FACTORS INFLUENCING ROBOTIC-ASSISTED SURGERY TOTAL COST

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Background

- The global robotic-assisted surgery (RAS) market, currently valued at $5.12 billion in 2024, is projected to expand to $15.52 billion by 2034.
- However, higher operational cost of care delivery is one of the common concerns associating with RAS.
- The estimated per-patient total hospital costs for RAS (with robot and maintenance costs included) was higher than laparoscopic surgery ($8,770 > $6,581).

Objective

- This study aims to investigate potential factors that may have an impact on the total cost (the sum of direct and indirect costs) of RAS.
- Findings will contribute to hospitals' planning of reducing the care delivery cost of RAS.

Methods

- We extracted 1526 RAS cases, including 499 Cholecystectomy (RCH), 138 Colectomy (RCO) and 889 Inguinal Hernia (RIH), from hospital records.
- Six variables were extracted, including total cost (TC), surgery time length (STL), length of stay (LOS), patient type (PT), case complexity assessed by Diagnosis Related Group (DRG) code, and payor (PY).
- Pearson correlations and boosted tree predictive model with dependent resampling was applied to assess the predictor total effect.

Results

- Majority RCO were inpatient cases (136/138, 98.5%), followed by RCH (103/499, 20.6%) and RIH (12/889, 1.3%).
- The average TC of outpatient RAS was $23,230.7 (SEM 991.3) and the mean TC of inpatient RAS was $21,882 (SEM 2698.5).

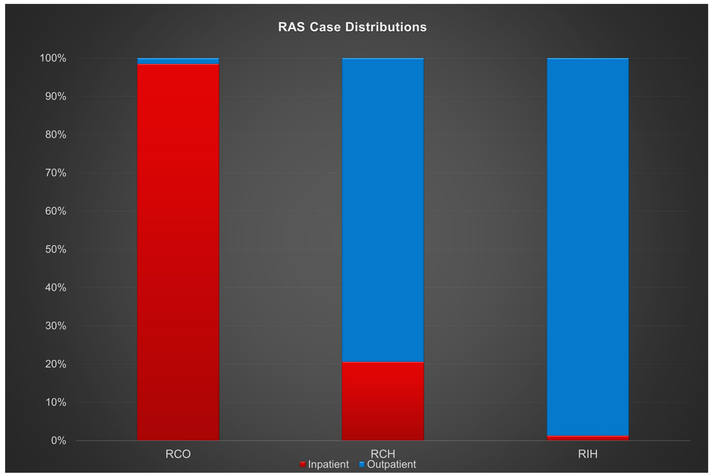


Figure 1. RAS Inpatient and Outpatient Cases Distribution.

- Overall, STL had no correlation with TC (r= - 0.05, p=0.070) but LOS significantly correlated with TC (r=0.65, p<0.0001).
- The predicting modeling showed LOS had the strongest predictor total effect for TC in all 3 procedures:
  - RCH – LOS 0.90 followed by DRG 0.41;
  - RCO – LOS 0.64 followed by PY 0.33;
  - RIH – LOS 0.89 followed by PY 0.24.

Conclusion

- Our findings suggest that LOS and case complexity assessed by DRG are two potential factors influencing the TC of RCH.
- In RCO and RIH, LOS and PY may have a considerable impact on TC..
- Hospitals may decrease the TC of RAS by reducing LOS.
- Future study is needed for further validate these findings.

Reference

- Ho C, Tsakonas E, Tran K, et al. Robot-Assisted Surgery Compared with Open Surgery and Laparoscopic Surgery: Clinical Effectiveness and Economic Analyses. Available from: https://www.ncbi.nlm.nih.gov/books/NBK168933/