR = 0.5, 95% CI = 0.4–0.6) were significant risk factors for readmission.

**Conclusion:** Nearly one fourth of patients with priapism were readmitted for recurrent priapism within 1 year of initial presentation. Most readmissions were within 60 days. Future research should focus on strategies to decrease recurrences in high-risk patients.

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**Key Words:** Priapism; Patient Readmission; Risk Factors

INTRODUCTION

Priapism, defined as penile tumescence lasting longer than 4 hours without sexual stimulation, is a urologic emergency for which prompt treatment is often necessary.<sup>1</sup> Despite being first characterized more than 100 years ago, the epidemiology of priapism has been explored only in a handful of studies.<sup>2,3</sup> Several population-level studies of European cohorts have estimated the incidence of priapism at 0.3 to 1.5 per 100,000 person-years.<sup>4–6</sup> A recent study from the United States using the Nationwide Emergency Department Sample estimated the

incidence to be 5.3 per 100,000 men per year.<sup>7</sup> The health care burden of priapism in the United States has been estimated to be more than \$123 million largely because of inpatient admissions.<sup>8</sup>

Priapism risk factors include alcohol and drug abuse, hematologic dyscrasias (thalassemia, thrombophilia, and sickle cell disease [SCD]), thrombotic disease states (asplenia and erythropoietin use), trauma, hematologic malignancies, metastatic malignancies, intracavernous injections for erectile dysfunction (ED), spinal cord injury, and use of oral certain antipsychotics and phosphodiesterase inhibitors.<sup>9,10</sup> SCD is one of the strongest risk factors and is estimated to account for 11% to 42% of priapism events.<sup>11,12</sup>

As such, patients who present with priapism are often young men who have long-term medical conditions, placing them at risk for recurrence. Although our anecdotal experience has suggested a high rate of recurrence for some patients, the frequency of, time to, and risk factors for priapism recurrence have not been well characterized in the literature, with recurrence rates ranging

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from weekly to several times within a year.<sup>6,13–15</sup> Most previous population-level studies on priapism have been cross-sectional analyses that have not tracked patient progress over time, thus limiting their ability to describe patterns of recurrence.<sup>7,8,12</sup> As such, we sought to characterize and to identify independent predictors for priapism readmission.

## METHODS

### Dataset

The New York Statewide Planning and Research Cooperative System (SPARCS) is an administrative database that has collected data since 1994 from every hospital inpatient stay and ambulatory surgery encounter in the state of New York. All emergency department data were available beginning in 2005. Available patient-level data include demographic information, procedures, and diagnoses. Our institutional review board deemed this study exempt from review (waiver number AAAQ4259).

This study was performed in accordance with the ethical standards of the institutional and national research committees and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

### Cohort

We identified all patients who presented to the emergency department from 2005 through 2014 with priapism (*International Classification of Diseases, Ninth Revision* [ICD-9] diagnosis code 607.3) as a principal diagnosis or as present on admission. Using unique personal identifiers, we identified any additional inpatient admissions or emergency room visits for up to 1 year after their initial presentation. Patients presenting because of trauma were excluded.

### Outcomes

The primary outcome was readmission for priapism. Readmission was defined as the subsequent emergency department encounter or inpatient admission with priapism as the primary diagnosis or present on admission within 1 year of the initial presentation. Patients who were not readmitted for priapism within 1 year were censored at 12 months, and those with less than 12 months of follow-up were censored on the last day of the dataset (December 31, 2014). Because only the month and year of the encounter admission were available, the date of admission was set to the 15th of the month.

### Independent Variables

We defined patient comorbidity using the Elixhauser comorbidity index<sup>16</sup> and identified known risk factors for priapism (*Supplementary Table 1*)<sup>10</sup> based on SPARCS data for up to 1 year before initial presentation. Risk factors assayed included history of ED, psychiatric disease, SCD, drug abuse history, neurologic disease, and hematologic cancer. Neurologic disease

was defined as spinal cord injury, paralysis, cauda equina syndrome, autonomic neuropathy, spinal stenosis, lumbar disc herniation, cerebrovascular accident, or neurosyphilis. Psychiatric disease was defined as any mood, psychotic, or anxiety disorder. Outpatient prescription data were not available so ED and psychiatric disease were included, because some treatments for these patients (ie, antipsychotics, intracavernosal injections) are associated with priapism.<sup>1</sup>

Using ICD-9 *Clinical Modification* procedural codes, *Common Procedural Terminology* codes, and Healthcare Common Procedure Coding System codes, we identified the treatments performed at each encounter (*Supplementary Table 2*). Surgical procedures were defined as shunts, incision of the penis, penile implantation, or other penile procedures. Other procedures were defined as irrigation of the corpus cavernosa and penile injections. Patients who did not have a procedure to treat priapism were considered to have supportive care only. Patient-level characteristics, such as age, sex, race, and ethnicity, were identified. Other insurance was defined as self-pay, worker's compensation, other federal program, disability, Title V, or unknown. Geographic region was based on the county in which the hospital was located.

### Analysis

We first described patterns of initial encounter admission and readmission for patients with priapism. Differences between readmitted and non-readmitted patients were analyzed using  $\chi^2$  tests. In accord with the SPARCS data use agreement, cell counts smaller than 10 were suppressed. We used a Cox regression to identify predictors of time to priapism readmission. Demographic characteristics, including age, sex, and insurance status, were included in addition to priapism risk factors. Spearman rank correlation coefficient was calculated for each pair of ranked priapism risk factors (as ranks). Because drug abuse and psychiatric disease were highly correlated ( $r > 0.40$ ), they were combined for the multivariate model to prevent collinearity. Hazard ratios (HRs) and 95% CIs were reported. All  $P$  values less than .05 were considered significant. All analyses were performed using SPSS 23.0 (SPSS, Inc, Chicago, IL, USA).

## RESULTS

We identified 3,372 men who presented to an emergency department with priapism. The average age at first presentation was  $39 \pm 18$  years (*Table 1*) and nearly 40% were black (41% white and 19% other race). Most patients were healthy (comorbidity index = 0). Approximately 15% of patients had SCD, 16% had drug use history, and nearly 20% had psychiatric disease. Most patients had commercial health insurance (48%) or Medicare or Medicaid (27%). Other insurance was composed predominantly of self-payers (13%) or unknown insurance (11.5%), with a minority using worker's compensation (0.2%) or other federal program (0.3%).

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