

ROLE OF ROBOTICS IN THE PUBLIC HEALTH CARE SYSTEM

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Director of fellowship program in bariatric, laparoscopic and robotic surgery

Board of Director of the Canadian Association of Bariatric Physicians and Surgeons (CABPS)



DISCLOSURE

- Grant from Medtronic for the fellowship program



DISCLOSURE

First ever bilateral adrenalectomy performed using the da Vinci robot

MONTREAL – Dr. Pierre Y. Garneau, chief of surgery at Montreal's Sacré-Cœur Hospital, successfully performed the first documented robot-assisted bilateral adrenalectomy in a single operation in Canada.

The removal of both adrenal glands would typically require two separate visits to the operating room however thanks to the advanced technology and specialized resources available at Sacré Cœur Hospital, Dr. Garneau was able to remove both adrenal glands during the same operation for the treatment of Cushing's disease.

This rare endocrine disorder, caused by chronic excess cortisol, only exceptionally requires such a complex surgical intervention – one that can be performed exclusively in highly specialized centres.

Dr. Garneau is a leading figure in adrenal and bariatric surgery, practicing at Sacré-Cœur Hospital a high-volume centre where roughly 1,500 bariatric surgeries are performed annually and where he performs about 30 robotic adrenalectomies per year. He is also the director of the University of Montreal fellowship program in minimally invasive, bariatric and robotic surgery, one of the largest of its kind in Canada.

This case represented a rare and complex clinical challenge for the treating endocrinologists. The patient had already undergone two neurosurgical procedures to remove a pituitary tumour which is typically the first line treatment for pituitary dependent Cushing's disease, yet her hypercortisolism persisted.

Given the failure of standard thera-



Dr. Pierre Y. Garneau, chief of surgery.

pies, a multidisciplinary team of endocrinologists, neurosurgeons, and adrenal specialists reviewed the patient's case to explore other possible treatment options. Dr. Garneau was one of the physicians consulted to explore the option of the complete surgical removal of both adrenal glands.

Dr. Garneau performed the bilateral adrenalectomy using the fully computerized da Vinci robot. "The enhanced precision and ergonomics offered by the cutting-edge technology allowed us to push the boundaries of traditional treatments and because we were able to perform the surgery in just one visit to the OR, the patient was able to leave the hospital the next day," said Dr. Garneau. The patient will need hormone replacement therapy for the rest of her life, but her endogenous cortisol production has ceased thanks to the procedure.



March 2026
HEALTH TECHNOLOGY ASSESSMENT • Government of QUEBEC
INESSS. Efficacité et innocuité de la chirurgie robotique
bariatrique



No clear superiority in routine bariatric surgery

SCOPE

Primary RYGB and sleeve;
literature largely through January 2025.

SELECTIVE USE

Complex cases were not established
as a distinct value strategy.

EVIDENCE QUALITY

Generally low to very low;
few randomized trials.

**Routine replacement of effective
laparoscopy is not supported by
the clinical evidence.**





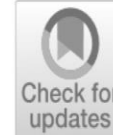
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REVIEW



A systematic review of full economic evaluations of robotic-assisted surgery in thoracic and abdominopelvic procedures

Hamid Sadri¹  · Michael Fung-Kee-Fung² · Bobby Shayegan³  · Pierre Y. Garneau⁴  · Padina Pezeshki⁵ 

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A systematic review of full economic evaluations of robotic-assisted surgery in thoracic and abdominopelvic procedures

Hamid Sadri¹  · Michael Fung-Kee-Fung² · Bobby Shayegan³  · Pierre Y. Garneau⁴  · Padina Pezeshki⁵ 

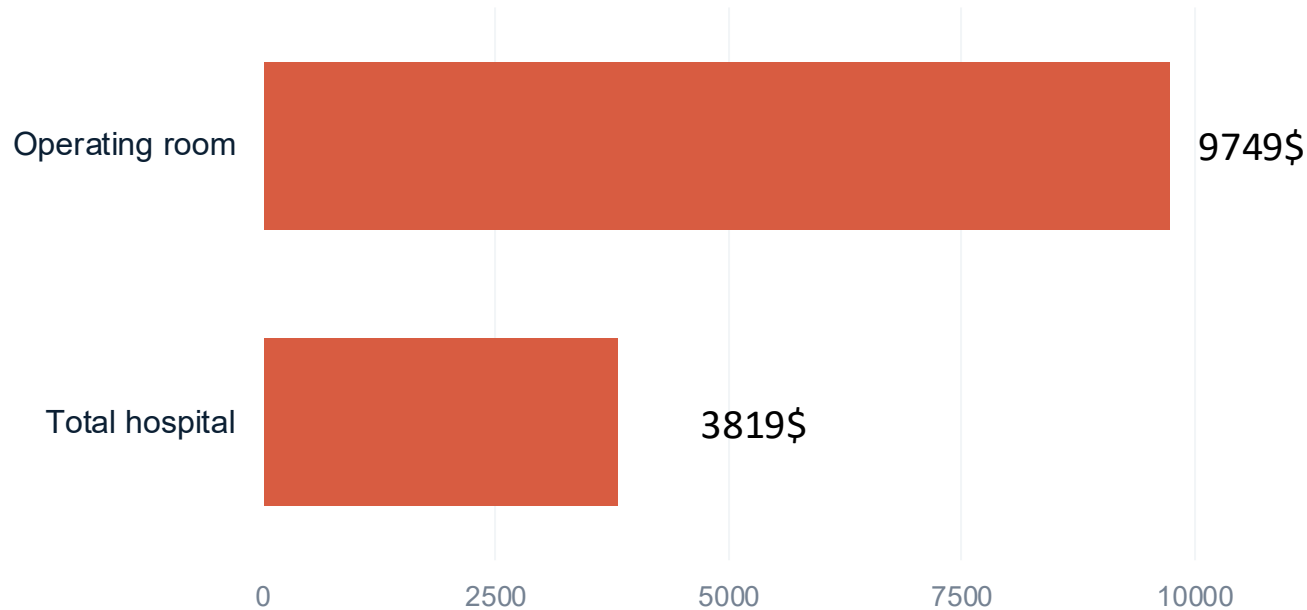
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-81% demonstrate an economic advantage

