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Preoperative urinary tract infection increases postoperative morbidity



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ABSTRACT

Background: Preoperative urinary tract infection (UTI) may be associated with surgical site infections secondary to hematogenous spread of bacteria. The association between preoperative UTI and postoperative complications has not been evaluated in general surgery populations.

Materials and methods: Patients undergoing elective general surgery procedures from 2011 to 2013 were selected from the American College of Surgeons National Surgical Quality Improvement Program database. Patients with UTI present at the time of surgery (PATOS) were identified as cases. Patients without UTI PATOS were selected and matched 2:1 on age, American Society of Anesthesiologists class, and Current Procedural Terminology code with identified cases. Univariate and multivariate analyses compared postoperative outcomes between the two groups.

Results: A total of 434,802 patients were identified for inclusion in the study, with an overall preoperative UTI rate of 0.1% ($n = 363$). On univariate analysis, the UTI group had a significantly higher incidence of overall complications, infectious complications, and noninfectious complications. Multivariate analysis confirmed that patients with UTI had a higher risk of postoperative complications compared with those without preoperative UTI (odds ratio [OR] 1.551, 95% confidence interval [CI] 1.071–2.247). This relationship persisted for both infectious (OR 1.515, 95% CI 1.000–2.296) and noninfectious (OR 1.683, 95% CI 1.012–2.799) complications.

Conclusions: We demonstrated an increased rate of 30-d complications in elective general surgery patients with UTI PATOS. These findings suggest that diligent efforts to diagnose and treat UTI before surgery may result in improved outcomes. Furthermore, surgeons should consider postponing elective procedures to allow for the complete resolution of preoperative UTI.

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Introduction

Over 4%–5% of patients undergoing colorectal surgeries and nearly 3% of patients undergoing elective vascular surgeries develop postoperative urinary tract infection (UTI).^{1–4} In the perioperative setting, UTI is associated with higher costs,

longer hospital stay, and increased incidence of other postoperative complications.^{3–8} Although the implications of postoperative UTI are well known, the impact of preoperative UTI on postoperative outcomes remains controversial. The urinary tract is the most common source of bacteremia in the elderly, which highlights the potential role of urinary

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pathogens in systemic illness.⁹ In the orthopedic surgery literature, bacteria from the urinary tract have been implicated in the development of surgical site infection (SSI). Specifically, a mechanism of hematogenous spread of urinary pathogens and subsequent seeding at the site of orthopedic implants has been described.¹⁰⁻¹³ Conversely, others argue that patients with preoperative UTI have no increased risk of SSI, and therefore, this should not be a reason to delay surgery.¹⁴

Despite the well-described negative consequences of postoperative UTI, fewer studies have examined the relationship between UTI present at the time of surgery (PATOS) and postoperative complications. Diagnosis and treatment of UTI preoperatively may prove to be an easily modifiable factor that could have the potential to improve postoperative outcomes. The goal of this study was to evaluate the risk of postoperative complications in the setting of preoperative UTI in patients undergoing elective general surgery procedures. We hypothesized that the presence of UTI at the time of elective surgery is associated with increased postoperative complication rates compared with those without preoperative UTI.

Methods

Data source and patient selection

All patients in the multi-institutional American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) participant use files from 2011 to 2013 who

underwent elective general surgery procedures were considered for inclusion in this study. Patients who had missing UTI PATOS information were excluded. Additional exclusion criteria included American Society of Anesthesiologists (ASA) class 5 or unknown, presence of preoperative sepsis or septic shock, and preoperative ventilator dependence. Patients with UTI PATOS were identified as cases. Patients without UTI PATOS were selected and matched 2:1 on age, ASA class, and Current Procedural Terminology (CPT) code with the previously identified cases (Fig. 1). The University of Wisconsin granted Institutional Review Board exemption for this study. Patient consent was not required for this study.

Variable definitions

“Elective surgery” is defined in NSQIP as surgery in which the patient presents to the facility for a scheduled surgery on the day that the procedure is to be performed and specifically excludes emergent and urgent cases, along with cases in which the patient is inpatient status before surgery, presents through the emergency department, or is transferred from a clinic. General surgery procedures were defined as those being performed by a general surgeon and included a variety of different procedures ranging from skin and soft-tissue surgery to solid organ resections (Table 1). Procedures were categorized by CPT code into seven major groups as summarized in Table 1.

Preoperative UTI was defined according to the UTI PATOS variable, which was added to the NSQIP database in 2011. This variable captures UTIs that were likely or definitely present

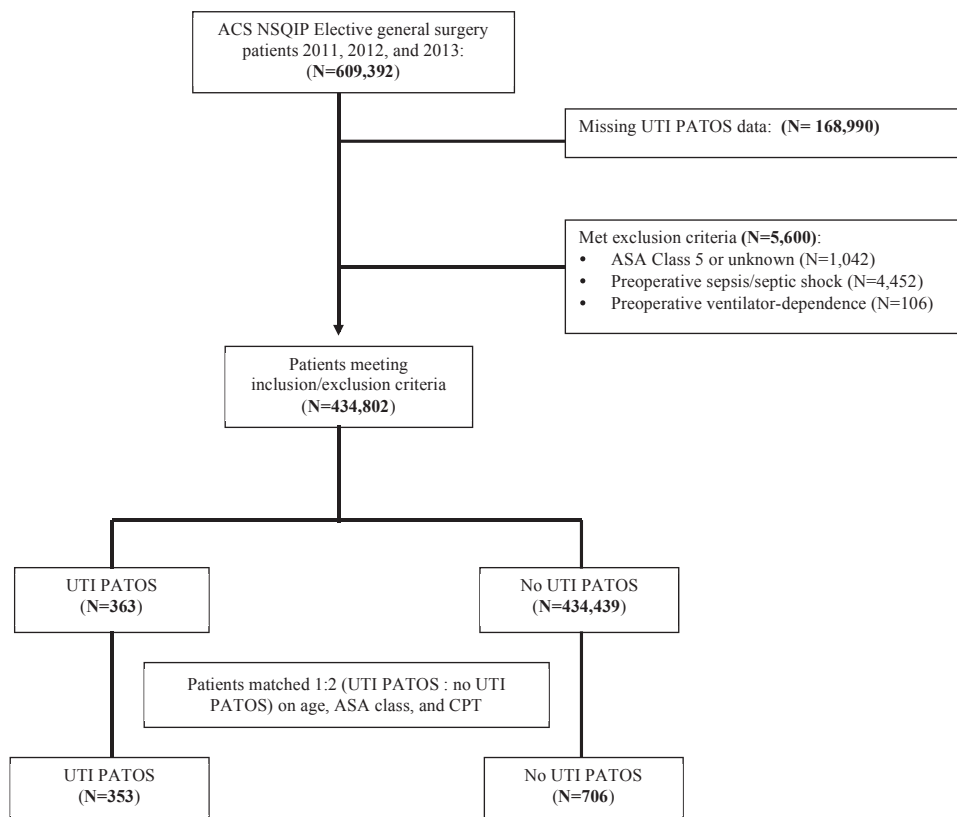


Fig. 1 – Flow diagram depicting construction of cohorts.

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