

MEDICAL COMPLICATIONS IN 166,601 SURGICAL PATIENTS WITH MORBID OBESITY VARY DIRECTLY WITH INCREASING AGE INDEPENDENT OF BMI.

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INTRODUCTION: In today's overweight society, every surgeon must operate on medically high-risk morbidly obese patients. In this milieu of toxic obesity, every clinical insight helps. Although we have reported increased obesity co-morbidities in Medicare patients, some of whom are younger on disability, the specific risks of weight-related peri-operative problems by age are unknown. Objective: To identify the incidence of obesity co-morbidities by decades of age in pre-operative bariatric surgery patients.

METHODS: Pre-operative data on 166,601 patients from the Surgical Review Corporation's BOLD database was analyzed by age: <30 (n=18,119), 30-40 (n=41,879), 40-50 (n=46,911), 50-60 (n=40,788), 60-70 (n=17,475), >70 (n=1,429) years. Data included demographics, BMI, and % incidence of 33 obesity co-morbid conditions. Statistics: ANOVA for continuous variables; Dichotomous variables by general linear models modified for binomial distribution.

RESULTS: BMI varied inversely by age (48+-8 <30 to 44+-8 >70), as did female/male percent (84/16 <30 to 64/36 >70) (p<0.0001). African-American/Caucasian/Hispanic race percent varied from 12.4/67.5/12.6 in the <30 group to 7.0/86.6/2.2 among patients >70 years of age (p<0.0001). Variations by age of obesity co-morbidities are displayed in the Table. The incidence of hernia, abdominal panniculitis, angina, cholelithiasis, CHF, DVT/PE, fibromyalgia, impaired function, GERD, diabetes, gout, hypertension, ischemic heart disease, dyslipidemia, leg edema, back pain, musculoskeletal pain, obesity hypoventilation, PVD, pulmonary hypertension, stress incontinence, and unemployment increased directly with increasing age, peaking in the >70 group (12) and the 60-70 years

cohort (10) ($p < 0.0001$). Asthma, depression, psychologic impairment, and liver disease were highest in the 40-60 decades, but lower <30 and >70 ($p < 0.0001$). Alcohol/tobacco/substance use, PCOS, mental health diagnosis, and pseudotumor cerebri (n=6) were inversely proportional to increasing age <30 to 60-70, >70 ($p < 0.0001$).

CONCLUSIONS: Among adult surgical patients with obesity, the incidences of weight-related medical conditions vary by age. Younger patients are heavier, more frequently female, African-American or Hispanic, and have more psychological/behavioral issues. The major cardiopulmonary, abdominal/hepatobiliary, endocrine/metabolic, and weight-induced somatic issues increase in prevalence directly with increasing age. This severe age variation in morbid obesity suggests exaggerated adverse effects the longer one has obesity. Although BOLD did not capture the length of time each patient was morbidly obese, these results suggest the concept of obesity years, with entrenched co-morbidities accumulating the longer patients carry excess weight. These results may not be perfectly representative of all obese surgical patients. Nevertheless, applying this advanced knowledge clinically may facilitate presumptive management of obese surgical patients, reduced peri-operative adverse events, and improving outcomes.

Table: Variation of Obesity Co-Morbidities by Age in Adult Surgical Patients

CO-MORBIDITIES (% of each age group affected)	Age					
	<30	30-40	40-50	50-60	60-70	>70
Abdominal Panniculitis	5.82	6.09	6.19	7.31	7.67	6.09
Angina	1.45	1.74	2.34	3.47	4.42	3.64
Asthma	17.16	16.22	17.08	18.05	18.21	16.24
Back Pain	43.28	46.33	47.3	49.27	51.51	50.73
Cholelithiasis	11.1	16.88	19.55	22.71	25.53	24.28
CHF	0.42	0.74	1.43	3.01	5.57	6.58
DVT/PE	1.26	1.86	2.66	3.72	4.59	5.18
Depression	28.48	32.43	34.91	38.04	34.88	27.5
Diabetes	14.16	22.62	33.72	46.28	55.69	57.66
Drug Use	0.65	0.43	0.43	0.36	0.17	0.28
Dyslipidemia	17.8	27.9	41.59	55.28	64.17	64.73
EtOH Use	32.71	32.97	31.48	28.63	25.83	24.14
Fibromyalgia	0.84	1.98	3.36	4.68	4.79	3.29
GERD	37.3	43.96	47.57	49.9	48.5	44.44
Gout	1.18	2.22	3.1	4.7	6.64	8.19
Hernia	1.58	3.35	5.18	6.82	8.14	7.42
Hypertension	28.77	42.62	59.32	74.41	82.23	84.81
Impaired Function	0.63	1.04	2.35	4.46	7.61	9.8
Ischemic Heart Disease	0.61	1.26	3.01	6.41	12.3	18.33
Leg Edema	15.88	22.67	27.6	32.4	36.24	35.62
Liver Disease	4.66	5.38	6.35	6.85	5.89	3.99
Menstrual Irregularity	19.56	19.17	22.57	24.65	24.56	23.65
Mental Health Diagnosis	10.12	11.04	10.77	10.31	8.01	0.45
MSK Pain	29.88	36.32	42.82	49.99	53.34	53.88
Obesity Hypoventilation	0.97	1.22	1.54	2.21	3.39	3.43
Obstructive Sleep Apnea	28.73	38.37	46.69	51.08	52.13	48.29
PVD	0.26	0.39	0.87	1.67	2.81	3.36
PCOS	12.19	8.87	3.76	1.41	0.68	0.35
Pseudotumor Cerebri	2.56	2.44	1.82	1.26	0.8	0.49
Psychologic Impairment	14.58	16.1	16.6	16.94	14.71	11.41
Pulm. HTN	3.44	3.93	4.29	5.03	5.71	5.53
Stress Incontinence	12.59	19.26	23.86	26.82	28.59	30.65
Tobacco Use	9.2	7.75	6.9	5.15	3.43	3.5

**Expressed as the percent incidence in each age group for each comorbidity.
All grouped age variations were significant at p<0.0001.**