Laparoscopic Converted to Open Cholecystectomy Compared to Robotic Cholecystectomy, Reduced Cost of Care With Increased Postoperative Morbidity and Mortality: A Population Based Study

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Background

- Laparoscopic cholecystectomy (L-CCY) is the gold standard for elective and emergency cholecystectomy.
- There are 5% to 30% conversion rates to open cholecystectomy, with increased perioperative morbidity and mortality.
- Recently, robotic assistance for cholecystectomy (R-CCY) in acute cholecystitis patients is preferred, due to perceived decrease in conversion rates.
- The current study aims to compare the outcomes of R-CCY to those that require conversion to open cholecystectomy (O-CCY) during L-CCY..

Methods

- National Inpatient Database (NIS 2009-2014) was used to identify adults who had undergone laparoscopic converted to open cholecystectomy (ICD-9 V64.41), as well as robotic cholecystectomy (ICD-9 51.23, 51.24 and 17.42),
- Demographic and clinical variables and cost of hospitalization were compared between the groups. Standard statistical analysis was performed.

Results

- 18,163 total patients were identified of which 17,538 (96.57%) received L-CCY to O-CCY and 622 (3.42%) received R-CCY
- Lower length of stay (3.4 days vs. 6.4 days; p <0.01) and higher cost of hospitalization (56,375.22± 36,657.80 vs. 19,034.28± 40,831.86; p <0.01) was noted in R-CCY patients
- R-CCY patients had lower Charlson's score (p<0.01), higher discharge to home (92% vs. 79.6%; p<0.01) and suffered lower mortality (0% vs 0.5%; p<0.01)
- L-CCY to O-CCY patients suffered significantly higher incidence of respiratory (2.8% vs. 1.0%), cardiac (1.3% vs 0%), gastrointestinal (5.3% vs. <0.5%) complications, postoperative infection (1.1% vs. <0.5%) and hemorrhage (2.7% vs. <0.5%).
- No difference was seen in terms of postoperative sepsis (1.3% vs <0.5%; p= 0.13).

Discussion

- The current study highlights the advantages of R-CCY in acute cholecystitis patients. R-CCY patients had a decreased incidence of postoperative cardiopulmonary and wound complications; yet tend to be healthier overall
- While overall cost of robotic cholecystectomy is higher, decreased length of stay and greater likelihood of being discharged to home likely results in decreased healthcare spending overall
- Further studies are needed to see the effect of robotic cholecystectomy on the overall cost of healthcare in patients with acute cholecystitis.

Table 1. Comparison of Demographic and Clinical Characteristics of Patients Receiving Cholecystectomy for Acute Cholecystitis, Separated According to Type of Surgical Intervention

Variables	Total	Laparoscopic converted to open Cholecystectomy	Robotic assisted Cholecystectomy	P value
Age , Mean±SD	58.44± 17.39	58.73± 17.31	50.43± 17.62	<0.01
Race, N (%)				
Caucasian	10,810 (59.5%)	10,456 (59.6%)	354 (56.9%)	<0.01
African American	1,765 (9.7%)	1,686 (9.6%)	79 (12.7%)	<0.01
Hispanic	2,896 (15.9%)	2,756 (15.7%)	140 (22.5%)	<0.01
Asian Pacific Islanders	429 (2.4%)	428 (2.4%)	0 (0%)	<0.01
Others	2,263 (12.5%)	2,215 (12.6%)	48 (7.7%)	<0.01
Charlson's Score, (%)				
Score 0	2,611 (14.4%)	2,433 (13.9%)	168 (27.0%)	<0.01
Score 1-3	7,879 (43.4%)	7,582 (43.2%)	297 (47.7%)	<0.01
Score 4-5	5,787 (31.9%)	5,671 (32.3%)	116 (18.6%)	<0.01
Score >6	1,883 (10.4%)	1,842 (10.5%)	41 (6.6%)	<0.01
Outcomes (N, %)				
Home	14,530 (80%)	13,958 (79.6%)	572 (92%)	<0.01
Transfer to other facility	1,740 (9.6%)	1,722 (9.8%)	18 (2.9%)	<0.01
Home with Home health	1,769 (9.7%)	1,738 (9.9%)	31 (5.0%)	<0.01
Died during current hospitalization	83 (0.5%)	83 (0.5%)	0 (0%)	<0.01
Complications (N,%)				
Respiratory complications	2.7%	2.8%	1.0%	<0.01
Cardiac	1.2%	1.3%	0%	<0.01
Urinary	0.9%	1.0%	<0.5%*	0.155
Sepsis	1.3%	1.3%	<0.5%*	0.13
GI	5.1%	5.3%	<0.5%*	<0.01
Hemorrhage	2.6%	2.7%	<0.5%*	<0.01
Post-op Infection	1.1%	1.1%	<0.5%*	<0.01
Total Cost, Mean±SD	49285.5± 404715.2	19034.3± 40831.9	56375.2± 36657.8	<0.01
Total LOS, Mean±SD	6.3± 3.9	6.4± 3.9	3.4± 2.8	<0.01

*Exact data not reported due to small numbers, to reduce risk of re-identification. HCUP data user agreement