- * 28/33 were oncology cases
- * 16/33 were radical prostatectomies
- * Several studies compared robotic to open surgery..



14 retrospective studies | 1,414,357 patients



+\$3,819

mean absolute difference in total hospital cost
per case

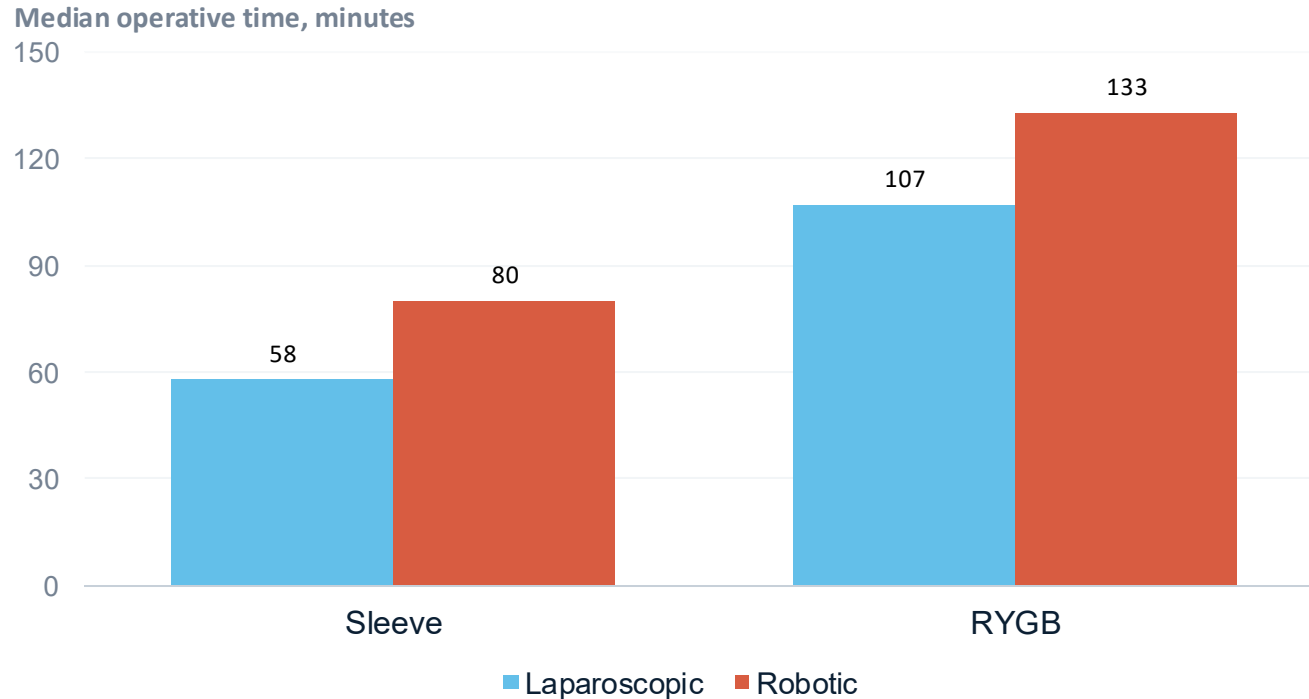
CLINICAL OFFSET

Robotics showed only slight advantages in length of stay and complication rates.

Affolter J, et al. Surg Endosc. 2025;39:2784–2798



More volume did not erase the robotic time penalty



467,954

propensity-matched patients

Higher at 30 days

Reoperation • readmission •
reintervention • ED visits

No mortality difference

Rahimi-Ardabily A, et al. Surg Endosc. 2026;40:384–390



Across 82,155 RYGB, outcomes were mostly equivalent

28

eligible studies

82,155

patients

9,051

robotic RYGB

NO SIGNIFICANT DIFFERENCE

Key perioperative outcomes
overall

4.4% vs 3.4%

Leang YJ, et al. Surg Obes Relat Dis. 2024;20:62–71



Revision RYGB may be where robotics earns its place

41,404

revisional cases

14,474 SG • 26,930 RYGB

REVISIONAL RYGB

6.2% → 4.8%

overall morbidity

laparoscopic → robotic

1.87 → 1.76 days

length of stay

TRADE-OFF

+35 min

No morbidity advantage for
revisional sleeve gastrectomy

**Benefit appeared in complex revisional RYGB,
not across all revisions.**

Spurzem GJ, et al. Surg Endosc. 2024;38:6294–6304



Clinical outcomes

**Transfusion and/or
estimated blood loss**



Conversion rate
vs. laparoscopy only



**Positive surgical margin rate
and/or lymph node yield and/or
lymph node upstaging**



Operative time



Complication rate
*30 days or other
Intraoperative and/or postoperative*



Readmission rate
30 days or other



Length of hospital stay



Reoperation rate
30 days or other



Perioperative mortality
30 days



Clinical outcomes (sleeve)

