

Open Versus Laparoscopic Inguinal Hernia Repair in Patients with Obesity: A NSQIP Propensity-Matched Analysis of 59,943 Elective, Emergency, and Recurrent Cases

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Background

- Laparoscopic inguinal hernia repair has become increasingly adopted as an alternative to open repair.
- Limited evidence around their safety in patients with obesity, especially in emergent and recurrent scenarios.

Objective:

Our study aims to investigate the 30-day outcomes of open vs. laparoscopic inguinal hernia repair in the population with obesity using the National Surgical Quality Improvement Program (NSQIP).

Methods

- Retrospective cohort 2015 – 2023 from NSQIP database.
- Eligibility: 18 years or over, BMI ≥ 30kg/m², undergoing inguinal hernia repair.
- Post operative complications assessed – superficial and deep surgical site infection, organ space infection, wound disruption, urinary tract infection, pneumonia, septic shock, bleeding requiring transfusion, deep vein thrombosis, pulmonary embolism, reintubation, failure to wean ventilation, post op dialysis requirement, myocardial infarction, cardiac arrest, cerebrovascular accident (CVA).
- Patients with open and laparoscopic repair matched with propensity score matching by 1:1 nearest neighbor, caliper of 0.05 standard deviations of the logit. Matched on age, sex, medical history (COPD, diabetes, steroid use, smoking), functional status, incarceration and recurrence.
- Effects analyzed with bivariate chi-squared test and linear regression, multivariate logistic regression constructed with hypothesis driven variable selection.

Results

Table 1: Study cohort size

	Open	Laparoscopic
All patients	29,654	29,654
Emergency Subgroup	584	584
Recurrent hernia subgroup	3024	3024

Figure 1: Love plot depicting reduction in bias after propensity match between open inguinal hernia repair and laparoscopic inguinal hernia repair groups.

