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Unplanned Conversions from Robotic and Laparoscopic Colectomy in Patients With Colon Cancer Are Associated With Worse Outcomes: Identifying Key Factors from NSQIP

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BACKGROUND

Robotic and laparoscopic colectomies for colon cancer have potential benefits to patients such as shorter length of stay and less morbidity. Using the prospectively-collected, retrospectively-reviewed NSQIP database, we evaluated outcomes of robotic and laparoscopic colectomies for colon cancer compared with open colectomies.

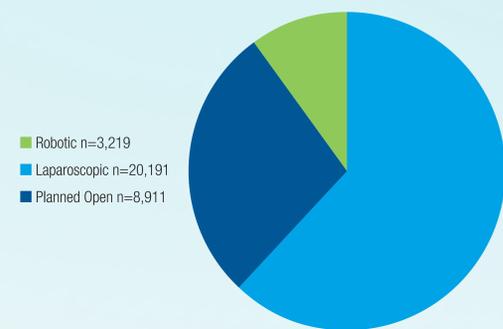
GOALS

(1) Compare the outcomes of patients who undergo conversion from robotic or laparoscopic colectomy to open versus patients who undergo planned open colectomy for colon cancer and (2) to build a predictive model to identify preoperative risk factors associated with unplanned conversion.

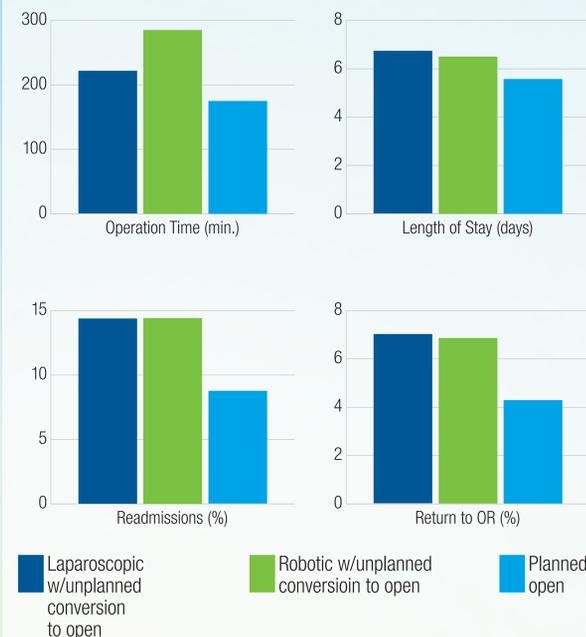
METHODS/INTERVENTIONS

Robotic and laparoscopic cases that underwent an unplanned conversion were selected and case matched with planned open according to a 1:1:1 ratio controlling for gender, age, weight, probability of morbidity, T stage, ASA classification, and wound class. Quantitative variables were compared using the Kruskal-Wallis test, while categorical variables were compared using the chi-squared test. Preoperative variables were statistically the same. When analyzing the outcomes data, continuous fields such as length of stay and operation time were compared with a linear regression with a log transformation.

COLECTOMY APPROACH FOR COLON CANCER



CASE-MATCHED OUTCOMES RESULTS



Approach	Conversion rate
Laparoscopic	7%
Robotic	11%

Outcome	Outcomes planned open superior to conversions
Operative Time	p = 0.00001
Length of Stay	p = 0.0046
SSI	p = 0.19
Ileus	p = 0.022
Return to OR	p = 0.004
Readmission	p = 0.007

RESULTS

32,321 patients underwent colectomy for colon cancer. 204 patients were case matched. A univariate comparison showed that planned open surgery has better results in nearly all outcomes metrics. Risk factors for unplanned conversions were identified and a predictive model was built. There were 14 strongly correlated variables ($p < .05$). These were then tested for autocorrelation and put into the model building algorithms. The predictive model selected wound classification, T stage, increased weight, and diabetes as the most important predictors of an unplanned conversion.

CONCLUSIONS

Unplanned conversions from robotic or laparoscopic colectomy have worse outcomes than those who undergo a planned open colectomy for colon cancer. The planned open group had significantly shorter length of stay, operation time as well as lower rates of SSI, return to the OR, and readmission. Given the morbidity of unplanned conversions, a planned open colectomy would be ideal for patients at risk for conversion from robotic or laparoscopic colectomy. A predictive model was then built to identify risk factors associated with unplanned conversions. The model found wound classification, T stage, and diabetes to be the best predictors of unplanned conversion. Many other factors were not found to be significant, notably, age, race, smoking status, and chemotherapy within 90 days. Our predictive model (boosted CHAID model) based on these risk factors of unplanned conversion was able to create a risk score for each patient. This could guide decision making in the future.