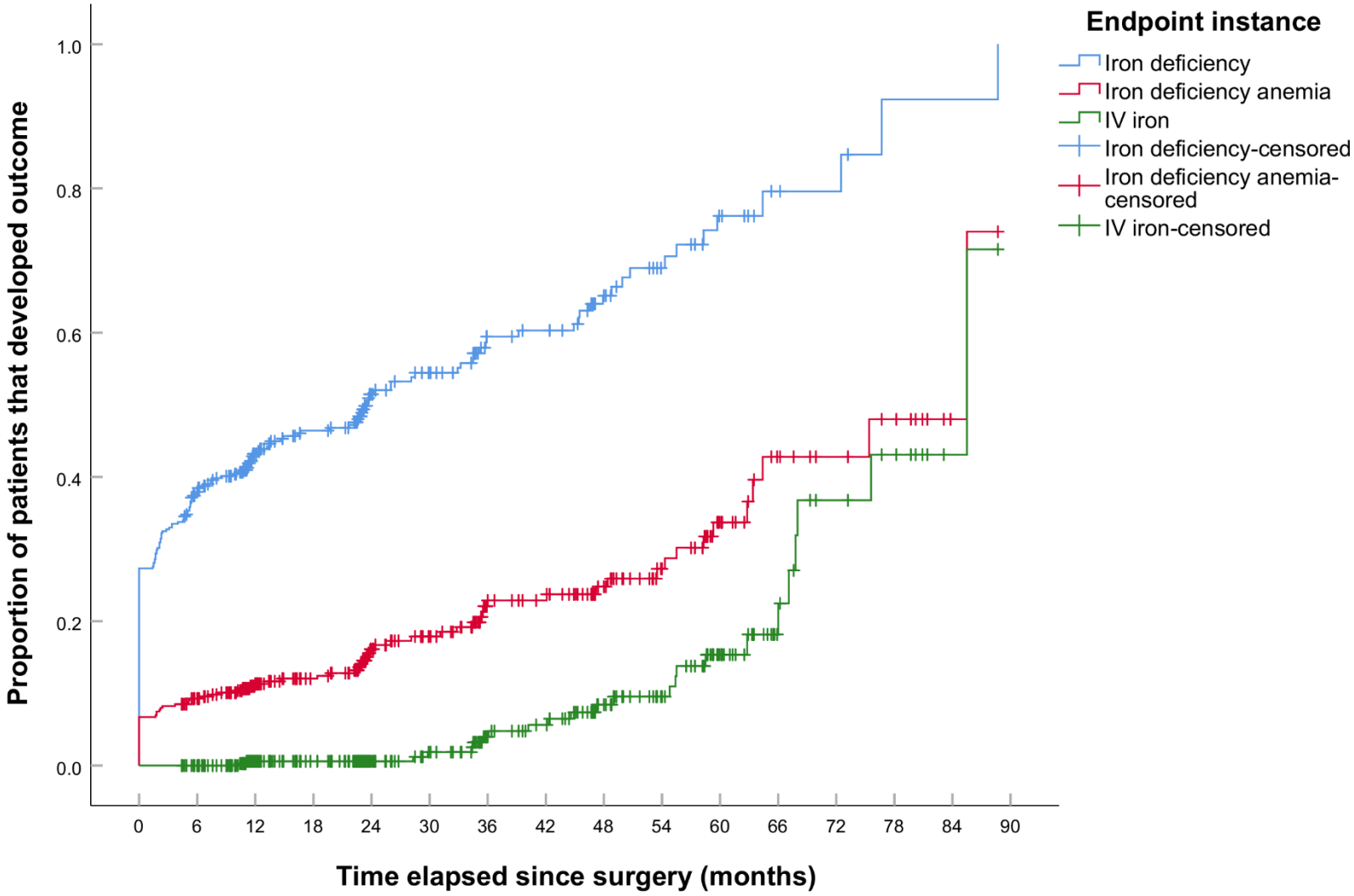
