The Robot Wears Prada

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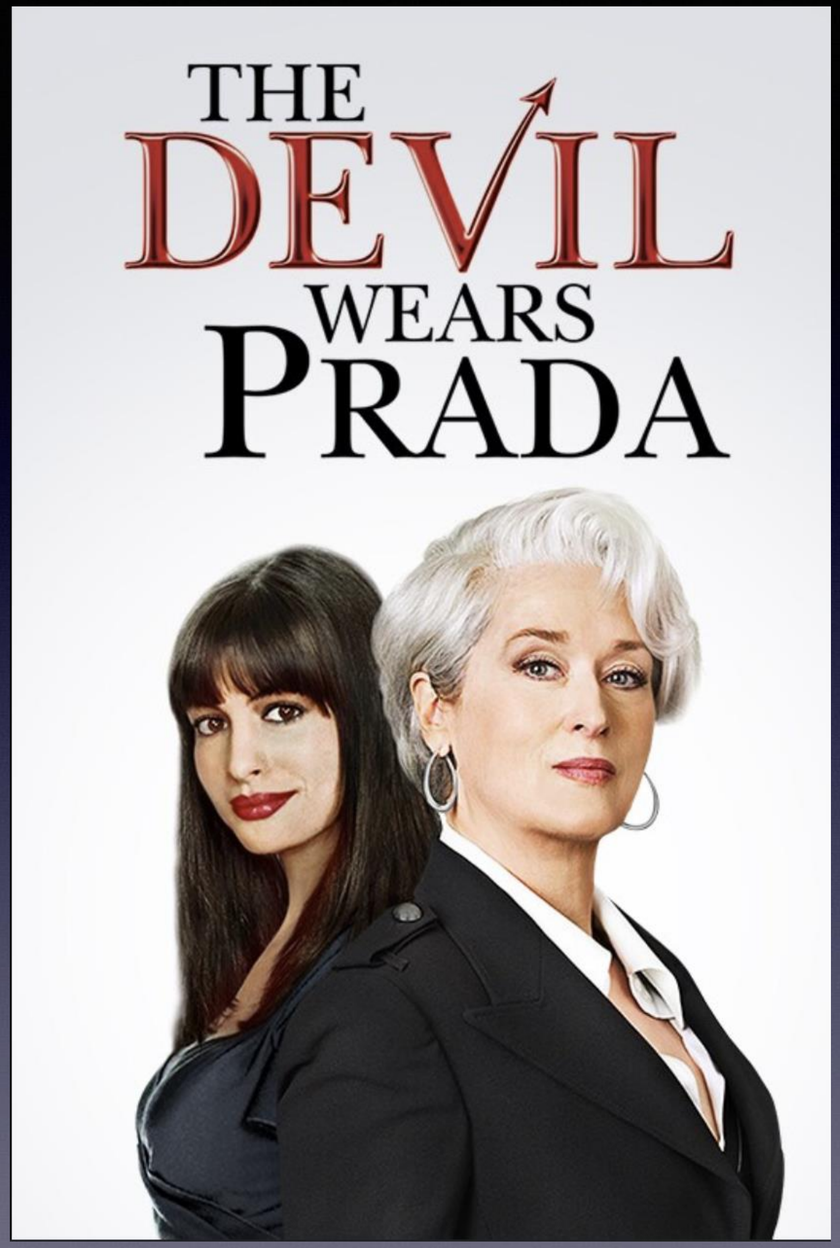

