

Cost-Analysis of Laparoscopic Appendectomy in a Large Integrated Healthcare System

Lavina Malhotra, MD¹, Elizabeth Pontarelli, MD¹, Gary Grinberg, MD¹, Richard Isaacs MD¹, James Morris, MD¹, Panduranga Yenumula, MD¹

1. Department of Surgery, Kaiser Permanente South Sacramento, CA

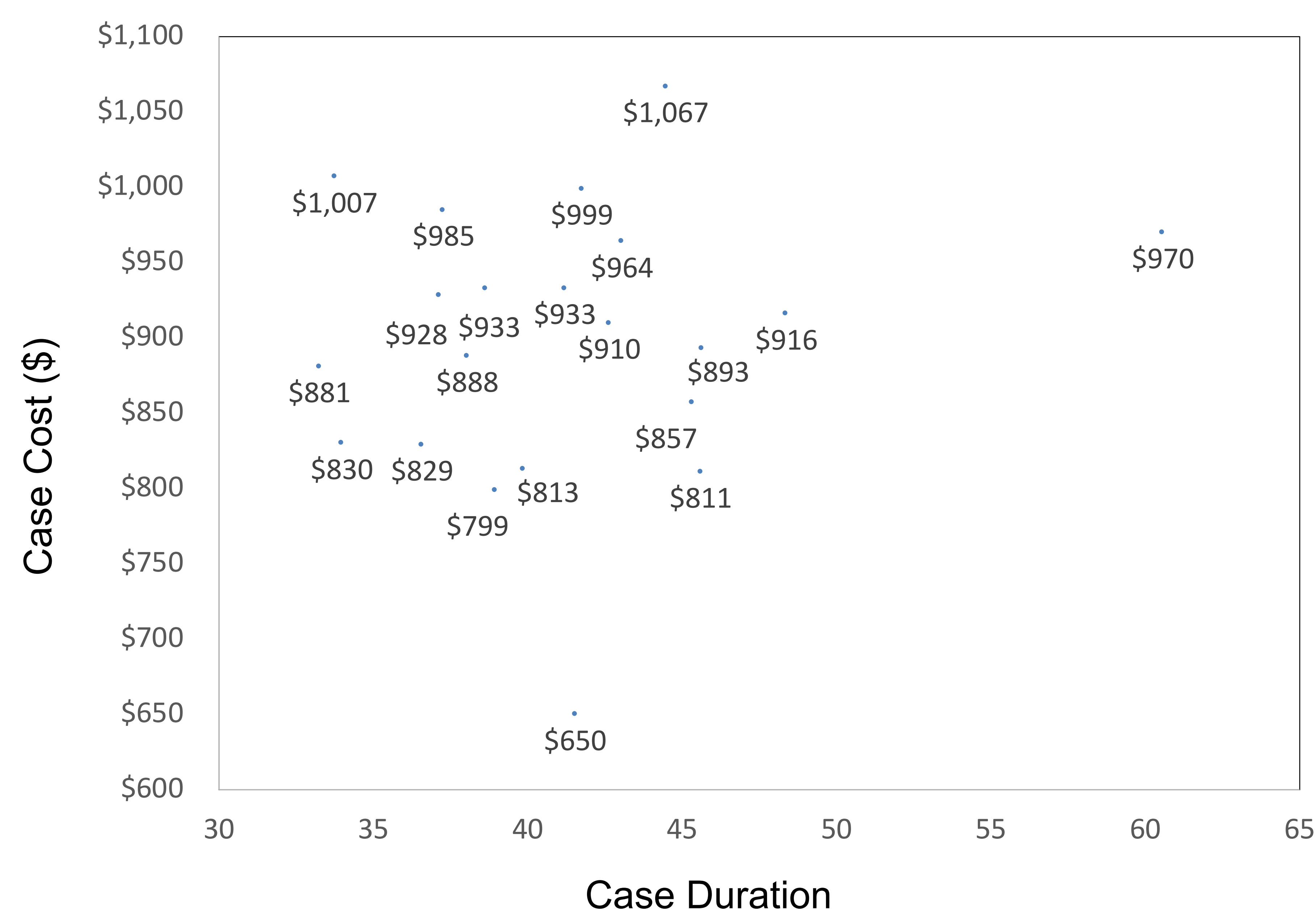
Background

- Healthcare spending increased by \$933.5 billion, comprising 17.8% of nations GDP and placing greater emphasis on operational excellence, cost containment and high quality of care
- Significant variation is seen in operating room (OR) costs with common surgical procedures such as laparoscopic appendectomy (LR)
- We evaluated cost of LR in our healthcare system and compared operative times and outcomes across different hospital centers

Methods

- Included all patients with LR over 12 years of age, excluded open appendectomy and other combined procedures
- Retrospectively reviewed cost data during one-year period (2018)
- LR performed at 20 hospital centers by 233 surgeons
- Operating room supply cost and procedure durations were obtained for each hospital
- NSQIP outcomes and demographic data were compared to costs of each hospital
- Data analysis, regression and statistical calculations were performed in R (version 3.3.1)

Cost and Case Duration for Laparoscopic Appendectomy



○ Kaiser Hospitals across Northern California

Figure 1. Cost and Case Duration for Laparoscopic Appendectomy

References

- Tanden N, Altman S, Armstrong S, Berwick D, de Brantes F, et al. A systemic approach to containing health care spending. *N Engl J Med.* 2012;367(10):949-54.
- Norbeck TB. Drivers of health care costs. A physicians foundation white paper--first of a three-part series. *Mo Med.* 2013;110(1):30-5.
- Brauer DG, Hawkins WG, Strasberg SM, Brunt LM, Jaques DP, Mercurio NR, et al. Cost variation in a laparoscopic cholecystectomy and the association with outcomes across a single health system: implications for standardization and improved resource utilization. *HPB (Oxford).* 2015;17(12):1113-8.

Results

- In year 2018 a total of 4,757 LR performed across 20 hospitals (27 to 522 per hospital) by 233 surgeons
- Average supply cost per case ranged from \$650 at the lowest cost center to \$1067 at the highest cost center
- Average operative time varied between sites from 33 to 60 minutes, no association between lower cost and longer operative time
- No significant difference in postoperative complications between high and low cost centers
- Highest cost items were single use energy devices (SUD) and endoscopic stapler.
- Average cost per case increased to \$1181 with use of both SUD and stapler, \$734 with stapler use alone and \$197 when none were used
- Individual surgeon cost ranged from \$197 to \$1181, with approximately half using both SUD and staplers, and half using only staplers
- Single surgeon used endoclips and endoloop, average case cost reduced to \$197, average operative time 40 mins for total 10 cases with no postoperative complications

Conclusions

- Performing laparoscopic appendectomy with reusable instruments and finding alternatives to expensive energy devices and staplers can significantly decrease costs and does not increase operative time or postoperative complications.
- We estimate an average savings of \$417 per case is possible by selective use of disposable devices which would result in an annual savings of over \$1 million for our health system and over \$125 million nationwide