

Morbid obesity is associated with postoperative complications in laparoscopic hysterectomy

Margaret T. Berrigan, MS; Maria V. Vargas, MD; Alex Gu, BS; Chapman Wei, BS; Hannah N. Robinson, BS; Paul Tyan, MD; Gaby N. Moawad, MD
Department of Obstetrics and Gynecology, The George Washington University School of Medicine and Health Sciences

BACKGROUND

- The prevalence of obesity in American women is 38.8% and continues to increase.
- In surgical patients, increasing BMI is associated with longer operative times, greater estimated blood loss, and greater complication severity.
- The benefits of laparoscopic procedures, including shorter hospital stays, less postoperative pain, and fewer wound infections, are more significant in patients with obesity than in patients with normal BMI.
- Hysterectomy is the second most common surgery performed in reproductive-age women.
- The complication rate of laparoscopic hysterectomy (0.3%) is lower than that of abdominal hysterectomy (1.7%), thus laparoscopic approaches have largely replaced traditional abdominal hysterectomy where clinically appropriate.
- This study aims to evaluate the relationships between obesity and postoperative complications following laparoscopic hysterectomy.

METHODS

- We conducted a retrospective cohort study using the American College of Surgeons National Quality Improvement Database (ACS-NSQIP) by identifying all cases of laparoscopic total hysterectomy, laparoscopic assisted vaginal hysterectomy, or laparoscopic supracervical hysterectomy from 2005 to 2016 using the appropriate CPT codes.
- Patients were stratified into BMI categories; ANOVA and chi-squared tests were performed to evaluate the incidence of pre-surgical variables and postoperative outcomes in these groups.
- Binary logistic regression analyses were performed on the BMI = 35-39.9 and BMI > 40 categories to correct for covariables.

RESULTS

- Higher BMI is associated with more pre-existing conditions and medical comorbidities (Table 1).
- Higher BMI is associated with greater incidence of 30-day postoperative complications (Table 2).
- BMI > 40 is an independent risk factor for superficial wound infection, pulmonary embolism, deep vein thrombosis, and unplanned return to the OR (Table 3).
- BMI > 35 is an independent risk factor for superficial wound infection when compared with BMI 18.5-24.9 (OR = 1.84; 95% CI 1.413-2.394; p < 0.001).

TABLE 1: SIGNIFICANT VARIABLES BY BMI CATEGORY

Variable	BMI Category					p-value
	BMI 18.5-24.9 (n=22,393)	BMI 25-29.9 (n=27,050)	BMI 30-34.9 (n=21,147)	BMI 35 - 39.9 (n=13,572)	BMI > 40 (n=13,940)	
Age (yr)	47.9±11.6	48.6±11.5	47.5±11.5	48.5±11.4	49.2±11.5	<0.001
<u>Race/ethnicity</u>						
White	78.230%	71.183%	69.031%	69.525%	72.482%	<0.001
Black	6.163%	11.823%	16.045%	18.155%	17.281%	
Hispanic	7.855%	11.608%	11.165%	9.542%	7.654%	
Other	7.534%	5.190%	3.533%	2.497%	2.389%	
<u>Diabetes</u>						
No DM	97.731%	94.673%	90.263%	85.780%	78.372%	<0.001
NIDDM	1.527%	4.026%	7.197%	10.212%	15.251%	
IDDM	0.741%	1.301%	2.539%	4.008%	6.377%	
<u>ASA Class</u>						
1 or 2	89.184%	86.418%	79.955%	66.637%	35.445%	<0.001
3 or 4	10.816%	13.582%	20.045%	33.363%	64.555%	
Smoking	17.912%	17.327%	16.901%	16.593%	14.491%	<0.001
<u>Dyspnea</u>						
None	98.593%	98.085%	97.290%	96.279%	92.712%	<0.001
Exertional	1.344%	1.845%	2.648%	3.603%	7.044%	
At rest	0.063%	0.070%	0.061%	0.118%	0.244%	
<u>Pre-op Function</u>						
Independent	99.710%	99.789%	99.683%	99.617%	99.405%	<0.001
Partial	0.246%	0.189%	0.255%	0.317%	0.574%	
Dependent	0.045%	0.022%	0.061%	0.066%	0.022%	
Pulmonary comorbidity	0.884%	0.839%	1.017%	1.400%	1.915%	<0.001
Cardiac comorbidity	13.339%	22.969%	32.094%	40.259%	50.961%	<0.001
Chronic steroid	1.630%	1.386%	1.381%	1.496%	1.808%	0.005
Weight loss	0.290%	0.122%	0.142%	0.140%	0.108%	<0.001
Bleeding disorder	0.889%	0.850%	0.913%	1.076%	1.370%	<0.001
Ascites	0.067%	0.052%	0.052%	0.015%	0.072%	0.043