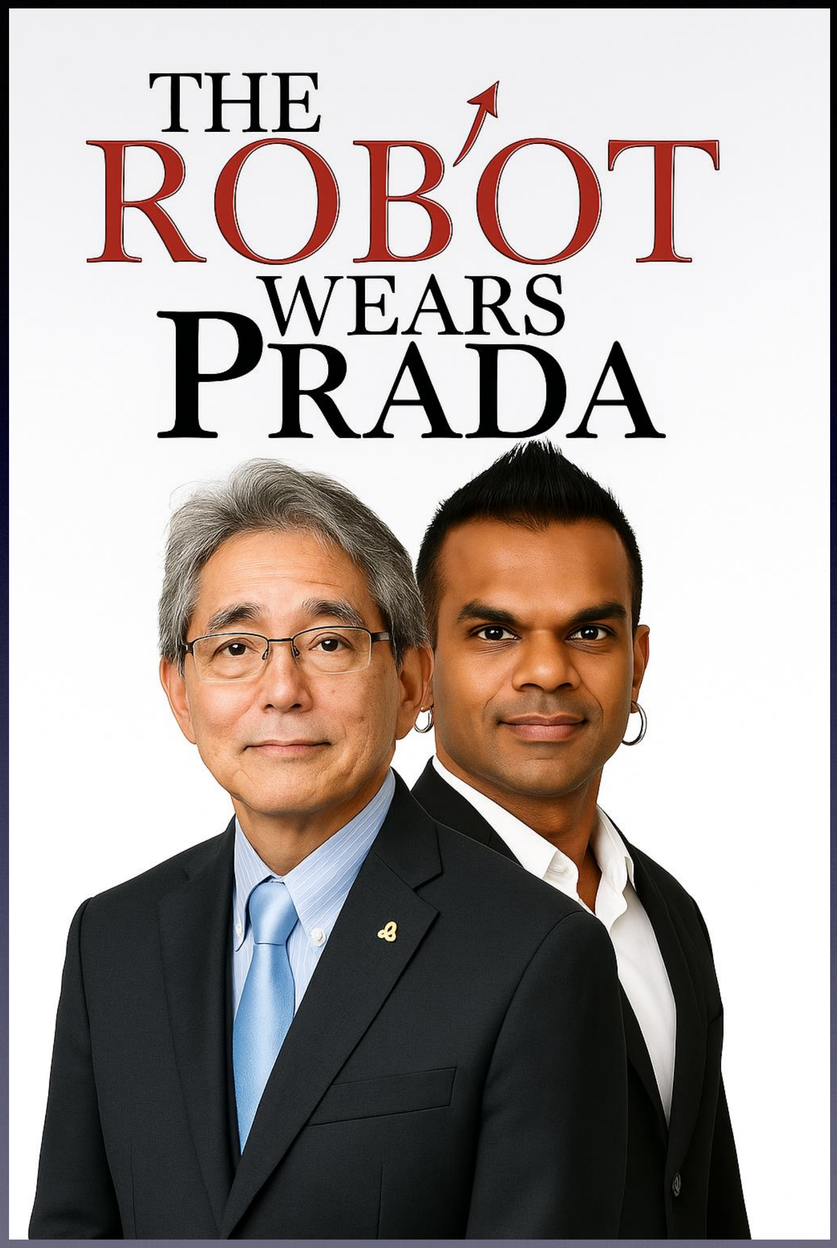

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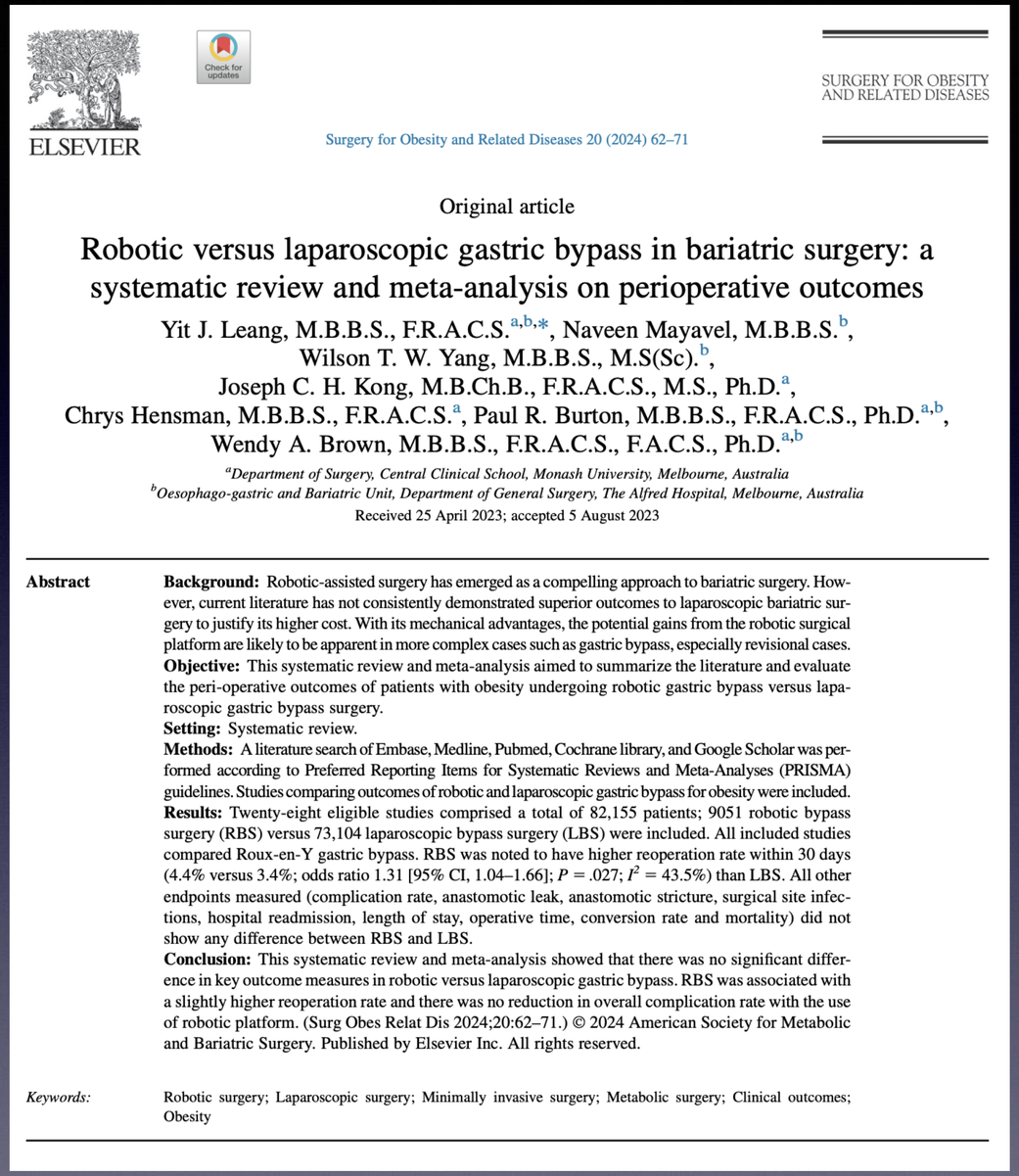
82,000 patients

