Complications Following Robotic Heller Myotomy Are Lower Compared to Laparoscopy

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Introduction

Although laparoscopy has become the preferred approach for Heller myotomy compared to open surgery, it is not without its limitations. These limitations include limited rotational motion, reduced depth perception, 2-dimensional visualization, ergonomic difficulties, and independent camera movement. Robotic platforms were developed to overcome these limitations by improving visualization (three-dimensional) and decreasing limits from wrist tremor and range of motion. The aims of this study were as follows: (a) to use the National Inpatient Sample database to compare the impact of robotic and laparoscopic surgery on post-operative outcomes following Heller myotomy and (b) to analyze the impact of surgical volume on perioperative outcomes using a validated classification model to assess surgical volume.

Methods

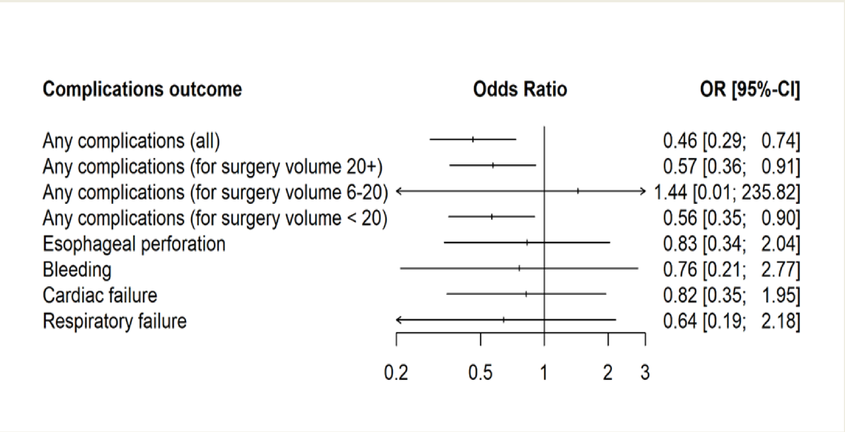
A retrospective population-based analysis was performed using the National Inpatient Sample (NIS) database for the span of 2010 to 2015. All patients who underwent laparoscopic or robotic Heller myotomy were included. Weighted multivariable random intercept linear and logistic regression models were used to assess the impact of robotic surgery on patient outcomes compared to laparoscopy.

Results

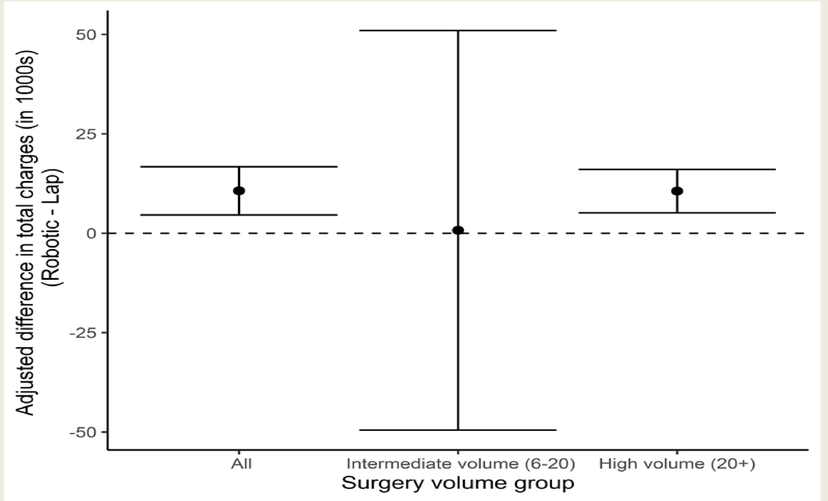
A total of 11,562 patients were included. Risk adjusted analysis found the robotic cohort to have significantly decreased risk of complications for all centers OR (95% CI) = 0.46 (0.29, 0.74), complications for high volume centers OR (95% CI) = 0.57 (0.36, 0.91), and complications for low volume centers OR 0.56 (0.35, 0.90). Overall charges were significantly higher in the robotic group compared to the laparoscopic group.

The subset analysis performed on high volume centers showed that the robotic cohort had a higher rate of esophageal perforation (2.7% vs 0.8%, p<0.001), whereas the laparoscopic cohort had a higher rate of overall complications (10.1% vs 4.4%, p <0.001) and cardiac failure (2.8% vs 0.8%, p = 0.01)

Forest plot of risk adjusted odds ratio for robotic vs laparoscopic surgery on complication outcomes for cohort of Heller patients



Risk adjusted difference with 95% confidence interval for total charges between robotic and laparoscopic surgery for cohort of Heller patients.



Conclusions

Robotic Heller myotomy is associated with lower overall complications and improved outcomes compared to laparoscopic Heller myotomy even in high volume centers. Robotic Heller myotomy is associated with higher rate of esophageal perforations in high volume centers despite the reduction in overall complications. Robotic Heller myotomy is also associated with increased charges in comparison to laparoscopic Heller myotomy.