

PREOPERATIVE NUTRITIONAL STATUS OF PATIENTS UNDERGOING ROUX-EN-Y GASTRIC BYPASS FOR MORBID OBESITY



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Introduction

Patients undergoing Roux-en-Y gastric bypass (RYGB) as treatment for morbid obesity are at risk for numerous vitamin and mineral deficiencies postoperatively. With the tremendous rise in the number of bariatric surgery procedures being performed annually, there is concern that these nutritional complications may be underdiagnosed and undertreated, leading to profound adverse effects on patients. Few studies have examined the preoperative nutritional status of patients presenting for bariatric surgery in a systematic manner. The aim of this study was to evaluate the status of several vitamins, nutrients and nutritional markers preoperatively in patients having RYGB.

Methods

Retrospective review of 379 consecutive patients having RYGB between 8/20/02 and 2/24/04

- o 320 women and 59 men
- o mean BMI 51.8 +/- 10.6 kg/m² (range 24-115 kg/m²)
- o 25.8% Caucasian, 28.4% African-American, 45.8% Hispanic

Preoperative values of serum albumin, serum calcium, 25-OH vitamin D, serum iron, ferritin, hemoglobin, vitamin B12, and thiamine (vit B1) were examined and the prevalence of deficiencies noted. Data were also stratified based upon age, gender and race.

SPSS 11.0 was used to perform statistical analyses. Chi-Square tests were used to evaluate gender and age differences and one-way ANOVA with two degrees of freedom were used to evaluate significance between racial groups.

Results

The results for the overall group are summarized in Table 1. Significant preoperative deficiencies were noted for iron (43.9%), ferritin (8.4%), hemoglobin (22%; women 19.1%, men 40.7%), thiamine (29%) and 25-OH vitamin D (68.1%).

Analysis categorized by gender is summarized in Table 2. Although females were found to have a significantly greater prevalence of low ferritin levels than males (9.9% females vs. 0% males p=.01), males were found to have a greater prevalence of anemia (19.1% females vs. 40.7% males p<.005).

Extremes of age were evaluated and results shown in Table 3. Patients less than 25 years old were more likely to be anemic than patients greater than 60 years old (46% vs. 15% p<.005 respectively). This directly correlated with Iron deficiency which was also more prevalent in the younger age group (79.2% vs. 41.7% p <.005).

Nutrient deficiencies were stratified by race with mean values evaluated with one-way ANOVA. Summarized results in Table 4 demonstrate that the deficiency of Vitamin D in Hispanics (56.4%) is significantly less common than the corresponding deficiencies in Caucasians (78.8%) and African-Americans (70.4%) p=.01. Caucasians were the least likely group to be Thiamine deficient with a prevalence of 6.8%. This was significantly less than both African Americans and Hispanics (31.0% and 47.2% p<.005).

Conclusion

Transthoracic robotic assisted esophageal mobilization represents an important step toward the development of a procedure for total robotic esophagectomy. Minimally invasive and robotic techniques may improve the morbidity and mortality of esophageal surgery and make the surgical option available to a greater number of patients. Further studies to demonstrate learning curves and clinical outcomes are necessary in the growing field of robotics.

**Table 1:
Incidence of Abnormal Preoperative Values**

Nutrient	# Abnormal	%
Albumin	4/357	1.1
Calcium	12/374	3.2
25-OH Vitamin D	98/144	68.1
Iron	159/362	43.9
Ferritin	30/358	8.4
Hemoglobin	85/378	22
Vitamin B ₁₂	0/355	0
Thiamine (Vit B ₁)	41/141	29

**Table 2:
Incidence of Abnormal Preoperative Values By Gender**

Nutrient	Female Abnormal (%)	Male Abnormal (%)	p-value
Albumin	3/301=1.0%	1/56=1.8%	.60
Calcium	11/316=3.5%	1/58=1.7%	.48
25-OH Vitamin D	87/128=68%	11/16=68.8%	.95
Iron	128/305=42%	31/57=54.4%	.08
Ferritin	30/302=9.9%	0/56=0%	.01
Hemoglobin	61/319=19.1%	24/59=40.7%	<.005
Vitamin B ₁₂	0/302=0%	0/53=0%	NA
Thiamine (Vit B ₁)	36/125=28.8%	5/16=31.3%	.84

**Table 3:
Incidence of Abnormal Preoperative Values By Extremes of Age**

Nutrient	Age < 25	Age >60	p-value
Albumin	1/26=1.1%	0/63=0%	.11
Calcium	1/26=3.8%	0/36=0%	.24
25-OH Vitamin D	14/74=15.9%	1/3=33%	.54
Iron	19/24=79.2%	25/60=41.7%	<.005
Ferritin	3/24=12.5%	8/59=13.6%	.90
Hemoglobin	12/26=46%	10/65=15%	<.005
Vitamin B ₁₂	0/22=0%	0/60=0%	NA
Thiamine (Vit B ₁)	5/15=33.3%	1/3=33.3%	1

**Table 4:
Incidence of Abnormal Preoperative Values By Race**

Nutrient	Caucasian Abnormal (%)	A-A Abnormal (%)	Hispanic Abnormal (%)
Albumin	1/86=1.2%	3/167=1.8%	0/102=0%
Calcium	1/92=1.1%	6/173=1.6%	5/107=4.7%
25-OH Vitamin D	26/33=78.8%	50/71=70.4%	22/39=56.4%
Iron	33/90=36.7%	74/166=44.6%	50/104=48.1%
Ferritin	3/89=3.4%	19/164=11.6%	8/103=7.8%
Hemoglobin	16/96=16.7%	33/173=19.1%	36/107=13.8%
Vitamin B ₁₂	0/91=0%	0/162=0%	0/101=0%
Thiamine (Vit B ₁)	2/33=6.1%	22/71=31.0%	17/36=47.2%