No significant advantage of robotic versus laparoscopic RYGB in most outcomes—including leak rates, hospital readmission, length of stay, operative time, conversion rate, or mortality. Notably, robotic cases had a slightly higher 30-day reoperation rate (4.4% vs. 3.4%; OR 1.31)



ELSEVIER

SURGERY FOR OBESITY AND RELATED DISEASES

Surgery for Obesity and Related Diseases 20 (2024) 62–71

Original article

Robotic versus laparoscopic gastric bypass in bariatric surgery: a systematic review and meta-analysis on perioperative outcomes

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Abstract

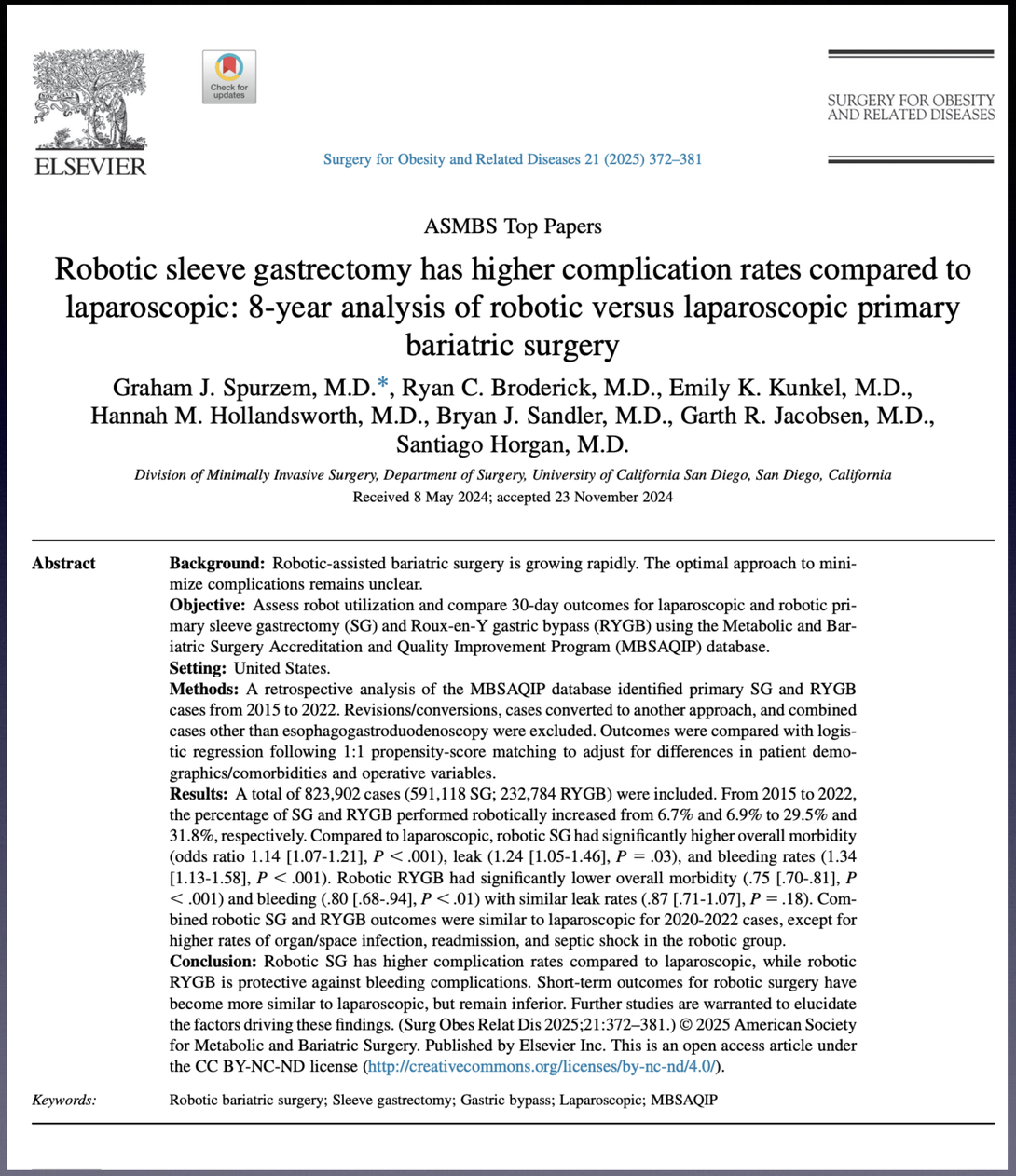
Background: Robotic-assisted surgery has emerged as a compelling approach to bariatric surgery. However, current literature has not consistently demonstrated superior outcomes to laparoscopic bariatric surgery to justify its higher cost. With its mechanical advantages, the potential gains from the robotic surgical platform are likely to be apparent in more complex cases such as gastric bypass, especially revisional cases.
Objective: This systematic review and meta-analysis aimed to summarize the literature and evaluate the peri-operative outcomes of patients with obesity undergoing robotic gastric bypass versus laparoscopic gastric bypass surgery.
Setting: Systematic review.
Methods: A literature search of Embase, Medline, Pubmed, Cochrane library, and Google Scholar was performed according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Studies comparing outcomes of robotic and laparoscopic gastric bypass for obesity were included.
Results: Twenty-eight eligible studies comprised a total of 82,155 patients; 9051 robotic bypass surgery (RBS) versus 73,104 laparoscopic bypass surgery (LBS) were included. All included studies compared Roux-en-Y gastric bypass. RBS was noted to have higher reoperation rate within 30 days (4.4% versus 3.4%; odds ratio 1.31 [95% CI, 1.04–1.66]; $P = .027$; $I^2 = 43.5\%$) than LBS. All other endpoints measured (complication rate, anastomotic leak, anastomotic stricture, surgical site infections, hospital readmission, length of stay, operative time, conversion rate and mortality) did not show any difference between RBS and LBS.
Conclusion: This systematic review and meta-analysis showed that there was no significant difference in key outcome measures in robotic versus laparoscopic gastric bypass. RBS was associated with a slightly higher reoperation rate and there was no reduction in overall complication rate with the use of robotic platform. (Surg Obes Relat Dis 2024;20:62–71.)

