Risk Factors for Prolonged Length of Stay in Abdominoplasty

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Purpose: An extended hospital stay following abdominoplasty can exert a significant toll on the healthcare system and its resources. This study aims to identify specific independent risk factors for prolonged length of stay in abdominoplasty, in order to aid in more effective allocation of hospital resources.

Methods: This study identified all patients who underwent an abdominoplasty in the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database between 2005 and 2013. Univariate logistic regression analysis was used to identify significant associations between preoperative risk factors and a prolonged length of stay. A prolonged length of stay was defined as a stay greater than 4 days, or greater than the 75th percentile for patients undergoing abdominoplasty. Multivariate logistic regression analysis was used to identify independent risk factors and predictors of a prolonged length of stay.

Results: There were 8,759 patients identified who underwent an abdominoplasty, with an average length of hospital stay of 3.3 days. Multivariate regression analysis demonstrated that age, male gender, obesity, ASA class of 3 or greater, smoking status, non-plastic surgeons, inpatient status, diabetes, pre-operative wounds, significant preoperative weight loss, bleeding disorders and prolonged operative times were independent risk factors for a prolonged length of stay.

Conclusions: These risk factors for a prolonged length of stay can aid in pre- and post-operative allocation of resources in order to ensure cost-effective and high-quality delivery of care for patients undergoing abdominoplasty.

Table 1. Descriptive analysis on patient demographics, preoperative risk factors, and postoperative complications with a prolonged length of stay.

Variables	Prolonged Length of Stay (n=2307)	Normal Length of Stay (n=6452)	p Value
Age, mean (SD)	**55.1 (12.5)**	**46.6 (11.5)**	**0.000**
Female, % (n)	**79.4 (1832)**	**89.8 (5789)**	**0.000**
Race, % (n)			0.000
White	86.6 (1847)	83.9 (4705)	
Black	10.6 (226)	10.9 (613)	
Hispanic	1.4 (30)	3.5 (199)	
Asian	0.8 (16)	1.1 (60)	
Other/Unknown	0.7 (14)	0.6 (34)	
BMI, mean (SD)	39.6 (13.0)	30.8 (7.8)	0.000
Obese, % (n)	75.9 (1749)	47.3 (3039)	0.000
ASA ≥3, % (n)	62.7 (1443)	20.4 (1314)	0.000
Smoking, % (n)	16.0 (368)	10.9 (701)	0.000
Plastic Surgeons, % (n)	16.4 (379)	64.1 (4133)	0.000
Inpatient Status, % (n)	97.9 (2258)	48.4 (3124)	0.000
Pre-Operative Comorbidities, % (n)			
Diabetes	28.0 (647)	8.8 (565)	0.000
Hypertension	55.7 (1285)	26.6 (1714)	0.000
Wound/Wound Infection	12.4 (285)	1.4 (89)	0.000
Steroid Use	2.5 (57)	1.4 (91)	0.001
>10% Weight Loss	1.1 (25)	0.4 (27)	0.000
Bleeding Disorder	4.3 (99)	1.2 (80)	0.000
Peri-Operative Variables			
Operative Time, mean (SD)	224.7 (111.7)	180.0 (88.8)	0.000
Length of Stay, mean (SD)	9.2 (16.0)	1.2 (1.0)	0.000

Post-Operative Complications, % (n)

Reoperation			
General Complications	**40.7 (939)**	**10.1 (652)**	**0.000**
Wound Complication	**18.9 (435)**	**5.8 (374)**	**0.000**
Superficial SSI	**10.5 (243)**	**3.7 (239)**	**0.000**
Deep Incisional SSI	**5.2 (119)**	**1.2 (76)**	**0.000**
Abscess	**2.3 (52)**	**0.3 (17)**	**0.000**
Dehiscence	**2.4 (55)**	**0.9 (56)**	**0.000**
Cardiac Complication	**1.1 (26)**	**0.0 (3)**	**0.000**
Pulmonary Complication	**7.8 (181)**	**0.2 (16)**	**0.000**
Thromboembolic Complication	**3.3 (75)**	**0.5 (34)**	**0.000**
Urinary Tract Infection	**3.2 (74)**	**0.4 (29)**	**0.000**

Table 2. Multivariate regression analysis identifying independent preoperative risk factors for a prolonged length of stay.

Variables	Multivariate Adjusted Odds Ratio	95% Confidence Interval		p Value
		Lower Bound	Upper Bound	
Age	**1.034**	**1.028**	**1.041**	**0.000**
Male Gender	**1.550**	**1.296**	**1.854**	**0.000**
Race	1.055	0.940	1.185	0.374
Obese	**1.522**	**1.310**	**1.769**	**0.000**
ASA ≥3	**2.230**	**1.917**	**2.595**	**0.000**
Smoking	**1.795**	**1.472**	**2.188**	**0.000**
Non-Plastic Surgeons	**4.252**	**3.643**	**4.963**	**0.000**
Inpatient Status	**19.083**	**13.944**	**26.116**	**0.000**
Pre-Operative Comorbidities				
Diabetes	**1.451**	**1.209**	**1.740**	**0.000**
Hypertension	1.153	0.989	1.345	0.105
Wound/Wound Infection	**4.057**	**2.971**	**5.540**	**0.000**
Steroid Use	1.096	0.690	1.740	0.956
>10% Weight Loss	**2.172**	**0.953**	**4.952**	**0.033**
Bleeding Disorder	**1.669**	**1.087**	**2.564**	**0.032**
Operative Time				
First Quartile	(Reference)	---	---	---
Second Quartile	**1.756**	**1.436**	**2.147**	**0.000**
Third Quartile	**2.653**	**2.183**	**3.225**	**0.000**
Fourth Quartile	**4.832**	**3.97**	**5.882**	**0.000**