

Urinary Tract Injury at Benign Gynecologic Surgery and the Role of Cystoscopy

A Systematic Review and Meta-analysis

Brahmananda Teeluckdharry, MD, LMCC, Donna Gilmour, MD, FRCSC, and Gordon Flowerdew, DSc

OBJECTIVE: To calculate the rates of urinary tract injury detected during and after benign gynecologic surgery. To explore the role of routine intraoperative cystoscopy and determine if it helps in reducing injuries detected postoperatively.

DATA SOURCES: We conducted a literature search for urinary tract injuries at benign gynecologic surgery in PubMed, EMBASE, ClinicalTrials.gov, and Web of Science from January 2004 to August 2014. We combined our results with a database from a previously published systematic review to include earlier studies.

METHODS OF STUDY SELECTION: A total of 79 studies met our inclusion criteria. Excluded were letters to the editor, studies involving only selective cystoscopy in higher risk patients, case reports, and reports that included injuries resulting from obstetric or oncologic procedures.

TABULATION, INTEGRATION, AND RESULTS: Data from each report were classified according to type of surgery into vaginal hysterectomy, abdominal hysterectomy, laparoscopic hysterectomy, other (nonrobotic) gynecologic and urogynecologic surgery, robotic hysterectomy, and other robotic gynecologic and urogynecologic surgery. We determined the ureteric and bladder injury rates for each surgery type from studies in which routine intraoperative cystoscopy was performed and separately from studies in which it was not performed. Intraoperatively detected rates of ureteric and bladder

injury were markedly higher with routine intraoperative cystoscopy. We obtained an adjusted ureteric injury rate of 0.3% and a bladder injury rate of 0.8%. The estimated postoperative ureteric injury detection rates per 1,000 surgeries were 1.6 without routine cystoscopy and 0.7 with routine cystoscopy. Postoperative bladder injury detection rates per 1,000 surgeries were 0.8 without routine cystoscopy and 1.0 with routine cystoscopy.

CONCLUSION: Although routine cystoscopy clearly increases the intraoperative detection rate of urinary tract injuries, this systematic review of 79 mostly retrospective studies shows that it does not appear to have much effect on the postoperative injury detection rate.

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Gynecologic surgery can have major perioperative morbidity, including urinary tract and bowel injuries, infection, hemorrhage, thromboembolism, and death.¹ Injuries to the urinary tract, even if they occur relatively infrequently, can cause significant morbidity. The effects of the injury, its management, and its sequelae may result in temporary or permanent loss of employment, pain, anxiety, depression, and adverse effects on interpersonal relationships and quality of life.² Hospitalizations from delayed diagnosis result in 1.72 times greater cost to the health care system than those with immediate detection of injury.³ Thus, intraoperative detection and recognition of urinary tract injuries remain very important for patients and gynecologists because they decrease morbidity⁴ and result in less litigation.⁵

In 2007, the American College of Obstetricians and Gynecologists issued a guideline on the selective use of intraoperative cystoscopy after all prolapse or incontinence procedures.⁶ The American Association of Gynecologic Laparoscopists in 2012 recommended that routine cystoscopic evaluation be carried out after all laparoscopic total hysterectomy procedures.⁷ The National Quality Forum also published quality

See related editorial on page 1136.

From the Departments of Obstetrics and Gynecology and Community Health and Epidemiology, Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia, Canada.

Corresponding author: Brahmananda Teeluckdharry, MD, LMCC, 95, Bently Drive, Halifax, Nova Scotia B3S0C4, Canada; e-mail: kevintee@dal.ca.

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indicators (NQF 2063) regarding the selective use of routine cystoscopy. However, no strict recommendations on the role of universal cystoscopy in benign gynecologic surgery exist to date.

Our objectives were to estimate the rates of urinary tract injury after benign gynecologic surgery, to explore the role of routine intraoperative cystoscopy at benign gynecologic surgery, and to measure the extent that routine cystoscopy helps reduce postoperatively detected injuries.