Outcome	Procedure with a da Vinci* system compared to laparoscopic	Reference
Operating time	Longer	Nasser H, et al. J Surg Res. 2020;249:34-41. DOI: 10.1016/j.jss.2019.12.012
Mortality rate (30 day)	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
Length of hospital stay	Longer	Nasser H, et al. J Surg Res. 2020;249:34-41. DOI: 10.1016/j.jss.2019.12.012
Conversion rate	Comparable	Nasser H, et al. J Surg Res. 2020;249:34-41. DOI: 10.1016/j.jss.2019.12.012
	Higher	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
Leak rate	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
Readmission rate (30 day)	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
	Higher	Dudash M, et al. Obes Surg. 2020;30(10):3706-3713. DOI: 10.1007/s11695-020-04712-z
Reoperation rate (30 day)	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5

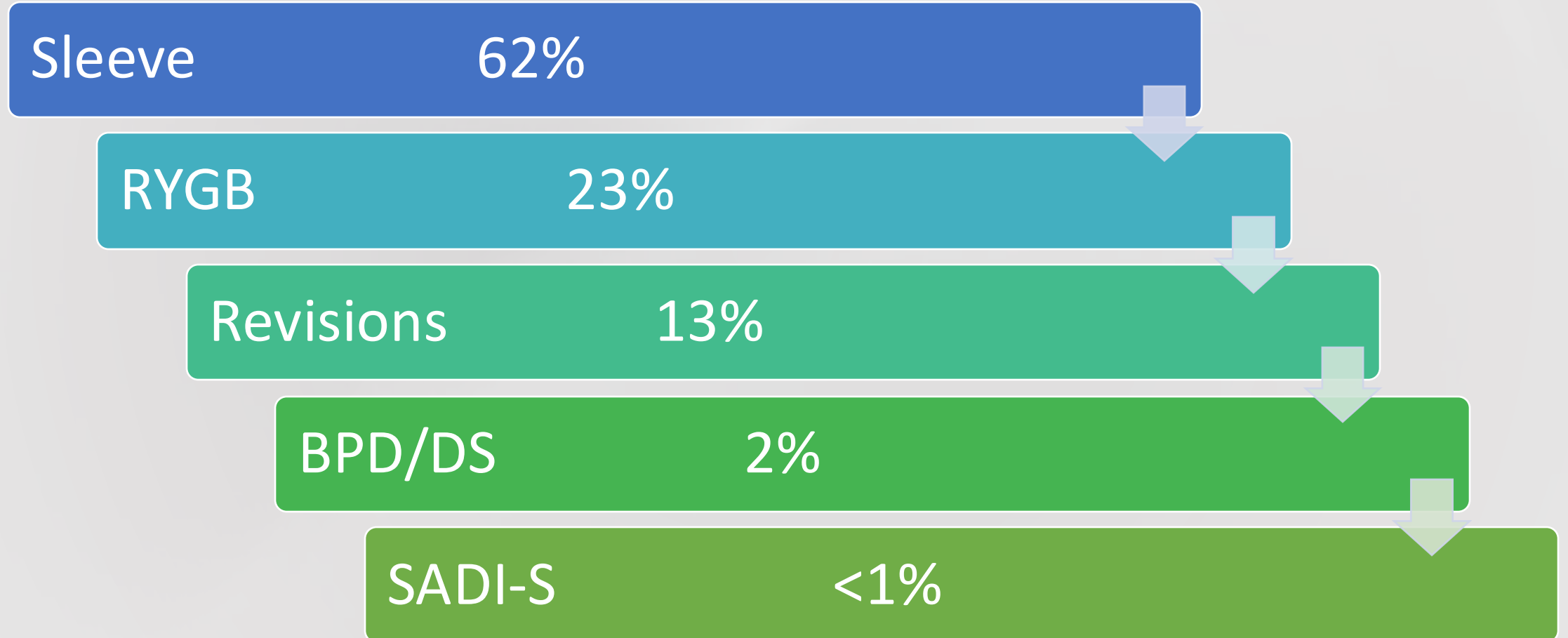


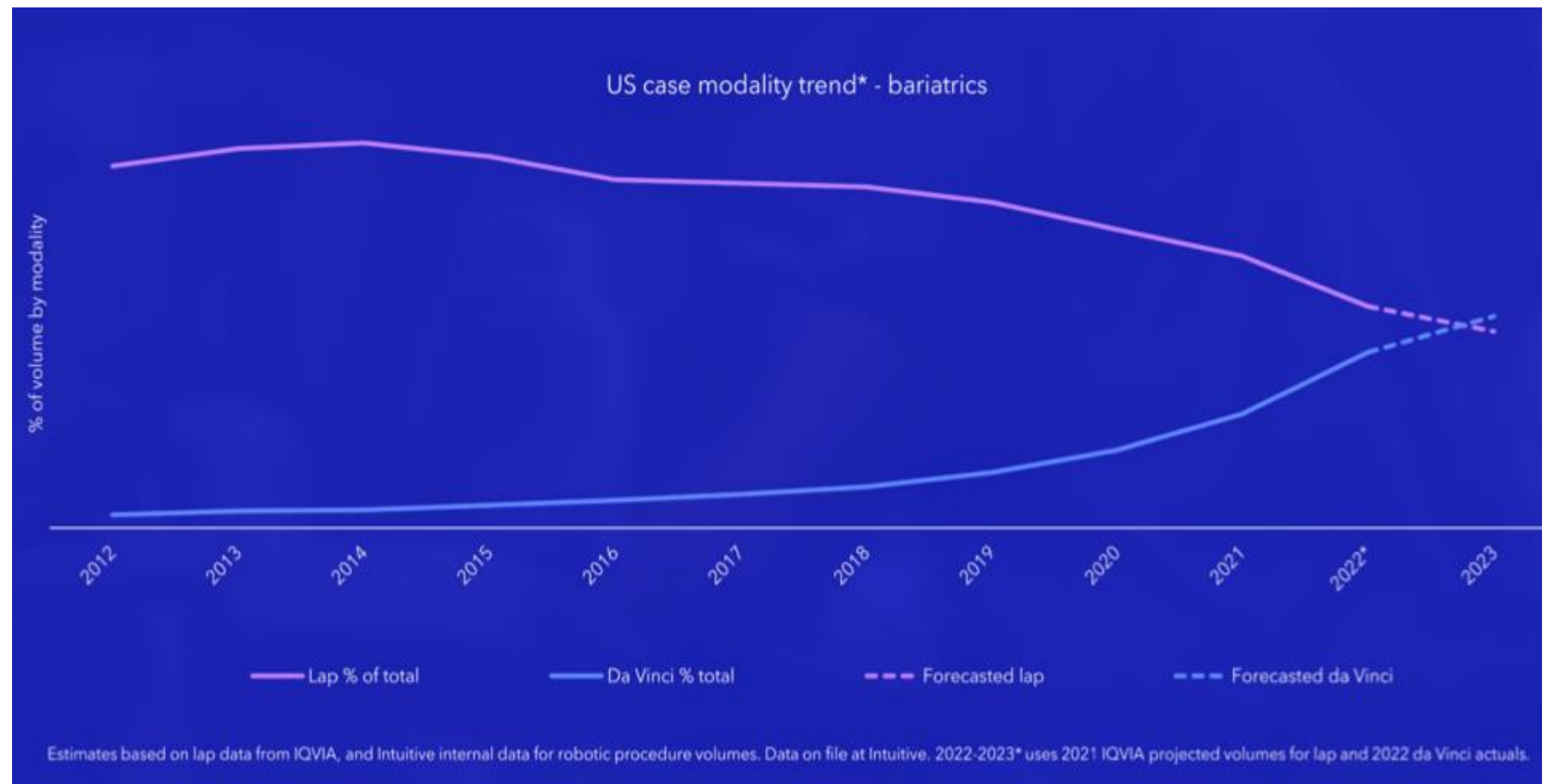
Clinical outcomes (gastric bypass)

Outcome	Robotic-assisted surgery with a da Vinci® system compared to laparoscopic	Reference
Anastomotic leak rate	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