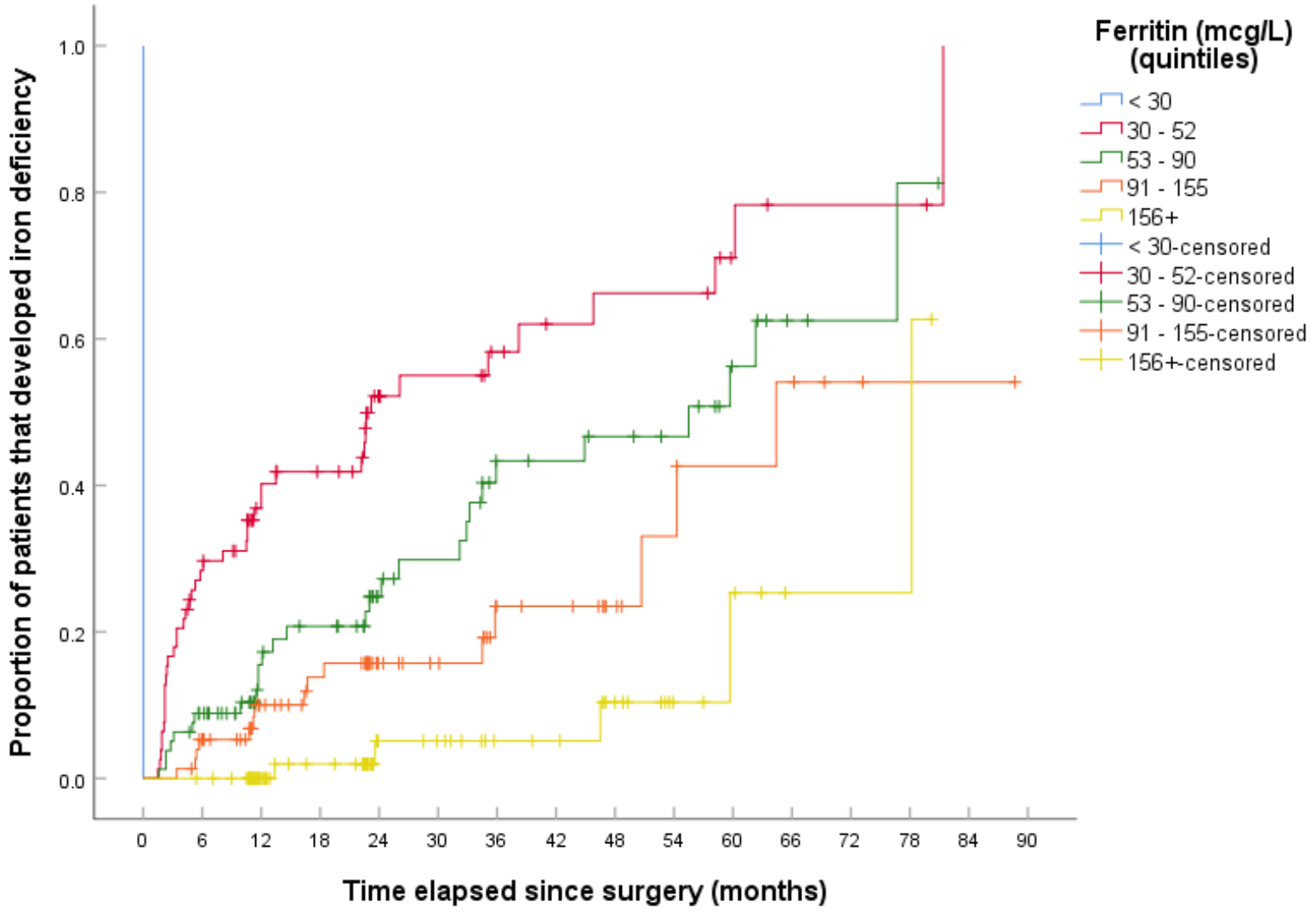
