HYPOALBUMINEMIA PREDICTS SERIOUS COMPLICATIONS FOLLOWING ELECTIVE BARIATRIC SURGERY

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BACKGROUND

- Patients with severe obesity have decreased serum albumin levels and demonstrate a physiologic malnutrition and decreased muscle mass which may predispose to increased postoperative complications through a phenomenon termed sarcopenic obesity.
- The degree of hypoalbuminemia (HA) and the impact of this phenomenon on patients undergoing elective bariatric surgery are not currently known.

OBJECTIVES

- **The aims of the present study were to:**
  1. **Characterize the prevalence and clinical characteristics of HA in bariatric surgery patients**
  2. **Compare complication rates among bariatric surgery patients with low and normal pre-surgery albumin levels**
  3. **Determine if HA is an independent predictor of 30-day serious complications and 30-day mortality among bariatric surgery patients**

METHODS

- All data was extracted from the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database.
- Patients who underwent sleeve gastrectomy (SG) or roux-en-Y gastric bypass (RYGB) between 2015 to 2018 were included.
- HA was defined as a pre-surgery serum albumin level of ≤ 3.5g/dL
- Results were organized into patient cohorts with low (HA) and normal (control) serum albumin.
- Bivariate analysis was used to compare cohorts.
- Influence of HA on post-operative complications and 30-day mortality, was determined using multivariable logistic regression modelling.

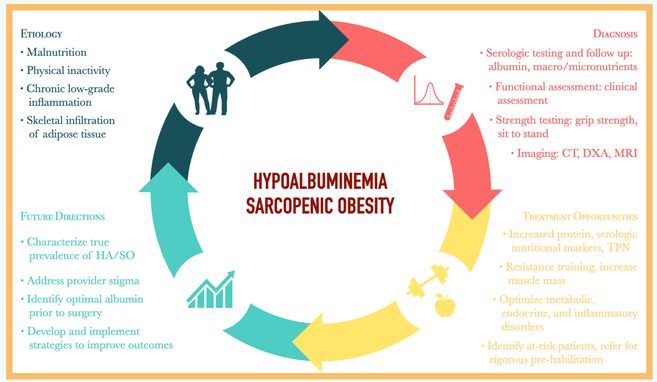


RESULTS

- Of 590 971 patients, 42 618 (7.2%) were identified as having serum albumin levels ≤ 3.5g/dL.
- HA patients were younger (44.0 +/- 11.9 vs. 44.5 +/- 12.0 years; p<0.0001), of increased BMI (48.5 +/- 9.0 kg/m^2 vs. 45.1 +/- 7.7 kg/m^2; p<0.0001), and had a lower baseline functional status (1.6% vs. 1.0% dependent or partially dependent; p<0.0001).

	Control (n=548,353)	HA (n=42,618)	p-value
Leak	2084 (0.4)	198 (0.5)	0.017
Bleed	5018 (0.9)	416 (1.0)	0.325
Cardiac	351 (0.1)	36 (0.1)	0.099
Pneumonia	985 (0.2)	115 (0.3)	<0.0001
AKI	623 (0.1)	132 (0.3)	<0.0001
Deep SSI	1342 (0.2)	157 (0.4)	<0.0001
Wound Disruption	256 (0.1)	29 (0.1)	0.043
Sepsis	542 (0.1)	61 (0.1)	0.004
Unplanned Intubation	706 (0.1)	100 (0.2)	<0.0001
C. Diff	494 (0.1)	66 (0.2)	<0.0001
Serious Complication	18,065 (3.3)	1860 (4.4)	<0.0001
Reoperation	6456 (1.2)	587 (1.4)	0.002
Reintervention	6552 (1.2)	690 (1.6)	<0.0001
Readmission	20,008 (3.7)	2037 (4.8)	<0.0001
Mortality	473 (0.1)	59 (0.1)	0.001

Table 2: Post-operative complications of patients with normal (control) and low (HA) pre-operative serum albumin levels following bariatric surgery.



Predictors of Serious Complications	Odds Ratio	95% Confidence Interval	p-value
Patient Factors			
Older Age (per 10 years)	1.04	1.03-1.06	<0.0001
Higher BMI (per 5kg/m2)	1.03	1.02-1.04	<0.0001
Female	0.99	0.96-1.03	0.72
Race			<0.0001
Black vs White	1.3	1.26-1.35	
Other vs. White	0.9	0.86-0.95	
Functional Status			<0.0001
Partially Dependent vs. Independent	1.54	1.35 -1.75	
Dependent vs. Independent	1.59	1.32-1.92	
Hypoalbuminemia	1.2	1.14-1.26	<0.0001
Comorbidities			
Diabetes			
Non-insulin Dependent vs. Non-Diabetic/Diet Controlled	1	0.97-1.04	0.81
Insulin Dependent vs. Non-Diabetic/Diet Controlled	1.16	1.11-1.22	<0.0001
OSA	1.1	1.06-1.13	<0.0001
HTN	1.1	1.06-1.13	<0.0001
DLD	1.05	1.02-1.09	0.006
GERD	1.28	1.24-1.32	<0.0001
COPD	1.57	1.44-1.70	<0.0001
Renal Insufficiency	2.14	1.91-2.41	<0.0001
Prior MI	1.59	1.45-1.74	<0.0001
Surgical Factors			
RYGB	2.37	2.30-2.44	<0.0001

Table 3: Predictors of serious complications of patients with normal and low pre-operative serum albumin levels following bariatric surgery.

Predictors of 30-Day Mortality	Odds Ratio	95% Confidence Interval	p-value
Patient Factors			
Older Age (per 10 years)	1.6	1.46-1.74	<0.0001
Higher BMI (per 5kg/m2)	1.33	1.28-1.38	<0.0001
Female	0.47	0.39-0.57	<0.0001
Race			
Black vs White	1.73	1.41-2.13	<0.0001
Other vs. White	0.84	0.58-1.20	0.335
Functional Status			
Partially Dependent vs Independent	1.75	1.11-2.76	0.016
Dependent vs. Independent	1.9	0.84-4.31	0.123
Hypoalbuminemia	1.13	0.85-1.49	0.404
Comorbidities			
Diabetes			
Non-insulin Dependent vs. Non-Diabetic/Diet Controlled	0.92	0.73-1.15	0.45
Insulin Dependent vs. Non-Diabetic/Diet Controlled	1.23	0.96-1.57	0.098
OSA	0.99	0.82-1.19	0.918
HTN	1.18	0.95-1.47	0.141
DLD	1.18	0.96-1.45	0.11
GERD	1.11	0.93-1.33	0.259
COPD	2.32	1.69-3.18	<0.0001
Renal Insufficiency	2	1.27-3.15	0.003
Prior MI	1.98	1.37-2.86	<0.0001
Surgical Factors			
RYGB	1.64	1.38-1.96	<0.0001
Complication			
Any Bleed	7.56	5.71-10.02	<0.0001
Any Leak	12.91	9.19-18.13	<0.0001

Table 4: Predictors of 30-day mortality of patients with normal and low pre-operative serum albumin levels following bariatric surgery.

CONCLUSION

- Our study highlights that bariatric HA is not a rare clinical entity and occurs in over 7% of all patients.
- We demonstrate that HA is associated with an increase in a number of post-operative complications and adverse thirty-day outcomes among bariatric surgical patients.
- After adjusting for comorbidities, we identified HA as one of the greatest modifiable factors predictive of serious complications.
- Adoption of strategies to identify and improve preoperative malnutrition, specifically focused on improving serum albumin levels may reduce overall serious complications among elective bariatric surgery patients

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