	Higher	Celio AC, et al. Surg Obes Relat Dis. 2017;13(11):1847-1852. DOI: 10.1016/j.soard.2017.07.016
Length of hospital stay	Comparable	Acevedo E Jr, et al. Surg Endosc. 2020;34(3):1353-1365. DOI: 10.1007/s00464-019-06915-7
	Longer	Celio AC, et al. Surg Obes Relat Dis. 2017;13(11):1847-1852. DOI: 10.1016/j.soard.2017.07.016
Conversion rate	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
Overall perioperative complication rate	Lower	Tatarian T, et al. Surg Endosc. 2021;35(7):3915-3922. DOI: 10.1007/s00464-020-07839-3
	Comparable	Dudash M, et al. Obes Surg. 2020;30(10):3706-3713. DOI: 10.1007/s11695-020-04712-z
Major complication rate	Comparable	Dudash M, et al. Obes Surg. 2020;30(10):3706-3713. DOI: 10.1007/s11695-020-04712-z
Readmission rate (30-day)	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
	Higher	Dudash M, et al. Obes Surg. 2020;30(10):3706-3713. DOI: 10.1007/s11695-020-04712-z
Reoperation rate (30-day)	Comparable	Scarritt T, et al. Obes Surg. 2021;31(2):854-861. DOI: 10.1007/s11695-020-05055-5
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Bariatric procedure in USA (2023)