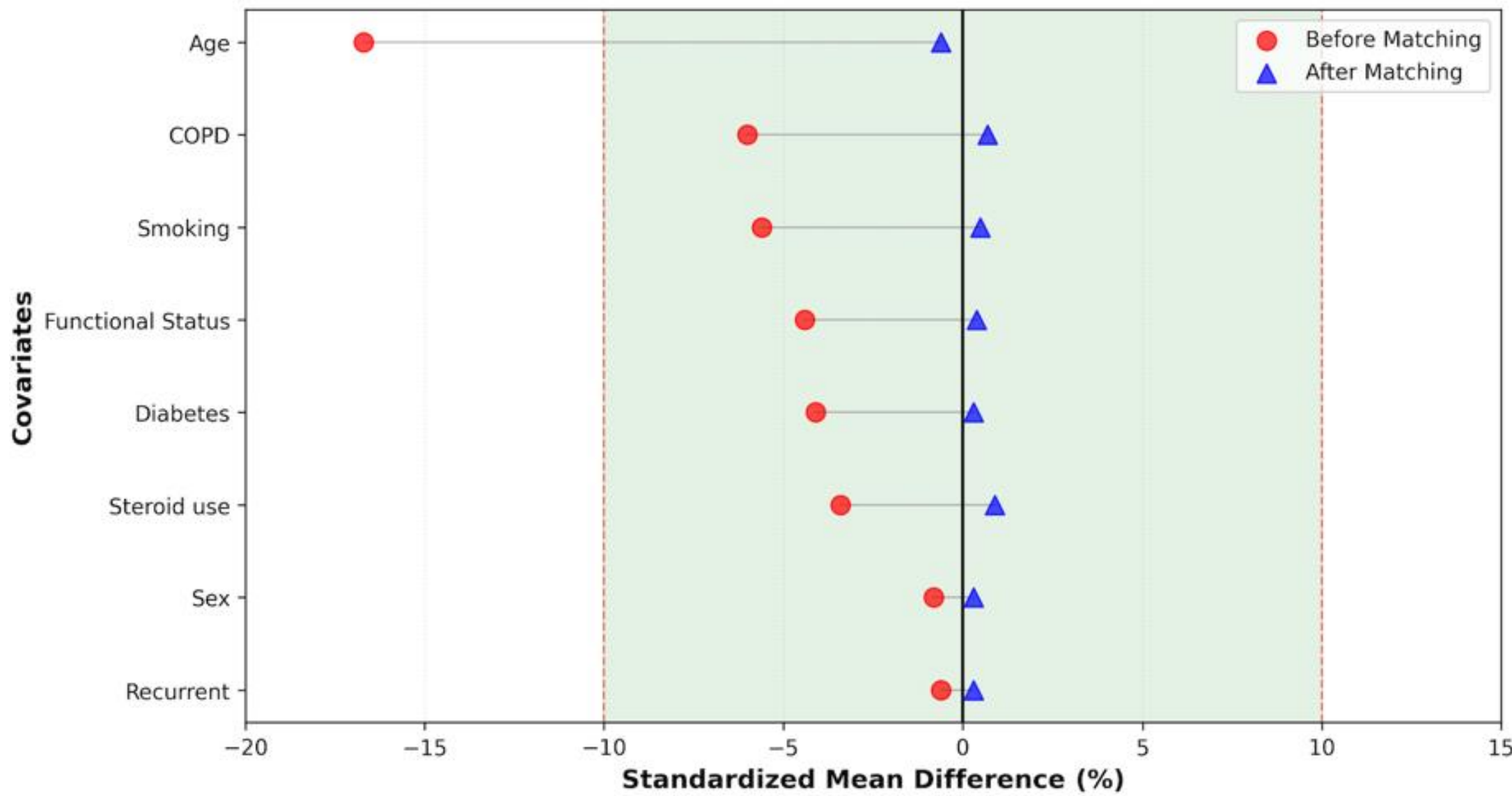


Figure 2: Annual trends of number of cases of open and laparoscopic cases between 2015 to 2023 in the NSQIP database.

