Poster 390: Development of a risk assessment tool for stress urinary incontinence and pelvic organ prolapse surgery in older women

Anne M Suskind,[1] Shoujun Zhao,[1] W. John Boscardin,[2] Kenneth Covinsky[2]
University of California, San Francisco, San Francisco, CA, Department of Urology[1] and Division of Geriatrics[2]
Funding: NIH-NIA R01AG058616

INTRODUCTION

Background

- Stress urinary incontinence (SUI) and pelvic organ prolapse (POP) are common in older women; over 50% of women over the age of 65 will have one, or both, of these conditions,[1,2] and 11% of these women will ultimately undergo surgery for their SUI or POP by age 80.[3]
- However, the literature on surgical outcomes in older adults is limited, as most studies include mainly healthier, younger individuals who likely have different surgical outcomes.
- Older women are not a homogenous group; many are frail and have multimorbidity, placing them at increased risk for surgical complications.

Objective

- To develop an on-line risk assessment tool that incorporates multimorbidity and frailty for women over the age of 65 undergoing surgery for SUI and POP.

METHODS

Subjects and Data

- A 100% sample of fee-for-service female Medicare beneficiaries undergoing surgery for SUI and POP from 2014 to 2016.
- Medicare MedPAR, Outpatient, Carrier and Master Beneficiary Summary files.

Outcomes (defined 1-year after surgery)

- 30-day complications: postoperative bleeding, wound complications, postoperative shock (systemic infection), cardiovascular complications, postoperative stroke and neurologic complications, urinary tract infection (UTI), acute renal failure and postoperative renal complications, pulmonary complications, blood clots (deep venous thrombosis/pulmonary embolus), complications related to anesthesia
- Death at 1 year

Covariates

- The 13 most highly predictive risk factors were identified from the Charlson Comorbidity Index (CCI) [which represents 17 codes for comorbidities], and from the Claims Based Frailty Index (CFI) [which includes 93 codes for durable medical equipment, comorbidities and procedures]. Risk factors that were redundant between the two indices were combined. The final covariates included the following: congestive heart failure, primary malignancy/cancer, secondary or metastatic malignancy/cancer, pneumonia or influenza in the past year, neurodegenerative and other neurological diseases (i.e., multiple sclerosis, Parkinson's Disease, migraines, epilepsy, etc.), dementia/psychiatric conditions/substance abuse, renal disease, chronic liver disease, anemia or platelet disorder, chronic lung disease, coronary artery disease, venous/lymphatic/thrombotic disorders, cerebrovascular accident/stroke and sequelae.
- SUI and POP CPT and ICD-9/10 procedure codes were combined into 15 representative procedures groups.
- Additional covariates included subject age and whether the individual lived in a nursing facility.

Statistical Analyses

- Relative risk (RR) regression modeling was used to calculate the risk of each outcome.
- Model fit, discrimination and calibration were evaluated for each of the 11 outcomes using c-statistics, Brier Scores, and Spiegelhalter p-values.

RESULTS

Table 1. Baseline cohort characteristics.

Characteristics	N=108,499
Age, mean (years)	73.6 +/-5.7
Charlson Comorbidity Score, N (%)	
0	56,338 (51.9)
1-2	37,469 (34.5)
3-4	9,202 (8.5)
5+	5,470 (8.3)
Claims Based Frailty Index, N (%)	
Not Frail (CFI < 0.15)	53,009 (48.9)
Prefrail (0.15 ≤ CFI < 0.25)	50,356 (46.4)
Mildly Frail (0.25 ≤ CFI < 0.35)	4,752 (4.4)
Moderately to Severely Frail (CFI ≥ 0.35)	362 (0.3)
Resides in a skilled nursing facility	828 (0.8)