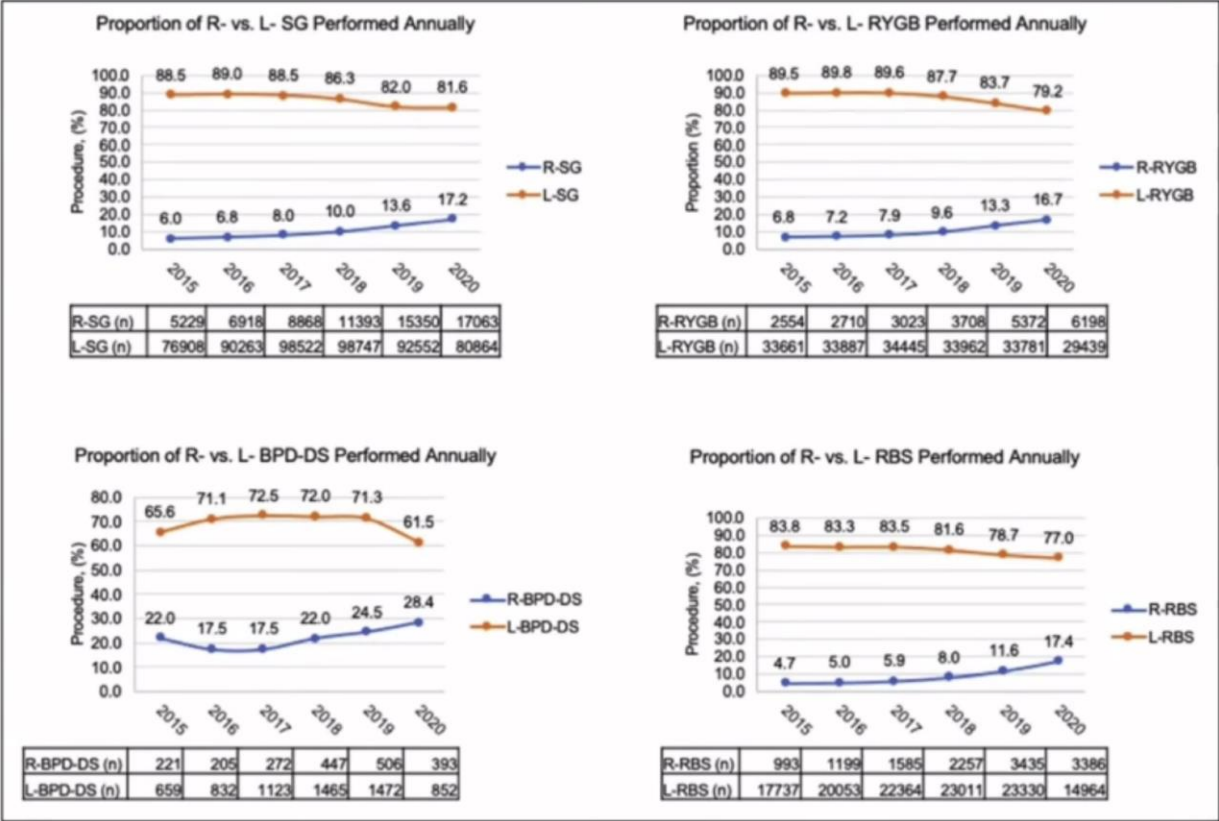




Current Trends in the Utilization of a Robotic Approach in the Field of Bariatric Surgery

Wayne B. Bauerle¹ · Pooja Mody² · Allison Estep² · Jill Stoltzfus³ · Maher El Chaar²

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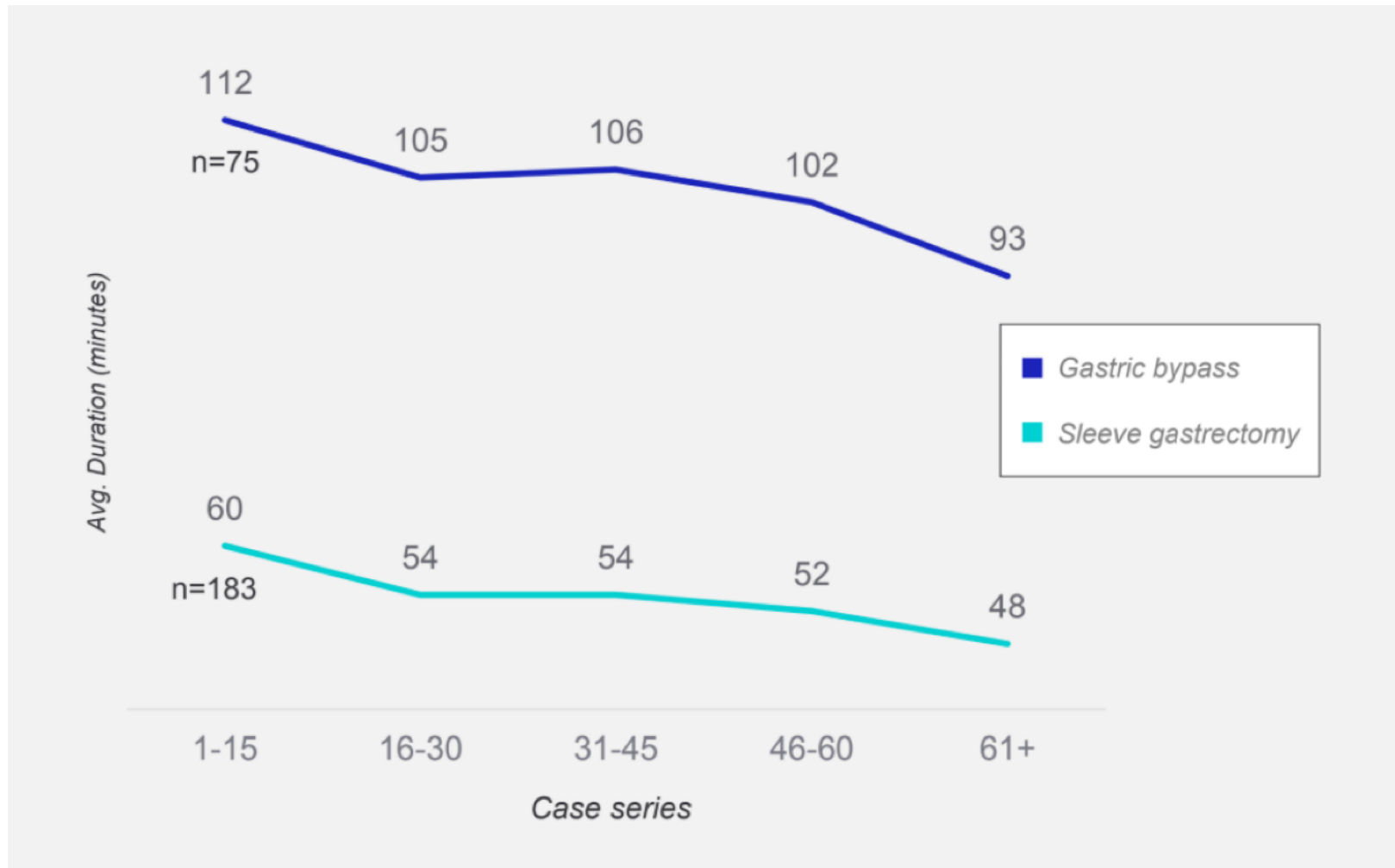