Keywords: Robotic surgery; Laparoscopic surgery; Minimally invasive surgery; Metabolic surgery; Clinical outcomes; Obesity

823,000 patients

Higher complication rates for robotic SG compared to laparoscopic

Short term outcomes for robotic surgery have become similar to laparoscopic but remain inferior



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Surgery for Obesity and Related Diseases 21 (2025) 372–381

SURGERY FOR OBESITY AND RELATED DISEASES

ASMBS Top Papers

Robotic sleeve gastrectomy has higher complication rates compared to laparoscopic: 8-year analysis of robotic versus laparoscopic primary bariatric surgery

Graham J. Spurzem, M.D.*, Ryan C. Broderick, M.D., Emily K. Kunkel, M.D., Hannah M. Hollandsworth, M.D., Bryan J. Sandler, M.D., Garth R. Jacobsen, M.D., Santiago Horgan, M.D.

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Received 8 May 2024; accepted 23 November 2024

Abstract

Background: Robotic-assisted bariatric surgery is growing rapidly. The optimal approach to minimize complications remains unclear.

Objective: Assess robot utilization and compare 30-day outcomes for laparoscopic and robotic primary sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB) using the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database.

Setting: United States.

Methods: A retrospective analysis of the MBSAQIP database identified primary SG and RYGB cases from 2015 to 2022. Revisions/conversions, cases converted to another approach, and combined cases other than esophagogastroduodenoscopy were excluded. Outcomes were compared with logistic regression following 1:1 propensity-score matching to adjust for differences in patient demographics/comorbidities and operative variables.

Results: A total of 823,902 cases (591,118 SG; 232,784 RYGB) were included. From 2015 to 2022, the percentage of SG and RYGB performed robotically increased from 6.7% and 6.9% to 29.5% and 31.8%, respectively. Compared to laparoscopic, robotic SG had significantly higher overall morbidity (odds ratio 1.14 [1.07-1.21], $P < .001$), leak (1.24 [1.05-1.46], $P = .03$), and bleeding rates (1.34 [1.13-1.58], $P < .001$). Robotic RYGB had significantly lower overall morbidity (.75 [.70-.81], $P < .001$) and bleeding (.80 [.68-.94], $P < .01$) with similar leak rates (.87 [.71-1.07], $P = .18$). Combined robotic SG and RYGB outcomes were similar to laparoscopic for 2020-2022 cases, except for higher rates of organ/space infection, readmission, and septic shock in the robotic group.