SOURCES

Using our previously published combination of MeSH terms and single-search strategies,^{8,9} we performed a comprehensive search of PubMed, EMBASE, and ClinicalTrials.gov from January 2004 to August 2014 identifying studies that describe the rates of urinary tract injuries in benign gynecologic surgery that used or did not use intraoperative cystoscopy. We used the following MeSH and non-MeSH terms to search for studies involving robotics in benign gynecologic surgery: gynecologic surgical procedures, adverse events, complications, intraoperative, postoperative, robotics, adverse, injury, tear, perforation, puncture, robotic gynecologic surgery, gynecologic, intervention, procedure, operation, operative, da Vinci, ureter, urinary, bladder. Because studies involving robotic surgery are fairly new, we additionally searched Web of Science. Searches in all these databases were limited to female human studies published in English. We also examined and hand-searched the reference lists of all eligible review articles to identify any additional studies not found with our search strategy.

STUDY SELECTION

The study design was a systematic review and the study population comprised case series of urinary tract injuries in benign gynecologic surgery. We retrieved 321 citations in PubMed and 284 citations in EMBASE for studies involving urologic injury without cystoscopy. Studies mentioning cystoscopy in benign gynecologic surgery amounted to 77 citations in PubMed and 64 citations in EMBASE. Abstracts involving robotic surgery with and without cystoscopy included 34 in PubMed, 159 in EMBASE, and 44 in Web of Science. Many of these studies were duplicated across databases. We did not find any ongoing or completed trial in ClinicalTrials.gov that was relevant to our study. There were 465 unduplicated abstracts screened independently by two authors (B.T. and D.G.) for possible inclusion in our study. From this, 61 studies were reviewed in detail as per our inclusion and exclusion criteria. A

summary of our article selection process is shown in Figure 1.

For studies that do not involve cystoscopy at all, we only selected studies with more than 500 patients. For studies that used routine intraoperative cystoscopy, because those are fewer in the literature and many involve fewer than 500 patients, we selected them irrespective of the number of patients involved. Studies that were selected included transurethral and transvesical cystoscopy with a 0°, 30°, or 70° lens. For the majority of reports, the most common route for performing cystoscopy was transurethral and the type of lens used was not specified. Cystotomies at the supratrigone have increased risk for morbidity, including vesicovaginal fistula formation, compared with cystotomies at the dome. Unfortunately, because of the way information is reported, we were unable to accurately differentiate among these cystotomy sites and therefore included all these cases as per our inclusion criteria. Excluded were letters to the editor, studies involving only selective cystoscopy in higher risk patients, case reports, and reports in which injuries resulting from benign gynecologic surgery could not be distinguished from injuries resulting from obstetric or oncologic procedures.

From this updated search, we found 31 studies that matched our inclusion and exclusion criteria: 19 on the frequency of lower urinary tract injury during benign gynecologic surgery, four on the frequency of injury with routine intraoperative cystoscopy after benign gynecologic surgery, and eight that dealt with complications of robotic surgery in benign gynecologic

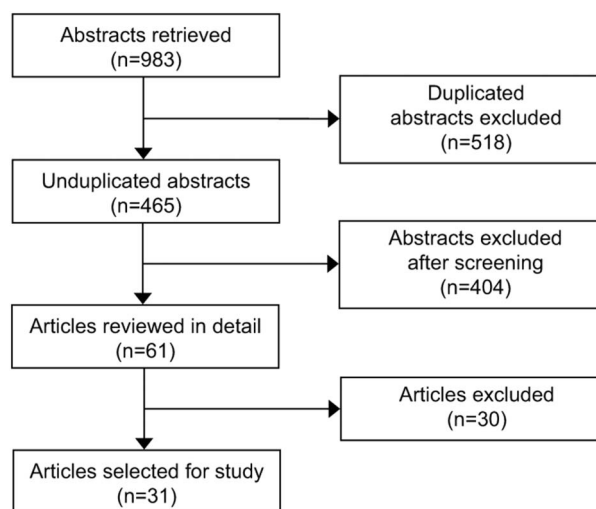


Fig. 1. Summary of study selection.

Teeluckdharry. Urinary Tract Injury Rates and Cystoscopy. *Obstet Gynecol* 2015.



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