

RISK FACTORS FOR 30-DAY PERIOPERATIVE COMPLICATIONS AFTER UROGYNECOLOGIC SURGERY

Hypothesis / aims of study

Given the aging population in the United States, pelvic floor dysfunction and the need for surgical management in elderly patients are projected to increase steeply in the coming decades. Complication rates and risk factors for complications after prolapse and incontinence procedures have not been fully delineated. Previous groups have reported perioperative complication rates ranging from 25-46% [1,2,3]. Risk factors found in some studies to be associated with complications after urogynecologic surgery include concomitant procedures, operative time, advanced age, medical comorbidities such as cardiac disease, and American Society of Anesthesiologists (ASA) classification [1,2,3]. However, findings have been inconsistent between studies. The multi-institutional American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) was established to improve understanding of surgical outcomes through the prospective collection of data across surgical disciplines. It captures over 240 patient variables from more than 460 participating institutions across the United States and is uniquely poised to assess outcomes data. Our objective was to utilize the NSQIP database to determine rates of and risk factors for complications after prolapse and incontinence surgery.

Study design, materials and methods

We performed a retrospective search of the NSQIP database for all patients undergoing urogynecologic procedures between 2006 and 2010. As the database contains de-identified data, our Institutional Review Board deemed that formal review was not necessary. Patients were identified using Current Procedural Terminology (CPT) codes for suburethral sling, vaginal vault suspension, anterior/posterior/enterocele/paravaginal repair, anal sphincteroplasty, fistula repair, insertion/revision of vaginal graft, Interstim implantation, urethral procedures, sacral colpopexy, colectomy, colpocleisis, as well as vaginal, laparoscopic, and abdominal hysterectomy performed with any concomitant urogynecologic procedure. The primary outcomes of interest were 30-day complication rates, which were categorized as medical, surgical, and overall complications. Medical complications included pneumonia, venous thromboembolism, prolonged ventilation, acute renal failure, urinary tract infection, peripheral neurological deficit, cardiac arrest, blood transfusion, and sepsis. Surgical complications included surgical site infection and wound disruption. Demographics, comorbidities, and procedural variables were compared for patients with and without complications using chi-squared and one-way ANOVA tests. Multivariate regression analysis was performed to identify independent risk factors for complications.

Results

19,174 patients underwent urogynecologic procedures within the NSQIP database between 2006 and 2010. Procedures by type are listed in Table 1. The overall complication rate was 6.09%. The most common complications were urinary tract infection (3.87%), surgical site infection (1.19%), and blood transfusion (0.69%). There were 8 deaths, for a mortality rate of 0.04%. Patient-related and procedural characteristics that were associated with an increased rate of complications on bivariate analysis included steroid use ($p<0.001$), diabetes ($p=0.02$), chronic obstructive pulmonary disease ($p=0.004$), bleeding disorders ($p=0.03$), previous cardiac surgery ($p=0.007$), open wound infection ($p=0.001$), ASA level > 3 ($p<0.001$), longer operative time ($p<0.001$), concomitant procedures ($p<0.001$), and resident physician involvement ($p<0.001$). After multivariate regression, the variables that remained statistically significant included steroid use (OR 1.79, CI 1.22-2.62, $p=0.003$), wound infection (OR 2.1, CI 1.14-3.87, $p=0.02$), ASA level > 3 (OR 1.43, CI 1.23-1.66, $p<0.001$), longer operative time (OR 1.003, CI 1.002-1.003, $p<0.001$), concomitant procedures (OR 1.16, CI 1.01-1.32, $p=0.04$), and resident physician involvement (OR 1.2, CI 1.04-1.38, $p=0.01$).

Interpretation of results

The overall 30-day perioperative complication rate in our study was 6.09% and the mortality rate was 0.04%. We identified independent risk factors for complications including steroid use, open wound infection, ASA classification above 3, longer operative time, concomitant procedures, and resident physician involvement. Previous studies also found ASA classification, operative time, and concomitant procedures to be associated with complications after urogynecologic surgery; the remaining risk factors are unique to our study. In contrast, age over 80 years and preexisting cardiac disease, which correlated with complications in other studies, were not independent risk factors in our study. The strengths of our study include the large sample size and utilization of a national database, allowing for a high degree of generalizability. However, our study has several important limitations. First, NSQIP cannot identify specific complications such as bladder, bowel, and ureteral injury, which undoubtedly contributes to the lower overall complication rate compared to previous studies [1,2,3]. Furthermore, NSQIP does not capture complications occurring more than 30 days postoperatively. This was a retrospective study subject to the inherent limitations of this study design, including information bias. Although NSQIP has been validated and found to have high rates of accuracy and reliability, our study relies on correct CPT code recording at the time of surgery. Postoperative care and surgical technique may also vary among the institutions participating in NSQIP; these variables are difficult to quantify and cannot be controlled for in our study. Finally, surgical volume and experience of the operating surgeon cannot be identified in NSQIP; we were, however, able to assess resident involvement as a proxy for surgeon experience. Despite these limitations, our data provide important information regarding 30-day complication rates and risk factors for complications after prolapse and incontinence surgery.

Concluding message

Complication rates after female pelvic organ prolapse and incontinence procedures are low and mortality is rare. Using a large, national database, we have identified several independent risk factors for 30-day complications after urogynecologic surgery, providing important information for surgeons as they counsel patients and consider treatment alternatives.

Table 1. Urogynecologic procedures identified in NSQIP database from 2006-2010, listed by type.

Type of surgery	CPT Codes	N	% (n=19,174)
Vaginal apical repairs	57282, 57283	475	2.48%
MIS apical repairs	57425	581	3.03%
Abdominal apical repair	57280	376	1.96%
Site-specific repairs	45560, 56180, 57200, 57240, 57250, 57260, 57265, 57268, 57270, 57284, 57285, 57289, 57423, 57555, 57556	4619	24.09%
Suspension of uterus	58400, 58410	18	0.09%
Vaginal mesh placement	57267	103	0.54%
Vaginal mesh revisions	57295, 57296	182	0.95%
Incontinence procedures	51845, 51990, 51992, 57288	7001	36.5%
Fistula repairs	57300, 57305, 57308, 57320	129	0.67%
Anal sphincter procedures	46750, 46760, 46761, 46762,	691	3.60%
Urethral procedures	52341, 53000, 53230, 53430, 53500, 57220	110	0.57%
Neurostimulator implantation	64575, 64590	11	0.06%
Vaginal closure procedure	57120, 57110	167	0.87%
Concomitant Hysterectomy			
Vaginal	58260, 58262, 58263, 58267, 58270, 58275, 58280, 58285, 58290, 58291, 58292, 58293, 58294	2794	14.57%
Abdominal	58150 58152, 58180	407	2.12%
Laparoscopic	58541, 58542, 58543, 58544, 58550, 58552, 58553, 58554, 58570, 58571, 58572, 58573	1510	7.87%

References

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Disclosures

Funding: The authors on this study have no financial disclosures. **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** The Northwestern Institutional Review Board determined that our study did not constitute human subjects research given that all data utilized had been previously de-identified. The IRB therefore deemed that formal IRB review was not necessary for the study. **Helsinki:** Yes **Informed Consent:** No