TABLE 3: BMI >40 AS AN INDEPENDENT RISK FACTOR FOR COMPLICATIONS

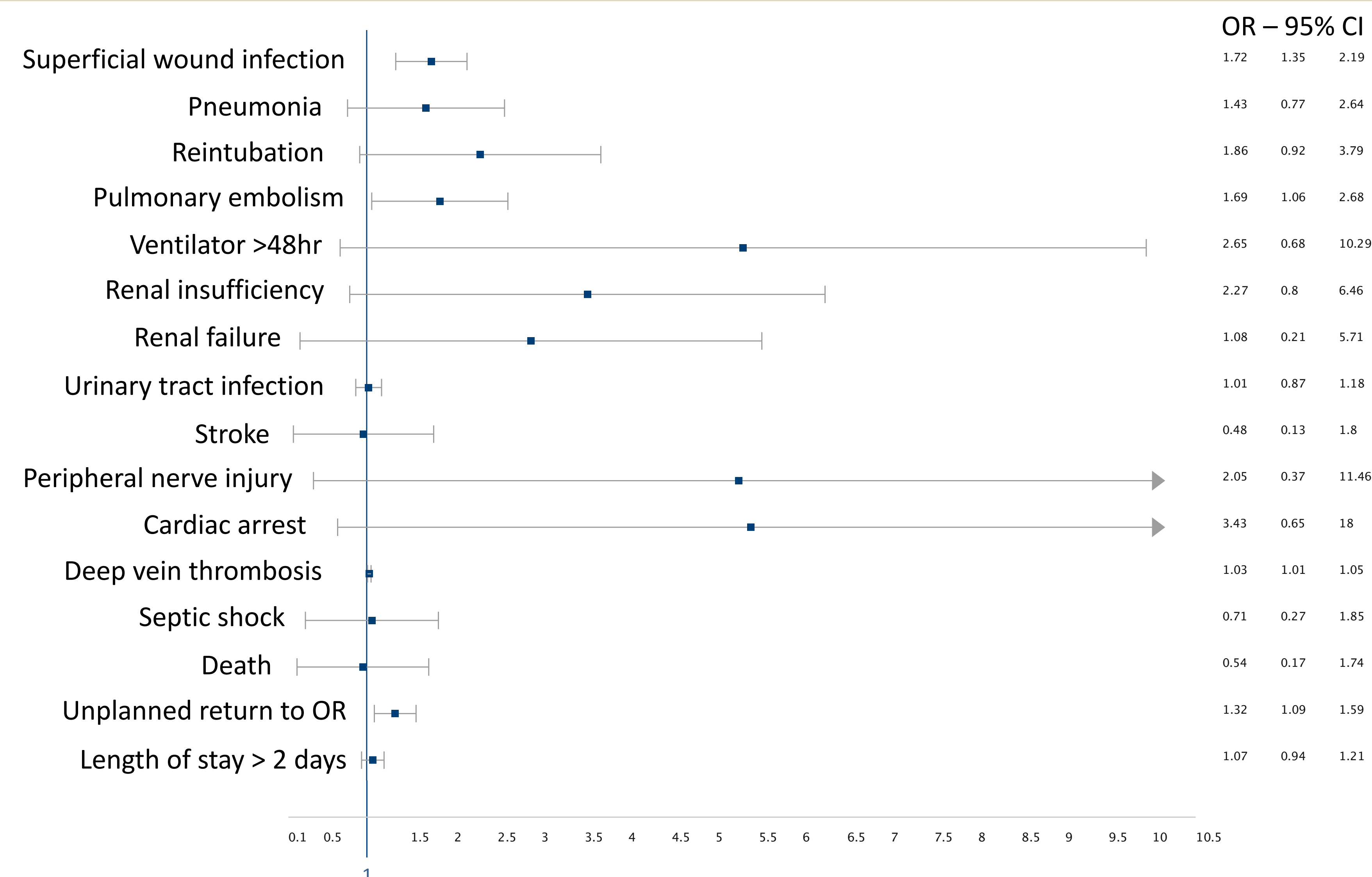


TABLE 2: INCIDENCE OF COMPLICATIONS BY BMI CATEGORY

Complication	BMI Category					p-value
	BMI 18.5-24.9 (n=22,393)	BMI 25-29.9 (n=27,050)	BMI 30-34.9 (n=21,147)	BMI 35 - 39.9 (n=13,572)	BMI > 40 (n=13,940)	
Any complication	4.323%	4.436%	4.700%	5.069%	5.911%	< 0.001
Superficial wound infection	0.581%	0.640%	0.686%	1.061%	1.521%	< 0.001
Deep wound infection	0.152%	0.163%	0.151%	0.206%	0.230%	0.434
Organ/space infection	0.924%	0.865%	0.908%	0.928%	0.940%	0.816
Wound dehiscence	0.228%	0.226%	0.180%	0.199%	0.280%	0.315
Pneumonia	0.089%	0.107%	0.132%	0.177%	0.194%	0.043
Reintubation	0.058%	0.048%	0.109%	0.169%	0.208%	< 0.001
Pulmonary embolism	0.165%	0.170%	0.255%	0.287%	0.251%	0.027
Failure to wean from ventilator >48 hours	0.013%	0.052%	0.052%	0.059%	0.079%	0.098
Renal insufficiency	0.022%	0.055%	0.061%	0.022%	0.100%	0.016
Renal failure	0.013%	0.000%	0.019%	0.022%	0.057%	0.004
Urinary tract infection	2.068%	2.214%	2.180%	2.210%	2.554%	0.082
Stroke	0.027%	0.007%	0.009%	0.029%	0.086%	< 0.001
Peripheral nerve injury	0.013%	0.004%	0.009%	0.000%	0.036%	0.029
Cardiac arrest	0.009%	0.007%	0.019%	0.044%	0.043%	0.047
Myocardial infarction	0.018%	0.037%	0.028%	0.037%	0.022%	0.796
Deep vein thrombosis	0.143%	0.067%	0.147%	0.177%	0.208%	0.003
Sepsis	0.304%	0.333%	0.336%	0.391%	0.409%	0.579
