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Does one score fit all? Measuring risk in ulcerative colitis

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Abstract

BACKGROUND: The American College of Surgeons Surgical Risk Calculator was developed to improve risk stratification and surgical quality but has not been studied at the institutional level for specific disease states, like ulcerative colitis (UC).

METHODS: UC patients undergoing colorectal resection had predicted risk calculator data compared with actual outcomes for length of stay (LOS), complications, reoperation, and death. Main outcome measures were the difference in actual vs predicted outcomes.

RESULTS: Seventy patients were evaluated. The actual and predicted mean LOS was identical, but not representative of the actual LOS picture, which had 10 LOS outliers (14.3%). The actual incidence of any complication ($P < .001$) and major complications ($P < .001$) was higher than predicted. The most common complications actually encountered-intrabdominal abscess (14.3%), postoperative ileus (7.2%), and anastomotic leak (5.7%), were not even calculated by the tool.

CONCLUSIONS: For UC, the calculator poorly evaluates relevant risks, complications, and is greatly impacted by outliers. These limitations caution use for surgical quality reporting and determining specific patient outcomes, at least in UC.

Health care spending in the United States has more than doubled between 2000 and 2013. In 2013 alone, spending increased 3.6% to reach $2.9 trillion.[1] Postoperative complications and readmissions contribute significantly to the skyrocketing costs. Major complications have been shown to increase hospital costs more than $11,000 dollars per episode.[2] Furthermore, more than 30% of complications occur after discharge from the index procedure, which can necessitate readmission.[3] In 2012, Healthcare Cost and Utilization Project national statistics estimated more

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than 70,000 readmission after common colorectal procedures (colon resection, small bowel resection, colostomy, ileostomy, and hemorrhoidectomy), at a mean cost per readmission of $15,282.[4] The total cost of readmissions after colorectal procedures alone has been estimated at $300 million annually.[5] These outcome measures have been cited as important makers of quality.[5–10] Quality improvement in surgery may be an effective strategy for improving patient care and reducing costs.[11] Federal programs aligning reimbursement and incentives with outcomes are adding to the impetus to improve quality in surgery.[12–14] To meet financial goals, attention will be focused on groups that consume health care dollars.

Measuring risk-adjusted outcomes of surgical patients is valuable for assessing surgical quality.[15] By improving the quality of care, risk adjustment may hold promise for reducing costs. The American College of Surgeons (ACS) risk calculator was developed from the need for an accurate decision-support tool to estimate the risk of postoperative complications.[16] The risk calculator uses inputs from patient demographics and the planned procedure to predict the chance of several adverse outcomes within a 30-day postoperative period.[17] From these data, the tool aims to estimate patient-specific postoperative risks for the shared decision-making and the informed consent process.[16] Although proven valuable in emergent and aggregate data samples, the tool may not be valid at the institutional level, in small data sets, when outliers impact outcomes.[11,16,18] The tool has also not been tested when evaluating patients by diagnosis, such as ulcerative colitis (UC), and may poorly represent their risk profile and postoperative outcomes.

UC is a chronic, relapsing disorder where patients typically have a poor general condition, even at a young age, worsened by the aggressive medical treatments.[19] UC patients are a high consumer of health care utilization and have higher costs of care, particularly in patients that eventually require surgery.[20] This population is also often immune-compromised and more susceptible to complications, making it a prime target for defining quality.[21–29] However, most institutions do not have an adequate cohort to base risk-adjusted outcomes on. Specific considerations in UC patients, such as use of biologic and immunomodulator medications, anemia, recent weight loss, previous abdominal surgeries, and recurrent hospitalizations, are not factored into the risk stratification. Despite a modifier for steroid use, it is unclear what impact the specific disease state of UC would have on the accuracy of the tool.

Our goal was to evaluate the validity of the ACS Risk Calculator in UC patients. The ACS Risk Calculator may not represent the true risks in UC patients and subsequently underestimate postoperative complications.

Methods

After institutional review board approval, a prospectively maintained departmental database was reviewed to identify patients that underwent elective laparoscopic surgical resection for ulcerative colitis from 1/2010 to 6/2014. Patients were included if older than 18 years of age, if the procedure was performed on an elective basis, if complete medical records to calculate an ACS risk score and assess the 30-day postoperative outcomes were available and the resection was performed through an abdominal approach. Patients were excluded if undergoing a stoma closure or transanal procedure. For intention to treat, laparoscopic cases included traditional multiport laparoscopic, hand-assisted laparoscopic (HALS), robotic-assisted laparoscopic (RALS), and single incision laparoscopic approaches (SILS).

Patient demographics, perioperative variables, and postoperative outcomes were evaluated. Data fields analyzed from the ACS Risk Calculator included age group, sex, functional status, emergency procedure, American Society of Anesthesiologists, wound class, steroids for chronic condition, ascites, systemic sepsis, ventilator dependent, disseminated cancer, diabetes, hypertension requiring medication, previous cardiac event, congestive heart failure within 30 days, dyspnea, current smoker, history of severe chronic obstructive pulmonary disease, dialysis, acute renal failure, body mass index, and the planned procedure to predict the chance of several adverse outcomes (serious/any complication, pneumonia, cardiac complication, surgical site infection, urinary tract infection, venous thromboembolism, renal failure, return to operating room (OR), death, discharge to nursing or rehab facility) within a 30-day postoperative period. All fields were also abstracted from the patient's medical record for validation and detail. Wound class for the risk calculator estimate was retrospectively captured from anesthesia/operative reports. Additional data fields from the patient's medical record included actual age, preoperative steroids and biologic therapy, preoperative hemoglobin, preoperative albumin, prior abdominal surgery, intraoperative conversion, postoperative anastomotic leak, and readmission. The prospectively predicted outcomes data were compared with actual data for postoperative length of stay (LOS), any complication, serious complications, surgical site infections, renal failure, return to the OR, urinary tract infection, and death.

Postoperative outcomes were evaluated within 30 days of the index operation. Renal failure was defined as dehydration with creatinine level greater than 2 mg/dL. Outliers were based on LOS, and LOS outliers were defined as those greater than 2 standard deviations (SD) from the mean. Serious complications were defined as Clavien Class III and greater.[30] Postoperative ileus was defined as lack of passage of flatus by postoperative day 5 or the need to insert a nasogastric tube to relieve nausea, distension, and/or vomiting. An anastomotic leak was defined as a disruption of the anastomosis identified at reoperation or extravasation of contrast medium at the anastomotic site on an imaging study.[31] On the risk calculator tool, the "Surgeon Adjustment of Risks" field was set at the default, "1- No adjustment necessary" for all cases.