Conclusion: Robotic SG has higher complication rates compared to laparoscopic, while robotic RYGB is protective against bleeding complications. Short-term outcomes for robotic surgery have become more similar to laparoscopic, but remain inferior. Further studies are warranted to elucidate the factors driving these findings. (Surg Obes Relat Dis 2025;21:372–381.)

Keywords: Robotic bariatric surgery; Sleeve gastrectomy; Gastric bypass; Laparoscopic; MBSAQIP

Obesity Surgery (2024) 34:3694–3702
https://doi.org/10.1007/s11695-024-07477-x

ORIGINAL CONTRIBUTIONS

Costs of Robotic and Laparoscopic Bariatric Surgery: A Retrospective Propensity Score-matched Analysis

Anna M. Senatore[1] · Francesco Mongelli[1,2] · Federico U. Mion[3] · Massimo Lucchelli[3] · Fabio Garofalo[4]

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Abstract

Purpose Robotic bariatric surgery has not shown significant advantages compared to laparoscopy, yet costs remain a major concern. The aim of our study was to assess costs of robotic and laparoscopic bariatric surgery.

Materials and Methods We retrospectively collected data of all patients who underwent either robotic or laparoscopic bariatric surgery at our institution. We retrieved demographics, clinical characteristics, postoperative data, and costs using a bottom-up approach. The primary endpoint was hospital costs in the robotic and laparoscopic groups. Data was analyzed using a propensity score matching.

Results Out of the total 122 patients enrolled in the study, 42 were subsequently chosen based on propensity scores, with 21 patients allocated to each group. No difference in clinical characteristics and postoperative outcomes were noted. Length of hospital stay was 2.4 ± 0.7 days vs. 2.6 ± 1.1 days ($p = 0.520$). In the robotic and laparoscopic groups, total costs were USD 16,275 ± 4018 vs. 12,690 ± 2834 (absolute difference USD 3585, 95%CI 1416–5753, $p = 0.002$), direct costs were USD 5037 ± 1282 vs. 3720 ± 1308 (absolute difference USD 1316, 95% CI 509–2214, $p = 0.002$), and indirect costs were USD 11,238 ± 3234 vs. 8970 ± 3021 (absolute difference USD 2,268, 95% CI 317–4220, $p = 0.024$). Subgroup analyses revealed a decreasing trend in the cost difference in patients undergoing primary gastric bypass and revisional surgery.

Conclusions Overall hospital costs were higher in patients operated on with the robotic system than with laparoscopy, yet a clinical advantage has not been demonstrated so far. Subgroup analyses showed lesser disparity in costs among patients undergoing revisional bariatric surgery, where robotics are likely to be more worthwhile.

Anna Maria Senatore and Francesco Mongelli have contributed equally to this work.

Key Points
- Cost assessment of robotic and laparoscopic bariatric surgery.
- Costs were higher in the robotic group (USD 16,275 ± 4018 vs. 12,690 ± 2834, $p = 0.002$).
- Lower cost disparity was noted in gastric bypass and revisional surgery sub-analyses.

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Hospital cost difference: approximately USD 3,819

Operating room cost difference: USD 9,746

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REVIEW ARTICLE

Costs of robotic and laparoscopic bariatric surgery: a systematic review and meta-analysis

Jan Affolter[1] · Julia Mühlhäusser[1] · Michele Marengo[2] · Fabio Garofalo[3,4] · Jörn-Markus Gass[1,6] · Francesco Mongelli[4,5]

Received: 3 February 2025 / Accepted: 12 April 2025 / Published online: 21 April 2025

Abstract

Background Bariatric surgery is currently the most effective approach to addressing severe obesity and reducing related health issues. Laparoscopy remains the standard technique, whereas robotic-assisted surgery is increasingly adopted, although its role in bariatric surgery remains debated. The main criticism concerns its higher costs and the lack of evidence demonstrating improved clinical outcomes compared to other treatment methods. We aimed to compare the costs of robotic-assisted and laparoscopic bariatric surgery through a systematic review and meta-analysis.

Methods Following PRISMA reporting guidelines, a literature search was conducted in PubMed, Cochrane Library, Web of Science, and Google Scholar for studies comparing robotic-assisted and laparoscopic bariatric surgery. The primary outcome was total hospital costs, with bias assessed using the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool. Effect sizes were calculated with 95% confidence intervals, and an overall effect was estimated using a random-effects model.

Results A total of 14 retrospective studies (293 articles screened) were included, with 1,414,357 patients (112,363 robotic; 1,301,994 laparoscopic). Total hospital costs favored laparoscopic surgery (SMD 0.721, 95%CI: 0.555–0.887, $p < 0.001$, absolute difference USD 3819). Operating room costs also favored laparoscopy (SMD 1.339, 95%CI 0.202–2.476, $p = 0.021$, absolute difference: USD 9746). Laparoscopy was associated with shorter operative time, while robotic surgery showed a slight advantage in hospital stay and complication rates. Subgroup and sensitivity analyses were consistent with the main findings. The quality of evidence was rated as low due to potential biases.

