Should Laparoscopic Hernia Repair be Avoided in COPD Patients?

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Background

- Current guidelines recommend minimally invasive, compared to open surgery, for patients having bilateral or recurrent hernia repairs.
- Laparoscopic approach is often avoided in chronic obstructive pulmonary disease (COPD) patients due to concern for increased risk of perioperative complications.
- Review of the literature indicates that the global prevalence of COPD has been increasing over the last few decades due to increasing sedentary lifestyles, smoking, and prolonged life expectancy.
- Surgeons and anesthesiologists are dealing with a larger and larger number of respiratory patients, especially COPD.

Purpose

- To determine if there is a difference in outcomes between laparoscopic and open procedures for inguinal hernia patients with COPD

Methods

- Data from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database was queried from 2005-2018.
- COPD patients undergoing inguinal hernia repair were compared based on approach (open vs lap)
- The 2 groups were propensity score matched on demographic data and pre-operative risk factors
- The primary endpoint was a composite outcome of major morbidity or death based on documented post-operative outcomes within the NSQIP database.
- Secondary endpoints were respiratory complications including post-operative pneumonia, failure to wean off the ventilator, and reintubation.

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Results

	Overall	Open	Laparoscopic	SMD
	2733	1822	911	
Male	2389 (87.4)	1606 (88.1)	783 (85.9)	**0.065**
Age (mean (SD))	67.41 (11.05)	67.40 (11.24)	67.41 (10.67)	**0.001**
BMI (mean (SD))	25.79 (5.37)	25.81 (5.51)	25.73 (5.08)	**0.016**
Diabetes (%)	310 (11.3)	209 (11.5)	101 (11.1)	**0.012**
Elective surgery (%)	2708 (99.1)	1810 (99.3)	898 (98.6)	**0.076**
Insulin (%)	90 (3.3)	60 (3.3)	30 (3.3)	**<0.001**
Smoking history (%)	1137 (41.6)	764 (41.9)	373 (40.9)	**0.020**
Dyspnea (%)	717 (26.2)	482 (26.5)	235 (25.8)	**0.015**
Severity of dyspnea (%)				**0.025**
At rest	60 (2.2)	42 (2.3)	18 (2.0)	
Moderate exertion	657 (24.0)	440 (24.1)	217 (23.8)	
None	2016 (73.8)	1340 (73.5)	676 (74.2)	
Dependent functional status (%)	46 (1.7)	35 (1.9)	11 (1.2)	**0.058**
Ascites (%)	9 (0.3)	7 (0.4)	2 (0.2)	**0.030**
History of CHF (%)	68 (2.5)	45 (2.5)	23 (2.5)	**0.004**
Hypertensive medication use (%)	1708 (62.5)	1139 (62.5)	569 (62.5)	**0.001**
Renal failure (%)	1 (0.0)	0 (0.0)	1 (0.1)	**0.047**
Dialysis (%)	16 (0.6)	11 (0.6)	5 (0.5)	**0.007**
Steroid use (%)	113 (4.1)	65 (3.6)	48 (5.3)	**0.083**
Pre-operative weight loss (%)	20 (0.7)	15 (0.8)	5 (0.5)	**0.033**
Bleeding disorder (%)	134 (4.9)	86 (4.7)	48 (5.3)	**0.025**
ASA class (%)				**0.053**
1	4 (0.1)	2 (0.1)	2 (0.2)	
2	727 (26.6)	480 (26.3)	247 (27.1)	
3	1763 (64.5)	1173 (64.4)	590 (64.8)	
4	**239 (8.7)**	**167 (9.2)**	**72 (7.9)**	

- After matching, 2733 patients remained with 1822 patients in the open repair group and 911 patients in the laparoscopic group.
- The covariates were well balanced.

	Overall	Open	Laparoscopic	p
	2733	1822	911	
Major morbidity (%)	58 (2.1)	34 (1.9)	24 (2.6)	**0.241**
Post-operative pneumonia (%)	25 (0.9)	16 (0.9)	9 (1.0)	**0.943**
Failure to wean from ventilator (%)	4 (0.1)	1 (0.1)	3 (0.3)	**0.216**
Reintubation (%)	**10 (0.4)**	**4 (0.2)**	**6 (0.7)**	**0.145**

	Open	Laparoscopic
	1822	**911**
Dindo-Clavien classification (%)		
0	1752 (96.2)	**870 (95.5)**
1	11 (0.6)	**3 (0.3)**
2	25 (1.4)	**14 (1.5)**
3	20 (1.1)	**9 (1.0)**
4	10 (0.5)	**11 (1.2)**
5	**4 (0.2)**	**4 (0.4)**

- There were no significant differences in any of the primary of secondary endpoints.
- Rates of major Dindo-Clavien outcomes were rare and similar between open and laparoscopic groups, respectively, (1.87% vs. 2.63%, p=0.241) with an odds ratio of 1.43 (0.83 – 2.41), 95% CI.
- Due to the rarity of events, a subgroup analysis by severity of dyspnea was not performed.

Conclusions

- COPD matched patients undergoing laparoscopic hernia repair did not have a significantly higher incidence of major morbidity, death, or respiratory complications compared to open inguinal hernia repair.
- Surgeons should consider laparoscopic hernia repair a viable option for most COPD patients