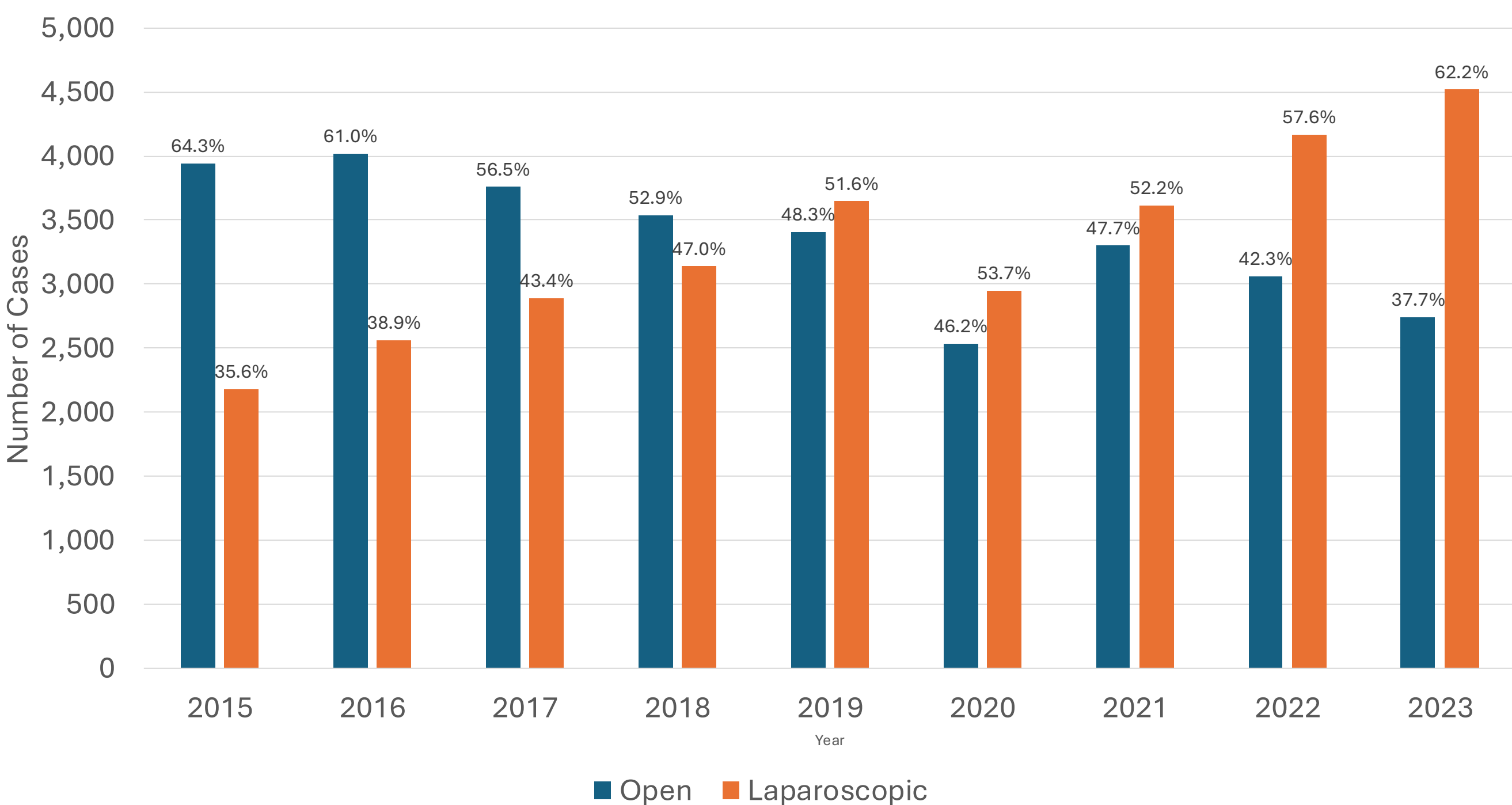


Table 2: Multivariate analysis - Predictors of serious complications

	aOR (95% CI)	p-value
Patient factors		
Age	1.34 (0.73 - 2.45)	0.352
BMI	1.12 (0.64 - 1.97)	0.694
Female sex	0.81 (0.34 - 1.92)	0.632
Race (black)	0.15 (0.03 - 0.71)	0.017
Diabetes	0.67 (0.24 - 1.87)	0.447
Smoke	0.48 (0.19 - 1.21)	0.119
ASA	2.41 (1.28 - 4.52)	0.006
Surgical factors		
Increased Op time	1.00 (1.00 - 1.01)	0.442
Laparoscopic	0.17 (0.04 - 0.79)	0.024
Clinical Factors		
Reducible	0.20 (0.03 - 1.35)	0.100

Table 3: multivariate logistic analysis – Emergency subgroup - Predictors of serious complications

	aOR OR (95% CI)	p-value
Patient factors		
Age	1.56 (1.25 - 1.94)	<0.001
BMI	0.97 (0.71 - 1.32)	0.851
Female sex	0.91 (0.47 - 1.79)	0.790
Race (black)	0.78 (0.34 - 1.78)	0.555
Diabetes	0.74 (0.34 - 1.64)	0.461
Smoke	1.22 (0.56 - 2.65)	0.617
ASA	1.69 (0.89 - 3.22)	0.110
Surgical factors		
Increased Op time	1.01 (1.00 - 1.01)	0.001
Laparoscopic	0.63 (0.34 - 1.17)	0.146
Clinical Factors		
Reducible	0.69 (0.30 - 1.57)	0.372

Table 4: multivariate logistic analysis – Recurrence subgroup - Predictors of serious complications

	aOR OR (95% CI)	p-value
Patient factors		
Age	1.26 (0.99 - 1.61)	0.059
BMI	1.12 (0.91 - 1.37)	0.294
Sex	1.59 (0.65 - 3.86)	0.308
Race (black)	1.20 (0.56 - 2.55)	0.639
Diabetes	1.21 (0.66 - 2.20)	0.538
Smoke	1.35 (0.69 - 2.65)	0.381
ASA	1.55 (0.96 - 2.50)	0.075
Surgical factors		
Increased Op time	1.003 (1.00 - 1.01)	0.051
Laparoscopic	0.21 (0.10 - 0.44)	<0.001
Clinical Factors		
Reducible	0.29 (0.13 - 0.63)	0.002

Discussion/Limitations

Discussion:

- Decreased composite serious complication rate – driven by reductions in surgical site infections
- No statistical difference in complication rates between laparoscopic and open groups in emergency repair
- Reduced serious complication rate in recurrent hernia repair

Strengths:

- Large contemporary, multicenter cohort
- Furtheres previous work from Froylich et al, 2017
- Supports safety of laparoscopic inguinal hernia repair in the obese population

Limitations:

- NSQIP related limitations:
 - No data on seroma, post op pain
 - No granular data on approach (TEP vs. TAPP)
- Very few incarcerated/strangulated cases (removed at stage of propensity match)
- CPT code related misclassification bias.

Conclusion

This large contemporary analysis demonstrates laparoscopic inguinal hernia repair is a safe approach in patients with obesity regardless of acuity of presentation (i.e. elective versus emergent) and has a very favorable 30-day safety profile in recurrent cases.

References

Froylich D, Haskins IN, Aminian A, O'Rourke CP, Khorgami Z, Boules M, et al. Laparoscopic versus open inguinal hernia repair in patients with obesity: an American College of Surgeons NSQIP clinical outcomes analysis. Surg Endosc. 2017;31(3):1305–10. doi: 10.1007/s00464-016-5112-6.