Conclusions Our systematic review and meta-analysis provides the most current and robust evidence indicating that the robotic-assisted approach incurs significantly higher costs than the laparoscopic approach in bariatric surgery. This finding remained consistent across the overall analysis as well as in nearly all subgroup and sensitivity analyses. Randomized controlled trials are warranted to accurately evaluate the cost-effectiveness of the robotic approach in both primary and revisional bariatric procedures.

Keywords Bariatric surgery · Health care costs · Robotic surgical procedures · Cost–benefit analysis

Jan Affolter and Julia Mühlhäusser contributed equally and share first authorship.

Jörn-Markus Gass and Francesco Mongelli contributed equally and share last authorship.

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The widespread and globally growing prevalence of obesity represents one of the most serious public health challenges for societies and healthcare systems [1]. Being a complex,

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Gastric bypass: laparoscopic - $15,520
robotic - $21,756

Sleeve gastrectomy: laparoscopic - $10,691
robotic - $16,393

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https://doi.org/10.1007/s11701-023-01809-2

RESEARCH

The downtrending cost of robotic bariatric surgery: a cost analysis of 47,788 bariatric patients

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Abstract
The surgical robot is assumed to be a fixed, indirect cost. We hypothesized rising volume of robotic bariatric procedures would decrease cost per patient over time. Patients who underwent elective, initial gastric bypass (GB) or sleeve gastrectomy (SG) for morbid obesity were selected from Florida Agency for Health Care Administration database from 2017 to 2021. Inflation-adjusted cost per patient was collected. Cost-over-time ($/patient year) and change in cost-over-time were calculated for open, laparoscopic, and robotic cases. Linear regression on cost generated predictive parameters. Density plots utilizing area under the curve demonstrated cost overlap. Among 76 hospitals, 11,472 bypasses (223 open, 6885 laparoscopic, 4364 robotic) and 36,316 sleeves (26,596 laparoscopic, 9724 robotic) were included. Total cost for robotic was approximately 1.5-fold higher ($p < 0.001$) than laparoscopic for both procedures. For GB, laparoscopic had lower total ($15,520) and operative ($6497) average cost compared to open (total $17,779; operative $9273) and robotic (total $21,756; operative $10,896). For SG, laparoscopic total cost was significantly less than robotic ($10,691 vs. $16,393). Robotic GB cost-over-time increased until 2021, when there was a large decrease in cost (−$944, compared with 2020). Robotic SG total cost-over time fluctuated, but decreased significantly in 2021 (−$490 compared with 2020). While surgical costs rose significantly in 2020 for bariatric procedures, our study suggests a possible downward trend in robotic bariatric surgery as total and operative costs are decreasing at a higher rate than laparoscopic costs.

Keywords Robotic surgery · Bariatric surgery · Surgical cost, robotic bariatric surgery

Introduction

In 1986, Unimation Inc. introduced PUMA 200 as the very first robotic-assisted surgery (RAS) device that was utilized to obtain biopsies from patients with suspected brain lesions [1, 2]. By the turn of the century, Intuitive Surgical's da Vinci® and Computer Motion's Zeus became the first two commercialized RAS systems [3–5]. Over two decades later, RAS systems have experienced a surge in development for minimally invasive surgery, including novel devices employing unique modifications to existing configurations [6–8].

The rapid growth in RAS technology is due, in part, to its perceived superiority over laparoscopic surgery because of improved ergonomics, arm movement through seven degrees of freedom, 3D display software, and application of haptic feedback [9, 10]. Additionally, a handful of studies have demonstrated that robotic surgery has similar or lower rates of complications than laparoscopy, as well as shorter learning curves for various bariatric surgery procedures such as gastric bypass [11–13].

Although recent research has also shown that robotic surgery has equivalent outcomes to laparoscopy in various bariatric procedures, the main deterrent to robot adoption in many hospitals has been lack of affordability [14–17]. In 2018, Childers et al. estimated the average cost of robotic procedures by analyzing Intuitive Surgical Inc. financial statements. They found the average cost of a robotic procedure to be $3568 ($1866 for instruments and accessories, $1038 for the robotic system, and $663

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Robotic vs lap chole: $1,795,735.21 ICER/QALY

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Cost-effectiveness analysis of robotic cholecystectomy in the treatment of benign gallbladder disease

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ABSTRACT

Background: Laparoscopic cholecystectomy is the current standard of care treatment for benign gallbladder disease. Robotic cholecystectomy is another approach for performing cholecystectomy that offers a surgeon better dexterity and visualization. However, robotic cholecystectomy may increase cost without sufficient evidence to suggest an improvement in clinical outcomes. The purpose of this study was to construct a decision tree model to compare cost-effectiveness of laparoscopic cholecystectomy and robotic cholecystectomy.