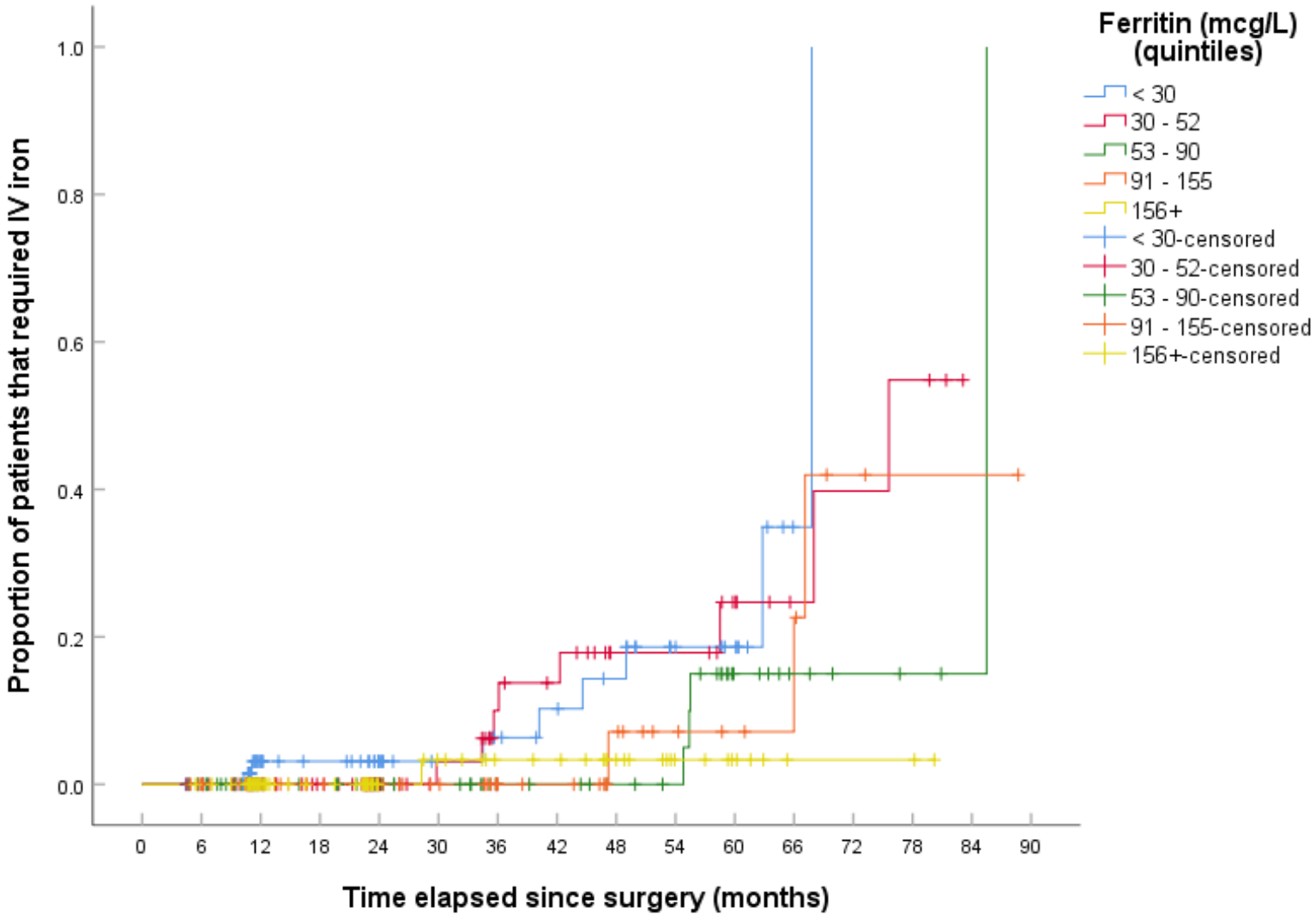