Septic shock	0.054%	0.041%	0.061%	0.052%	0.122%	0.047
Death	0.022%	0.041%	0.043%	0.059%	0.093%	0.064
Length of stay > 2 days	2.929%	3.068%	3.277%	3.463%	4.720%	< 0.001
Unplanned return to OR	1.576%	1.331%	1.225%	1.304%	1.162%	0.002

DISCUSSION AND NEXT STEPS

- Studies suggest higher BMI is associated with poorer surgical outcome. The prevalence of obesity in the United States makes pursuing a better understanding of BMI and postoperative outcomes a priority.
- While complication rates following laparoscopic hysterectomy are low across BMI groups, patients with obesity (BMI > 30) were more likely to suffer at least one postoperative complication than non-obese patients.
- Morbid obesity (BMI > 40) may contribute to a significantly increased risk of deep vein thrombosis and pulmonary embolism in the 30-day postoperative period, suggesting the need for additional venous thromboembolism prophylaxis in this patient population.
- Obesity should be considered when planning for and performing laparoscopic hysterectomy.
- Patients were not stratified based on the specific type of laparoscopic hysterectomy performed or the indication for hysterectomy as our aim was exploration of the overall associations between obesity and postoperative complications.
- Data were limited to 30 day postoperative outcomes; future studies should be directed at analysis of possible long term relationships.

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