Methods: Complication rates and effectiveness associated with robotic cholecystectomy and laparoscopic cholecystectomy over a 1-year time frame were compared using a decision tree model populated with data from the published literature. Cost was calculated using Medicare data. Effectiveness was represented by quality-adjusted life-years. The primary outcome of the study was incremental cost-effectiveness ratio, which compares the cost per quality-adjusted life-year of the 2 interventions. The willingness-to-pay threshold was set at $100,000/quality-adjusted life-year. Results were confirmed with 1-way, 2-way, and probabilistic sensitivity analyses varying branch-point probabilities.

Results: The studies used in our analysis included 3,498 patients who underwent laparoscopic cholecystectomy, 1,833 patients who underwent robotic cholecystectomy, and 392 patients who required conversion to open cholecystectomy. Laparoscopic cholecystectomy produced 0.9722 quality-adjusted life-years, costing $9,370.06. Robotic cholecystectomy produced an additional 0.0017 quality-adjusted life-years at an additional $3,013.64. These results equate to an incremental cost-effectiveness ratio of $1,795,735.21/quality-adjusted life-year. This exceeds the willingness-to-pay threshold, making laparoscopic cholecystectomy the more cost-effective strategy. Sensitivity analyses did not alter results.

Conclusion: Traditional laparoscopic cholecystectomy is the more cost-effective treatment modality for benign gallbladder disease. At present, robotic cholecystectomy is not able to improve clinical outcomes enough to justify its added cost.

Introduction

Gallbladder disease, affecting more than 20 million people nationwide, is the most frequent indication for gastrointestinal-related hospital admissions and incurs health care costs of more than $6.5 billion annually.[1] The vast majority of gallbladder-related admissions fall within the realm of benign gallbladder disease (BGD), which includes all noncancerous pathologies of the gallbladder.[2,3] As a result, cholecystectomy is the most common operation performed by general surgeons.[2] Presently, more than 800,000 cholecystectomies are performed annually[2] with a projected increase of >22% in the next decade due to a combination of increased age, population size, and obesity within the United States.[3] Once exclusively an open procedure, laparoscopy is now the most common approach to cholecystectomy due to reduced length of stay (LOS), decreased postoperative morbidity, enhanced