n = number, R- = Robotic, L- = Laparoscopic, SG = Sleeve Gastrectomy, RYGB = Rouxen- Y Gastric Bypass, BPD-DS = Biliopancreatic Diversion with Duodenal Switch, RBS = Revisional Bariatric Surgery, and MBS = Metabolic and Bariatric Surgery

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LEARNING CURVE

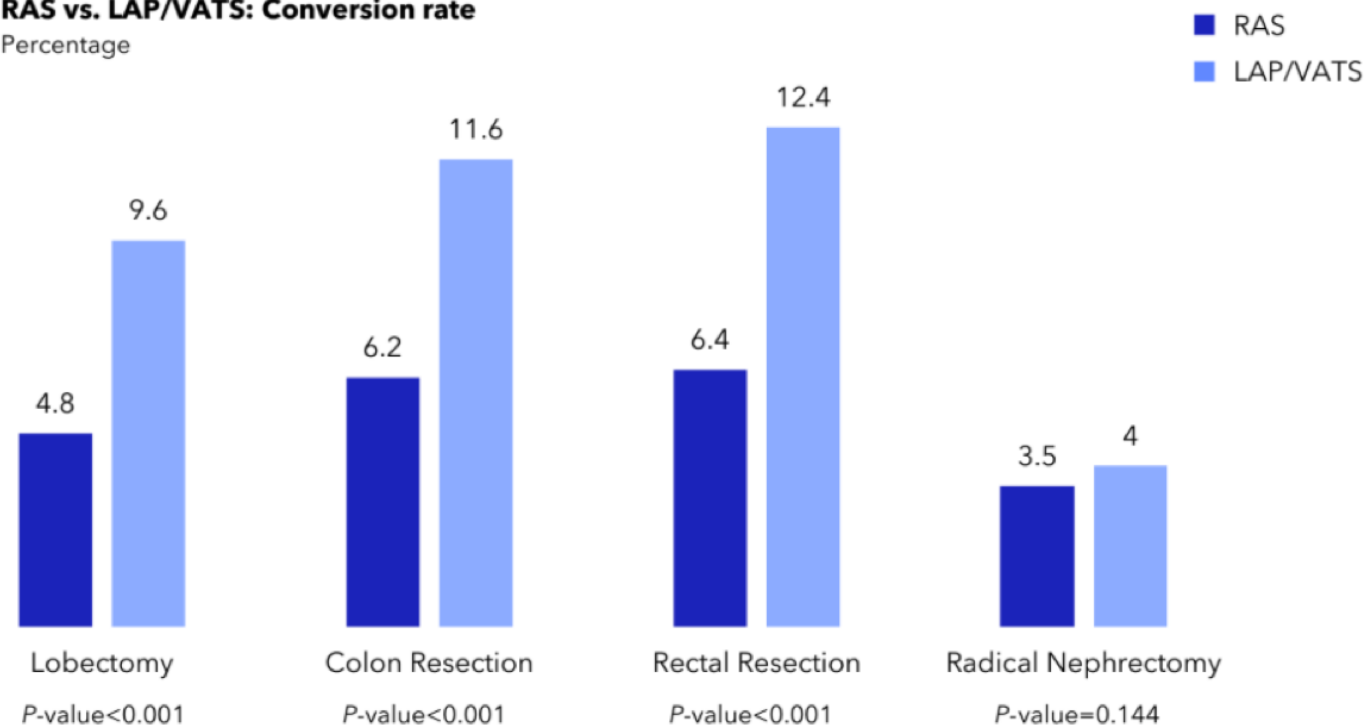


From a peer-reviewed publication by Ricciardi R, et al. 2022. DOI: 10.1007/s00464-022-09189-8

Data demonstrates significant reductions in conversions in all studied procedures except for nephrectomy.