Figure 1. Example of probability plot for 1-year mortality

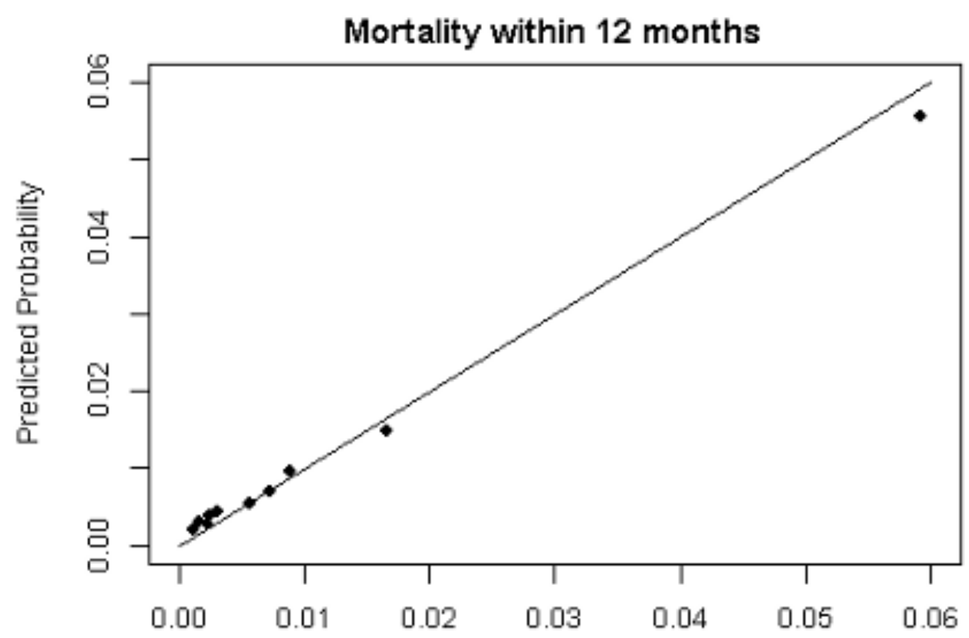
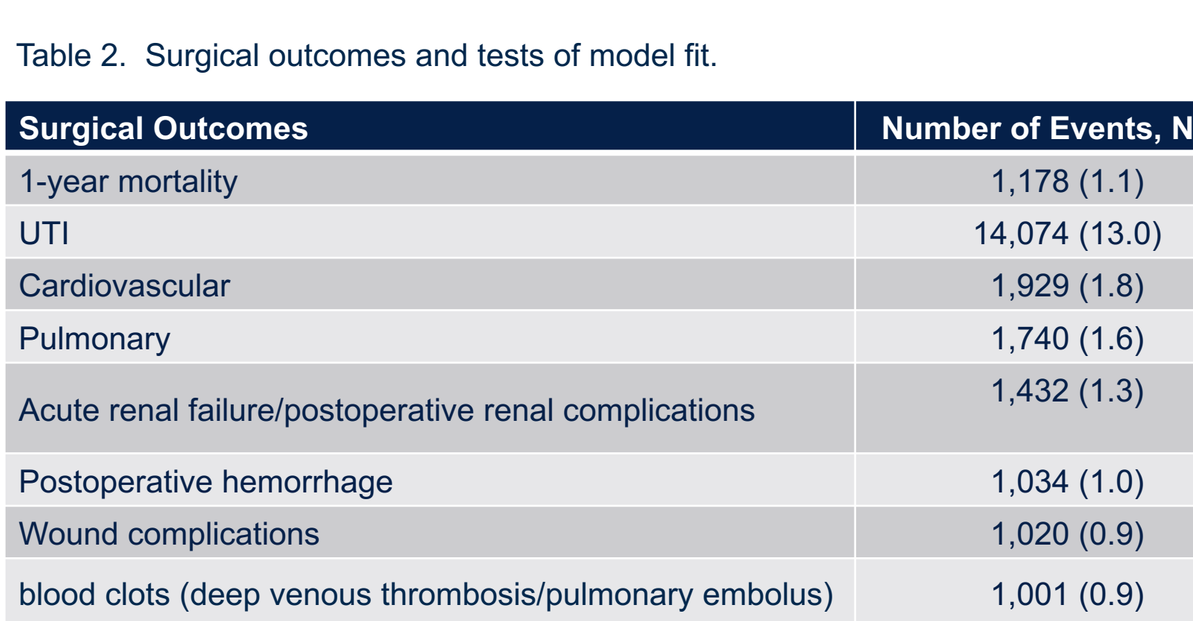


Table 2. Surgical outcomes and tests of model fit.

Surgical Outcomes	Number of Events, N (%)	C-Statistic	Brier Score	Spiegelhalter P-value
1-year mortality	1,178 (1.1)	0.8270	0.0102	0.5332
UTI	14,074 (13.0)	0.6057	0.1112	0.9365
Cardiovascular	1,929 (1.8)	0.8758	0.0155	0.3534
Pulmonary	1,740 (1.6)	0.7338	0.0154	0.8758
Acute renal failure/postoperative renal complications	1,432 (1.3)	0.7361	0.0127	0.9838
Postoperative hemorrhage	1,034 (1.0)	0.6774	0.0095	0.9882
Wound complications	1,020 (0.9)	0.6562	0.0094	0.9938
blood clots (deep venous thrombosis/pulmonary embolus)	1,001 (0.9)	0.7231	0.0089	0.9772
Postoperative stroke and neurologic complications	829 (0.8)	0.6895	0.0076	0.9992
Postoperative shock	324 (0.3)	0.7437	0.0029	0.9971
Complications secondary to anesthesia	163 (0.2)	0.7321	0.0015	0.9961

Figure 2. Screenshot of UroRisk Surgical Calculator currently in development.



CONCLUSIONS

- Models using clinically important and readily available preoperative characteristics were successfully created to predict the likelihood of numerous post-operative outcomes among women >65 years of age undergoing surgery for SUI and POP.
- Data from this study will be used to create the UCSF UroRisk Surgical Calculator, which will be available on the internet free of charge for patients and physicians to use to help augment the clinical decision-making process in this heterogenous and potentially vulnerable population.

REFERENCES

1. Nygaard I, Barber MD, Burgio KL, et al. Prevalence of symptomatic pelvic floor disorders in US women. *JAMA : the journal of the American Medical Association*. Sep 17 2008;300(11):1311-6. doi:10.1001/jama.300.11.1311
2. Nygaard I, Bradley C, Brandt D. Pelvic organ prolapse in older women: prevalence and risk factors. Research Support, U.S. Gov't, P.H.S. *Obstetrics and gynecology*. Sep 2004;104(3):489-97. doi:10.1097/01.AOG.0000136100.10818.d8
3. Clark AL, Gregory T, Smith VJ, Edwards R. Epidemiologic evaluation of reoperation for surgically treated pelvic organ prolapse and urinary incontinence. *American journal of obstetrics and gynecology*. Nov 2003;189(5):1261-7. doi:10.1067/s0002-9378(03)00829-9