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0039-6060/

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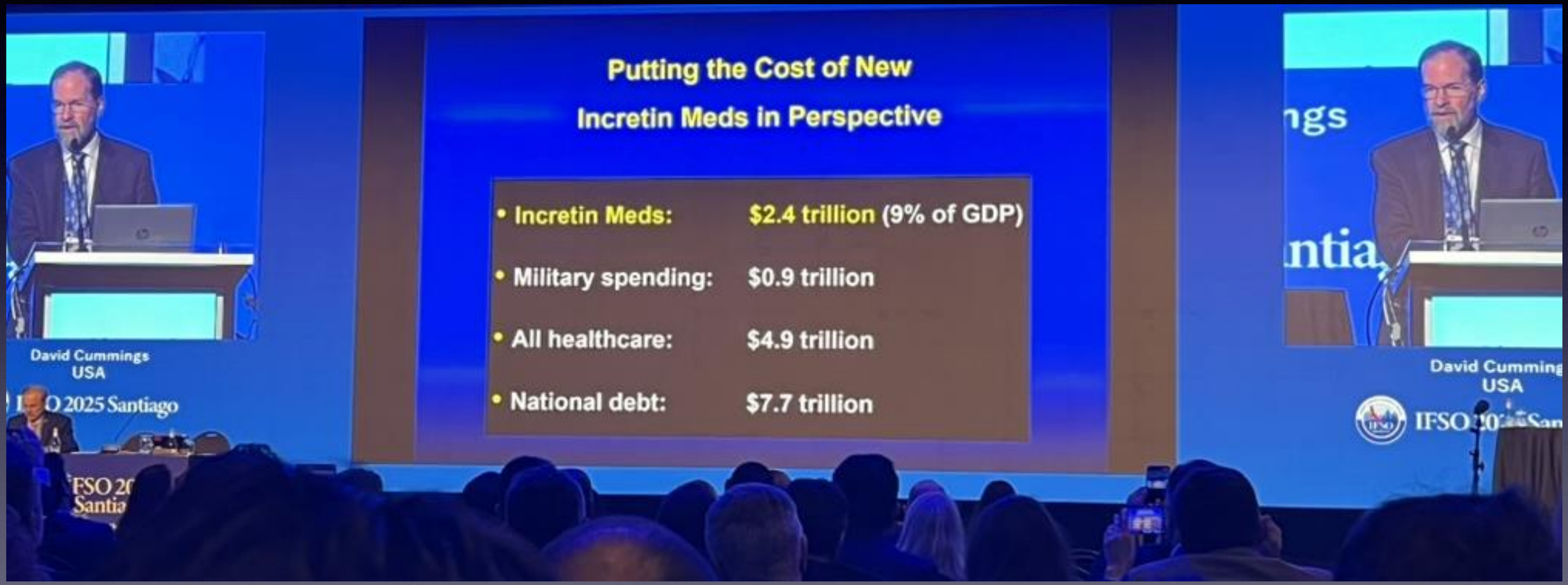
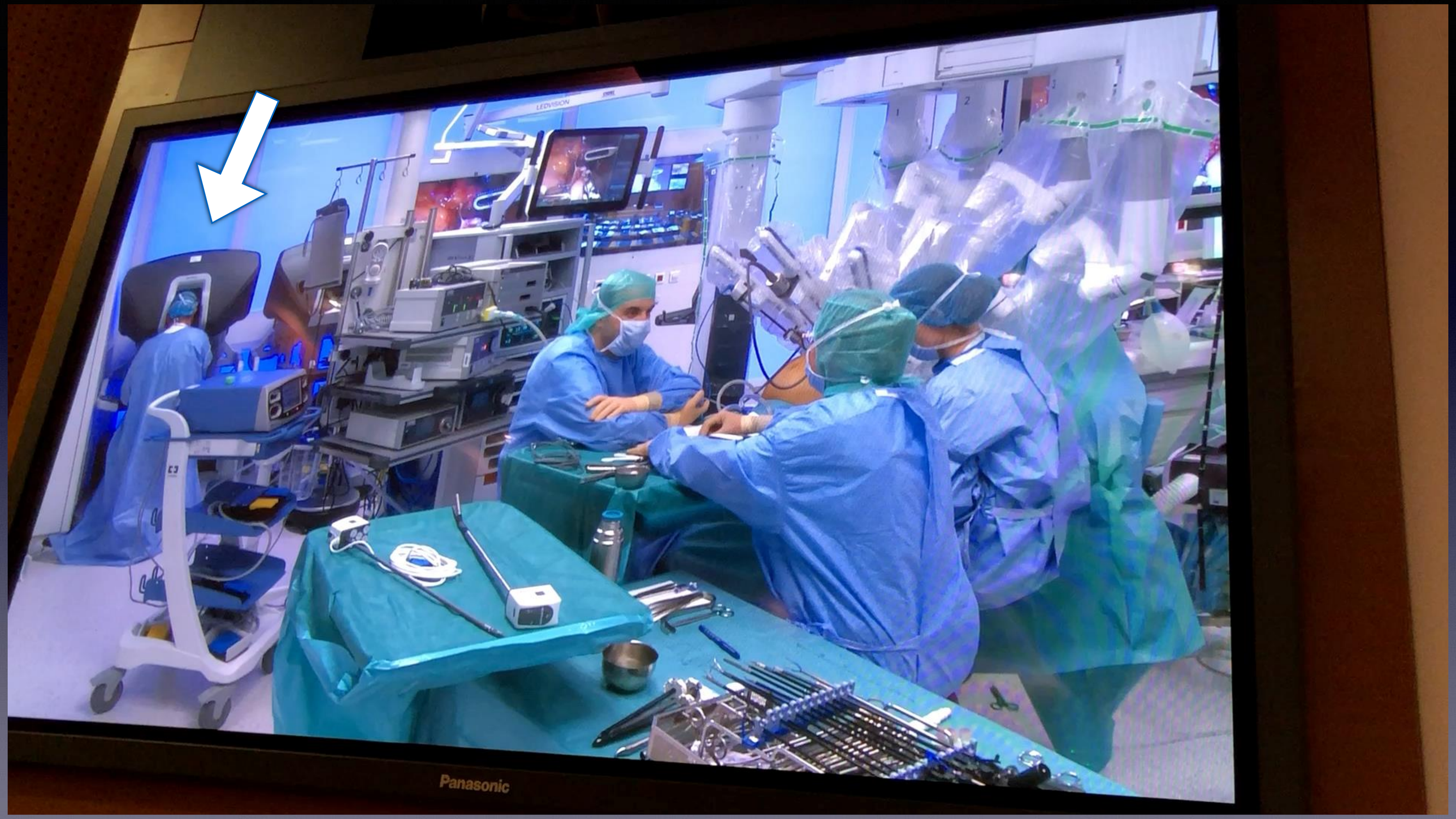
Bottom Line

- Currently there is no data that shows lower complication rates, operative times or any quality metrics of robotic vs laparoscopic bariatric surgery.
- May be an advantage in complex revision operations
- $3,000 - $10,000 / case difference in contribution margin to hospital
- Increases cost of health care delivery = less care for at risk populations.
- “We are not sexy, but we are cheap” R. Cohen

We should be part of the solution, not the problem




Panasonic

Rana: I'd rather you have the $$, rather than the Robot

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