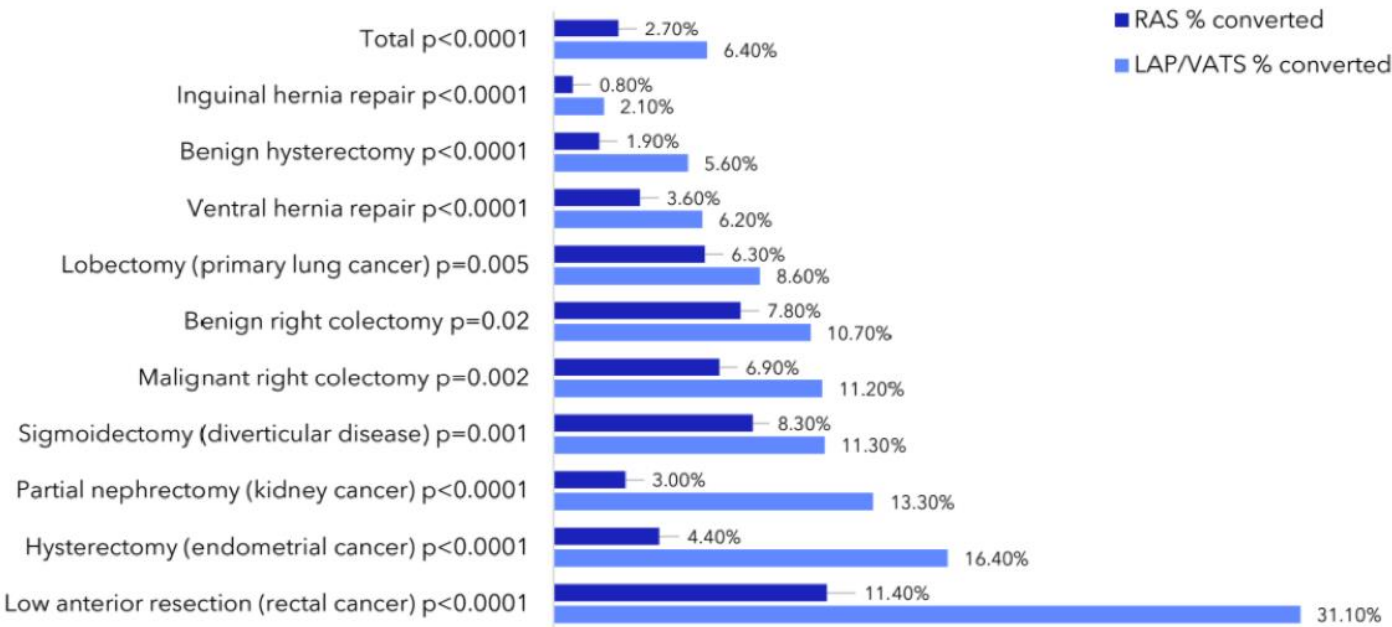
RAS vs. LAP/VATS: Conversion rate

Percentage

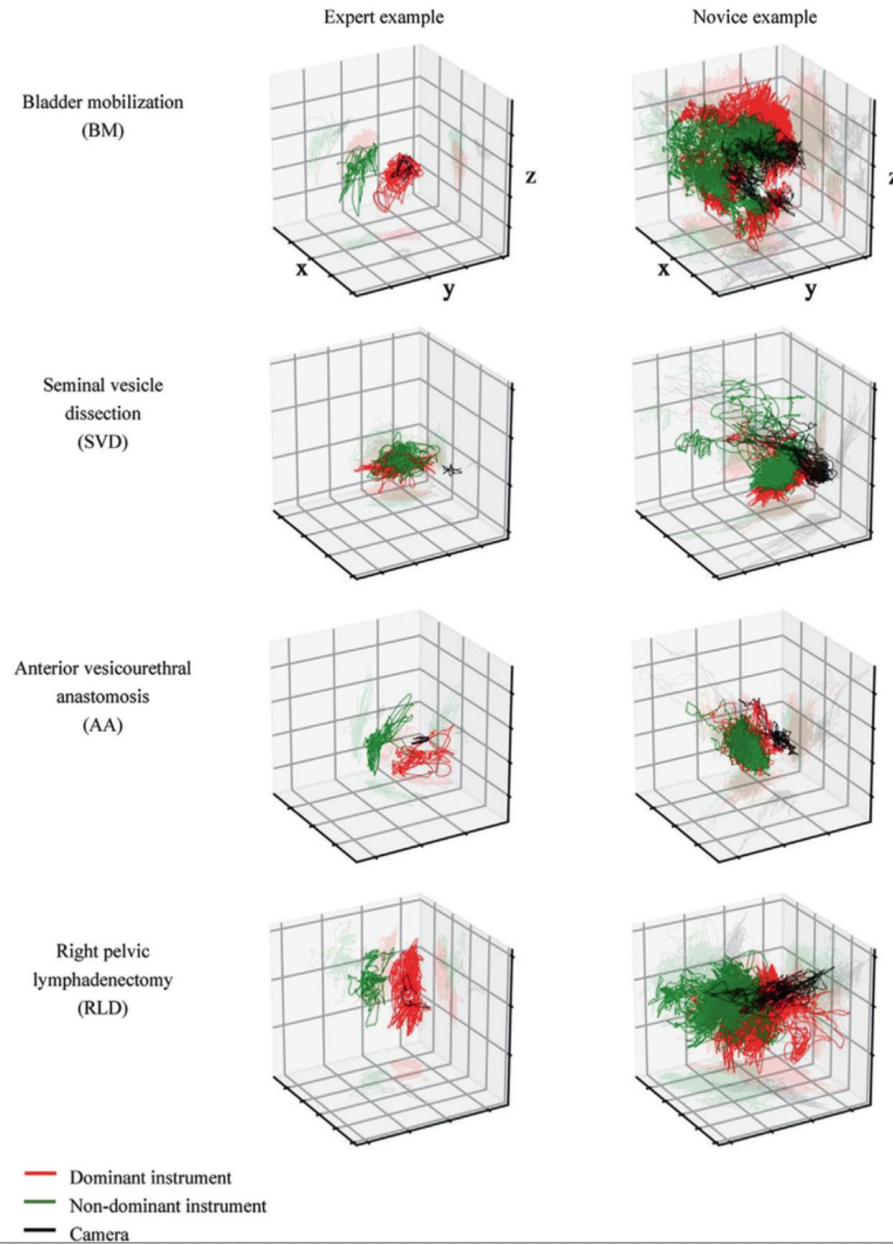


Impact of type of minimally invasive approach on open conversions across ten common procedures indifferent specialties

Conversion rates after propensity score matching (PSM) was performed between cohorts:



Best tools for evaluating trainees



UNIVERSITY OF MONTREAL PRINCING FOR A SLEEVE

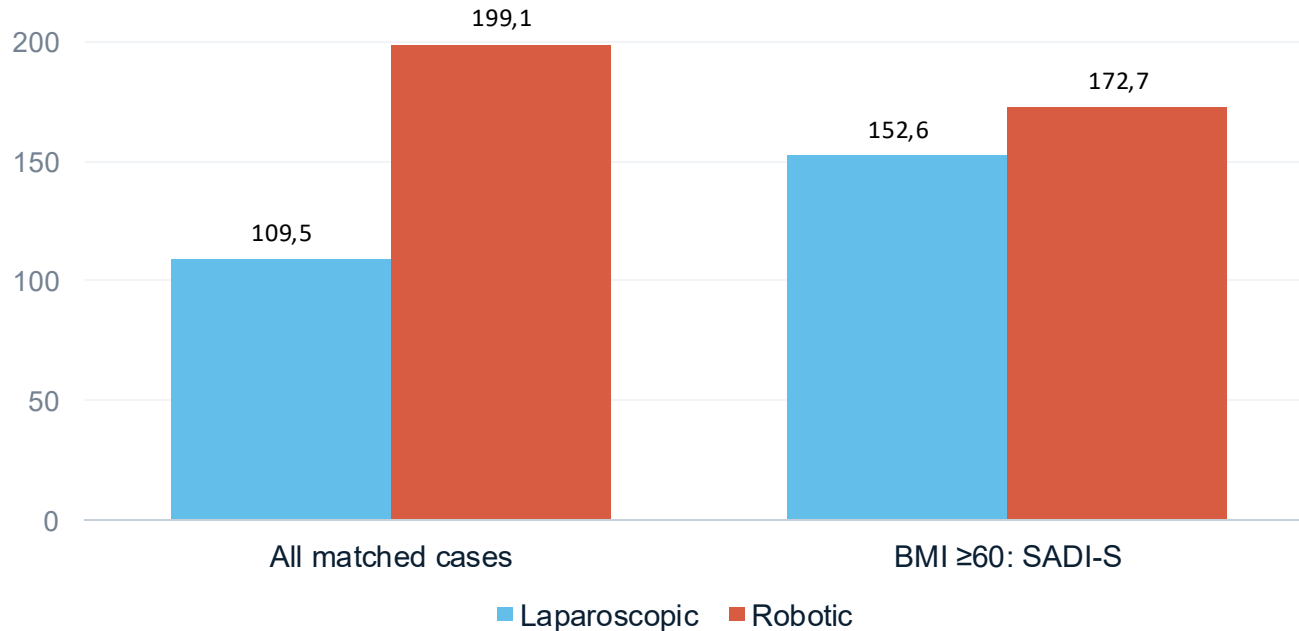
Instruments and materials

- Laparoscopic
 - 3240\$
- Robotic
 - 3380\$



Complexity narrows the time gap—but costs remain high

Mean operative time, minutes



Marincola G, et al. J Robot Surg. 2024;18:34.

COST PER CASE

RYGB

€8,135 robotic

€2,387 laparoscopic

SADI-S

€7,997 robotic

€3,955 laparoscopic

In BMI ≥ 60 SADI-S, the time difference was no longer statistically significant ($p=.107$).



Value changes when the lens expands beyond the OR

TIME HORIZON

Longer horizons capture downstream outcomes and resource use.

VOLUME

Larger caseloads spread fixed capital and service costs.

Implication

Cost per operation is not the same as cost-effectiveness.

Sadri H, et al. J Robot Surg. 2023;17:2671–2685



CONCLUSION

- Many weakness in the literature
- Retrospective studies
- Differing patient selection (complex cases)
- Very few prospective economic evaluations



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