Supplemental Figure 1. Kaplan-Meier curve of outcomes using a ferritin threshold of 40 ng/mL to define iron deficiency. Proportion of patients that developed iron deficiency or iron deficiency anemia, or required IV iron, plotted against time since bariatric surgery.



Supplemental Figure 2. Kaplan-Meier curve of the diagnosis of iron deficiency, stratified by ferritin. Proportion of patients that developed iron deficiency for each quintile of baseline ferritin level. The difference between groups was statistically significant (p-value < 0.001).



Supplemental Figure 3. Kaplan-Meier curve of the administration of IV iron, stratified by ferritin. Proportion of patients that required IV iron for each quintile of baseline ferritin level. There was no statistical difference between groups (p-value = 0.053).

Supplemental Table 1. Summary of clinical and laboratory data from each follow-up visit

	Baseline	3 months	6 months	1 year	2 years	3 years	4 years	5 years	6 years
Patients, no. (% total)	388 (100)	381 (98.2)	362 (93.3)	335 (86.3)	213 (54.9)	87 (22.4)	70 (18.0)	45 (11.6)	5 (1.3)
Month of bloodwork, mean (SD)	-	2.2 (0.6)	5.4 (1.0)	11.5 (1.6)	23.6 (1.8)	35.5 (2.0)	47.8 (2.6)	60.6 (2.9)	72.4 (3.5)
Weight loss (%TBW), mean (SD)	-	18.6 (6.9)	25.6 (6.6)	31.8 (9.1)	33.0 (10.7)	31.8 (12.9)	31.6 (11.0)	29.9 (10.5)	-
BMI decrease (kg/m^2), mean (SD)	-	9.3 (3.7)	12.8 (3.9)	16.0 (5.2)	16.5 (5.7)	16.1 (7.8)	15.9 (7.1)	14.5 (6.0)	-
Oral iron supplement, no. (%)									
Iron supplement	-	119 (31.3)	149 (41.1)	142 (42.5)	72 (33.8)	20 (22.9)	17 (24.2)	9 (20.0)	1 (20)
Prenatal vitamin only	-	228 (59.8)	179 (49.4)	146 (43.6)	70 (32.9)	26 (29.9)	16 (22.9)	11 (24.4)	1 (20)
Other multivitamin only	-	20 (5.2)	23 (6.4)	20 (6.0)	11 (5.2)	1 (1.1)	3 (4.3)	1 (2.2)	0 (0)
None	-	5 (1.3)	2 (0.6)	8 (2.4)	12 (5.6)	7 (8.0)	8 (11.4)	4 (8.9)	1 (20)
Unknown	-	6 (1.6)	6 (1.7)	15 (4.5)	43 (20.2)	33 (37.9)	26 (37.1)	20 (44.4)	2 (40)
IV iron*, no. (%)	-	0 (0)	0 (0)	2 (0.6)	0 (0)	2 (2.3)	2 (2.9)	1 (2.2)	0 (0)
Laboratory results, mean (SD)									
Hemoglobin (g/L)	133 (12)	135 (11)	135 (11)	134 (11)	133 (13)	132 (13)	134 (14)	131 (14)	125 (37)
MCV (fL)	87.7 (5.2)	88.3 (4.9)	89.3 (4.9)	90.0 (4.8)	88.9 (5.8)	89.1 (5.3)	90.1 (5.2)	90.2 (6.5)	87.8 (9.1)
Ferritin (mcg/L)	104 (106)	111 (111)	100 (96)	90 (85)	91 (101)	80 (77)	71 (70)	68 (53)	21 (21)
Iron (mcmol/L)	13 (5)	12 (4)	14 (6)	16 (6)	17 (7)	18 (6)	16 (4)	-	-
IBC (mcmol/L)	62 (8)	55 (8)	56 (8)	58 (9)	60 (15)	60 (11)	60 (8)	-	-
Transferrin saturation (%)	21.9 (8.5)	22.8 (7.1)	26.0 (9.2)	30.3 (11)	31.6 (12.9)	31.3 (14.4)	28.1 (10.5)	-	-
Transferrin (g/L)	-	2.30 (0.58)	2.24 (0.19)	2.28 (0.40)	2.46 (0.47)	2.50 (0.48)	2.28 (0.96)	-	-
Vitamin B12 (pmol/L)	345 (199)	448 (241)	421 (249)	418 (235)	442 (237)	515 (289)	491 (310)	571 (364)	286 (119)
Iron deficiency status, no. (%)									
Anemia	47 (12.1)	34 (8.9)	27 (7.5)	32 (9.6)	27 (12.7)	12 (13.8)	10 (14.3)	7 (15.6)	2 (40)
Iron deficiency	72 (18.6)	61 (16)	63 (17.4)	78 (23.3)	51 (23.9)	30 (34.5)	19 (27.1)	11 (24.4)	3 (60)
Iron deficiency anemia	22 (5.7)	9 (2.4)	10 (2.8)	17 (5.1)	12 (5.6)	8 (9.2)	6 (8.6)	2 (4.4)	1 (20)

*IV iron administered in period preceding follow-up appointment

BMI, body mass index; IV, intravenous; SD, standard deviation; TBW, total body weight

Supplemental Table 2. Clinical and laboratory characteristics of patients who received IV iron.

Variable	Statistic
	N=24
Age at time of surgery (yrs): mean (SD)	41 (10)
Sex/menopausal status: no. (%)	
Male	1 (4)
Pre-menopausal female	19 (79)
Post-menopausal female	4 (17)
Baseline body mass index (kg/m^2): mean (SD)	49 (7)
Procedure type: no. (%)	
Roux-en-Y gastric bypass	17 (71)
Sleeve gastrectomy	5 (21)
Duodenal switch	2 (8)
Hemoglobin (g/L): mean (SD)	
Pre-operative	130 (10)
Prior to IV iron	100 (21)
After first course of IV iron	120 (16)
Ferritin (mcg/L): median (IQR)	
Pre-operative	45 (28-72)
Prior to IV iron	8 (5-10)
After first course of IV iron	112 (50-172)
Iron deficiency status prior to IV iron: n (%)	
Anemia only	2* (8)
Iron deficiency only	4 (17)
Iron deficiency anemia	18 (75)
Oral iron, last documented prior to IV iron, no. (%)	
Ferrous gluconate	2 (8)

