

## Evidence-based approach to free tissue transfer in the obese patient—analysis of 1,258 abdominally-based reconstructions

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### Abstract

**Purpose:** Obesity is a growing epidemic in the United States (US) with an incidence exceeding 1/3 of all US adults (1-2). We aim to provide an outcome analysis of patients undergoing abdominally-based autologous breast reconstruction using the World Health Organization (WHO) obesity classification.

**Methods:** Patients were classified by WHO obesity criteria: non-obese (BMI=20-29.9 kg/m<sup>2</sup>), Class I (BMI=30-34.9 kg/m<sup>2</sup>), Class II (BMI=35-39.9 kg/m<sup>2</sup>), and Class III (BMI>40 kg/m<sup>2</sup>). Intraoperative and postoperative complications (medical and surgical) and hospital resource utilization were compared across groups.

**Results:** 812 patients undergoing 1258 free tissue transfers for breast reconstruction were included. Free flaps included: msTRAM (71.1 percent), DIEP (23.1 percent), and SIEA (5.8 percent). Overall, 66.5 percent were considered non-obese, 20.9 percent were defined as Class I obesity, 6.9 percent were Class II, and 5.7 percent were Class III (Table 1). Obesity was associated with a significant increase in minor (P=0.001) and major (P<0.001) complications. Morbidly obese patients had significantly higher rates of total flap loss (P=0.006), as well as longer operative times (P<0.0001) and greater intraoperative blood loss (P=0.02).

**Table 1. Postoperative complications based on WHO obesity classification**

	Non-obese	I	II	III	p-value
# of patients	540	170	56	46	
# of flaps	830	273	81	74	
Transfusion	6.7 (36)	11.2 (19)	7.1 (4)	15.2 (7)	0.07
OR time	494 (121)	517 (114)	513 (120)	583 (151)	<0.0001
EBL	235 (144)	243 (149)	286 (229)	301 (282)	0.02
Total flap loss	1.2 (10)	0.4 (1)	2.5 (2)	5.4 (4)	0.006
Partial flap loss	0.5 (4)	0.7 (2)	0.0 (0)	1.4 (1)	0.64
Fat necrosis	5.6 (30)	7.6 (13)	7.1 (4)	0.0 (0)	0.25
Seroma	6.5 (35)	5.3 (9)	7.1 (4)	2.2 (1)	0.64
Delayed mastectomy healing	27.2 (147)	42.4 (72)	48.2 (27)	45.7 (21)	<0.001
Delayed donor healing	14.3 (77)	25.3 (43)	26.8 (15)	45.7 (21)	<0.001
Hernia	2.4 (13)	6.5 (11)	5.4 (3)	8.7 (4)	0.023
Infection	8.3 (45)	7.1 (12)	3.6 (2)	2.2 (1)	0.3
Minor complication	43.3 (234)	57.6 (98)	66.1 (37)	65.2 (30)	0.001
Major complication	5.9 (32)	12.4 (21)	10.7 (6)	23.9 (11)	<0.0001
Multiple medical complications	0.2 (1)	0.6 (1)	0.0 (0)	4.3 (2)	0.02

Complications in the obese cohort translated into greater cost (P<0.001) (Table 2). Obese patients receiving a msTRAM experienced a significantly higher rate of hernia compared to DIEP and SIEA flaps (P=0.02) without a difference in flap loss rate (P=0.61). Overall, utilization of an SIEA flap in patients with a BMI >30 kg/m<sup>2</sup> was associated with significantly less hospital-associated cost (P=0.04).

**Table 2. Cost-related variables associated with obesity in free autologous breast reconstruction**

	<b>Non-obese</b>	<b>I</b>	<b>II</b>	<b>III</b>	
# of patients	540	170	56	46	
# of flaps	830	273	81	74	p-value
LOS (days)	4.2 (0.9)	4.3 (1.3)	4.3 (1.3)	4.7 (1.3)	<b>0.02</b>
Charges (dollars)	\$96,886 (22245)	\$102,693 (24276)	\$104,440 (25502)	\$117,552 (39016)	<b>&lt;0.0001</b>
Cost (dollars)	\$18,932 (4327)	\$20,016 (5037)	\$20,464 (5187)	\$22,292 (7309)	<b>0.001</b>
DV Cost (dollars)	\$1,919 (626)	\$1,996 (920)	\$2,056 (885)	\$2,241 (810)	<b>0.027</b>
OR Cost (dollars)	\$1,044 (429)	\$1,100 (826)	\$1,063 (749)	\$1,129 (371)	0.8

LOS (length of stay), Charges (total inpatient charges), Cost (total inpatient cost), DV Cost (direct variable cost), OR cost (operating room cost)

**Conclusion:** Obesity is associated with significantly greater perioperative morbidity and healthcare cost in abdominally-based breast reconstruction. BMI appears to be directly related to intraoperative technical difficulty, flap loss, donor site morbidity, and cost utilization. If an SIEA or DIEP flap can be utilized in obese patients, there may be decreased abdominal morbidity without added risk of flap loss.

#### References:

1. Executive summary of the clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. *Arch Intern Med* 1998 Sep 28; 158:1855-1867.
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