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Association for Academic Surgery

Postoperative urinary retention after laparoscopic total extraperitoneal inguinal hernia repair

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ARTICLE INFO

Article history:
Received 30 January 2018
Received in revised form
30 April 2018
Accepted 24 May 2018
Available online xxx

Keywords:
Urinary retention
Inguinal hernia
Laparoscopy

ABSTRACT

Background: Postoperative urinary retention (POUR) after laparoscopic inguinal hernia repair has an incidence of 2%-30%. POUR can lead to increased length of stay, decreased patient satisfaction, and increased health-care costs. The objective of this study was to determine the patient risk factors at our institution contributing to POUR after laparoscopic total extraperitoneal (TEP) inguinal hernia repair.

Methods: A retrospective chart review of patients who underwent a laparoscopic TEP inguinal hernia repair at our institution from 2009 to 2016. POUR is defined as the inability to urinate requiring urinary straight or indwelling catheterization in the postoperative period. Univariate analyses were performed on perioperative variables and their correlation with POUR.

Results: In total, 578 laparoscopic TEP inguinal hernia repair patients were included in the study: 277 (48%) indirect, 144 (25%) direct, 6 (1%) femoral, and 151 (26%) combination of direct, indirect, and/or femoral hernias. Of these, 292 (51%) were bilateral, and 286 (49%) were unilateral. Overall, 64 (11.1%) of the 578 patients developed POUR. POUR was significantly associated with benign prostatic hyperplasia, age 60 y or older, urinary tract infection within 30 d, and decreased body mass index.

Conclusions: Patients aged greater than 60 y, with benign prostatic hyperplasia, and a decreased body mass index ($\leq$25.8 kg/m^2) were more likely to develop POUR after laparoscopic TEP inguinal hernia repair. In addition, these patients were more likely to develop a urinary tract infection within 30 d. Future quality initiatives can be explored to minimize the incidence of POUR in high-risk patient populations.

This study was presented as a QuickShot oral presentation at the 2018 Academic Surgical Congress, Jacksonville, Florida, January 30–February 1, 2018.

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https://doi.org/10.1016/j.jss.2018.05.052

Introduction

Inguinal hernia repair is one of the most frequently performed operations in general surgery, with over 20 million operations performed yearly.[1] Over the past several years, laparoscopic hernia repairs have become increasingly common, now consisting of up to 40% of inguinal hernia repairs performed in some areas of the country. Postoperative urinary retention (POUR) is common after laparoscopic inguinal hernia repair with an incidence of 2%-30%.[1-6] This is in contrast to open inguinal hernia repairs, with POUR ranging between 0.4% and 3%.[2] POUR is defined as the inability to urinate and need for urinary straight or indwelling catheterization in the postoperative period. Urinary tract infections (UTIs), longer length of stay, increased cost, and decreased patient satisfaction can be associated with POUR. Reducing the rate of POUR after such a common operation could lead to an improvement in patient quality initiatives and reduction in health-care costs.[7]

Previously suggested risk factors for POUR include increased age, male sex, longer operative time, increased intraoperative fluids, higher doses of narcotics, benign prostatic hyperplasia (BPH), bilateral hernias, intraoperative catheter usage, and type of mesh fixation. These risk factors are not routinely shown to be correlated with POUR as some studies indicate multifactorial associations, whereas others show no specific clinical factors associated with POUR.[1-7] In previous studies, patient cohorts ranged from 101 to 350 patients. In addition, the majority of studies included both open and laparoscopic approaches to inguinal hernia repair, further limiting the consensus on which risk factors are associated with POUR in laparoscopic total extraperitoneal (TEP) inguinal hernia repair. The primary objective of this study was to determine patient risk factors at our institution contributing to POUR, representing the largest cohort of patients from a single institution all undergoing laparoscopic TEP inguinal hernia repair.

Materials and methods

An Institutional Review Board approved retrospective chart review was performed of patients who underwent a laparoscopic TEP inguinal hernia repair at our institution from 2009 to 2016. Inclusion criteria included adult patients aged 18 y or older, with a direct, indirect, and/or femoral inguinal hernia who underwent a laparoscopic repair. Patients who underwent a concurrent surgery at the time of the inguinal hernia repair were also included. Exclusion criteria included patients who underwent a conversion to an open inguinal hernia repair, chronic indwelling catheters, concurrent genitourinary surgeries requiring extended postoperative catheter courses, and an extended hospital stay from an unrelated infection. The procedures were performed by six minimally invasive general surgeons at the Medical College of Wisconsin in Milwaukee, Wisconsin. All surgeons performed the procedures in a standard TEP fashion, with intraoperative catheter usage, mesh type, and mesh fixation decided at the discretion of the surgeon.

Within this cohort of patients, patients who developed POUR were identified. POUR was defined as the inability to void spontaneously prior to hospital discharge, requiring straight or indwelling catheter placement. All patients were required to void prior to discharge. If they were unable to void, an indwelling catheter would be placed, the patient was admitted for observation, and the catheter was removed the following morning. If the patient was unable to void after removal of the catheter, the patient was discharged with an indwelling catheter and scheduled to follow-up with urology for a fill and void trial within 1 wk. Preoperative and postoperative variables were identified to determine risk factors that contributed to the incidence of POUR.

Statistical analysis was completed using IBM SPSS Statistics, Version 24. A P-value of <0.05 was considered significant. All proportional data are presented as percentages and were analyzed using chi-square tests. All continuous data are presented as mean ± standard deviation and were compared using two-tailed, unpaired Student t-tests. For operative time comparison, one-way analysis of variance was used.

Results

A total of 609 patients underwent laparoscopic TEP inguinal hernia repair during our study period, and 578 patients met inclusion criteria. Patient preoperative and intraoperative variables are included in Table 1. Of the 578 laparoscopic TEP inguinal hernia repair patients included in the study, 64 (11.1%) developed POUR. POUR was significantly associated with BPH, age 60 y or older, UTI within 30 d, and a decreased body mass index (BMI). Additional preoperative and intraoperative variables that were not statistically significant determinants of POUR are also listed. Patients with POUR had a significantly increased incidence of UTI at 6.3% as compared to 0.6% in those without POUR ($P < 0.0001$). Within this group of patients who developed a UTI, four patients (57.1%) had an intraoperative urinary catheter.

Six different surgeons performed laparoscopic TEP inguinal hernia repairs at our institution. Table 2 categorizes the six surgeons at our institution, the incidence of POUR, as well as operative first assistant and the use of intraoperative urinary catheterization. Of the six surgeons, four surgeons had patients that experienced POUR. Of patients who developed POUR, residents were the first assistant in a total of 48 cases (75.0%), fellows in 15 cases (23.4%) and attending in one case (1.6%). The extent of involvement by the first assistant in each case is unable to be clearly identified. Surgeon 1 accounted for 30 of the 64 patients who developed POUR (46.9%) but accounted for almost half of the patients in this study, 272 of 578 procedures (47.1%). Surgeon 4 accounted for 8 of the 64 patients who developed POUR (12.5%) and accounted for 64 of 578 cases in this study (11.1%). Although surgeon 4 accounted for only 12.5% of the total cases of POUR, surgeon 4 had the highest incidence of POUR per number of cases in this study and had the lowest usage of intraoperative urinary catheter in patients who developed POUR (25.0%).

Among the patients who developed POUR, Table 3 highlights the perioperative outcomes of those patients. Within