Ferrous sulfate	2 (8)
Ferrous fumarate	2 (8)
Polysaccharide-iron complex	9 (38)
Heme iron	1 (4)
Prenatal vitamin only	6 (25)
None	1 (4)
Unknown	1 (4)
Number of courses of IV iron, no. (%)	
1	15 (62)
2	4 (17)
3	4 (17)
4	1 (4)
Months between 1st and 2nd courses of IV iron, median (IQR)	13 (6-27)
Type of intravenous iron, no. (%)	
Iron sucrose	18 (75)
Combination of iron sucrose and ferric gluconate	1 (4)
Unknown	5 (21)
Number of IV iron treatments (1st course), median (IQR)	6 (4-10)
Iron sucrose dose (1st course) (mg), mean (SD)	214 (52)
Suspected cause of iron deficiency, no. (%)	
Rectal bleeding	1† (4)
Occult gastrointestinal bleed	1‡ (4)
Menstrual bleeding	6 (25)

*Includes 1 male patient receiving darbepoetin alfa and iron sucrose with hemodialysis, and 1 pregnant patient who met criteria for iron deficiency on bloodwork taken 2 weeks prior

†Tubular adenoma and hyperplastic polyp on colonoscopy

‡Gastric antral vascular ectasia treated with argon plasma coagulation

IQR, interquartile range; IV, intravenous; SD, standard deviation

Supplemental Table 3. Cox regression of iron deficiency (ferritin < 40 ng/mL), iron deficiency anemia, and administration of IV iron, using both univariate and multivariate analyses

Risk factor	Univariate analysis			Multivariate analysis			Multivariate excluding mediators§		
	HR	95% CI	p	HR	95% CI	p	HR	95% CI	p
Iron Deficiency									
Age (years)	0.98	0.96-0.99	<0.001*	0.99	0.98-1.01	0.267	1.05#	0.98-1.12	0.142
Female sex	3.28	1.94-5.56	<0.001*	1.34‡	0.79-2.48	0.250	92.7	3.12-2754	0.009*
Malabsorptive procedure	1.97	1.38-2.80	<0.001*	1.38	0.94-2.03	0.099	1.68	1.16-2.42	0.006*
Baseline anemia	1.69	1.17-2.45	0.005*	0.93	0.62-1.39	0.719	-	-	-
Baseline ferritin (mcg/L)	0.96†	0.95-0.96	<0.001*	0.96†	0.95-0.96	<0.001*	-	-	-
Weight loss (%TBW) at 6 months	1.02	1.00-1.04	0.061	1.00	0.98-1.02	0.709	1.00	0.99-1.02	0.698
Interaction of age*sex	-	-	-	-	-	-	0.93	0.88-0.99	0.030*
Iron Deficiency Anemia									
Age (years)	0.97	0.95-0.99	0.011*	0.97	0.94-0.99	0.007*	0.97**	0.95-1.00	0.014*
Female sex	1.79	0.82-3.89	0.144	1.08‡	0.45-2.61	0.858	1.58‡	0.71-3.51	0.261
Malabsorptive procedure	1.05	0.63-1.75	0.854	0.95	0.53-1.71	0.857	1.04	0.60-1.81	0.875
Baseline anemia	22.4†	11.1-45.1	<0.001*	20.1†	9.20-43.8	<0.001*	-	-	-
Baseline ferritin (mcg/L)	0.97†	0.96-0.98	<0.001*	0.97†	0.96-0.98	<0.001*	-	-	-
Weight loss (%TBW) at 6 months	0.98	0.96-1.02	0.319	0.98	0.95-1.02	0.257	0.98	0.95-1.01	0.166
Administration of IV Iron¶									
Age (years)	0.98	0.94-1.01	0.203	-	-	-	0.98	0.94-1.02	0.262
Female sex	2.45	0.33-18.3	0.382	-	-	-	2.12‡	0.28-16.1	0.469
Malabsorptive procedure	1.62	0.60-4.36	0.342	-	-	-	-	-	-
Baseline anemia	1.39	0.47-4.14	0.550	1.21	0.40-3.63	0.736	-	-	-
Baseline ferritin (mcg/L)	0.99	0.98-1.00	0.071	0.99	0.98-1.00	0.080	-	-	-
Weight loss (%TBW) at 6 months	0.98	0.92-1.04	0.450	-	-	-	-	-	-

*p < 0.05, statistically significant

†Time-dependent covariates were used because proportional hazards assumption was not satisfied in univariate analysis. Time measured in months.

‡There was no significant interaction between age and sex using p < 0.05.

§This multivariate analysis excludes baseline anemia and baseline ferritin.

¶The multivariate analysis included only two covariates to prevent overfit.

#Young age is a statistically significant predictor of iron deficiency when the interaction term between age and sex is not included.

**The effect of age is not statistical significance with the inclusion of an interaction term for age and sex.

CI, confidence interval; HR, hazard ratio; IV, intravenous; TBW, total body weight