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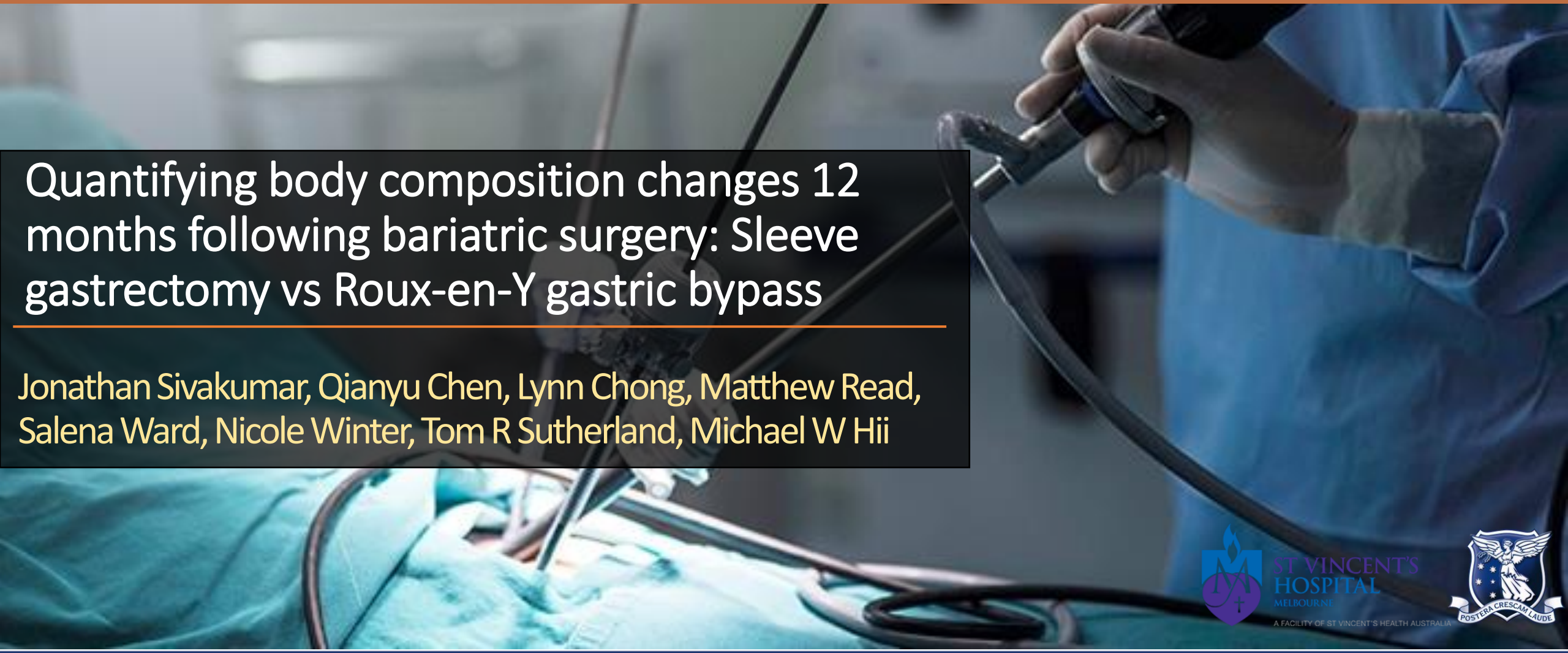

Quantifying body composition changes 12 months following bariatric surgery: Sleeve gastrectomy vs Roux-en-Y gastric bypass

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A FACILITY OF ST VINCENT'S HEALTH AUSTRALIA

POSTERA CRESCAM LAUDE

I have no potential conflict of interest to report.

Background

- Laparoscopic sleeve gastrectomy (SG) and laparoscopic Roux-en-Y gastric bypass (RYGB) – currently the two most performed bariatric procedures worldwide
- Although greater weight loss after RYGB in long-term, SG had similar short- and mid-term weight loss outcomes

Knowledge Gap

- Lack of understanding in body composition changes after the two procedures
  - How much fat mass is lost?
  - How much lean body mass is lost?
- Implication of lean mass
  - Key determinant to metabolic rate
  - Associated with long-term weight maintenance and glycaemic control for diabetics

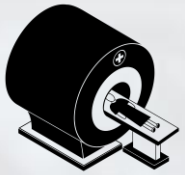
Methods

Patient Cohort

- Prospective cohort study in two tertiary hospitals in Melbourne between 2017 and 2023

Selection Criteria

- Inclusion criteria
  - All adult patients underwent primary/revisional SG or RYGB were invited
- Exclusion criteria
  - Cognitive impairment
  - Age <20
  - Preop weight >159kg



Data Extraction

- Preoperative DXA
- Post-operative DXA at 1-, 6-, 12-, and 24-months
- Parameters of interest:
  - Total weight
  - Fat mass
  - Lean body mass
  - Bone mineral content

Statistical Analysis

- Chi-squared tests for categorical variables, student's t-test for continuous variables
- Mixed model for repeated measures for post-op trajectory of each parameter

Results

	SG (n = 30)	RYGB (n= 15)	All patients (n = 45)	P-value
Demographics				
Age, Mean (SD)	40.0 (10.0)	50.4 (11.1)	43.5 (11.4)	**0.0029**
Gender, n (%) - Female	23 (76.67)	13 (86.67)	36 (80)	0.695
Comorbidities				
Diabetes type 2, n (%)	4 (13.33)	4 (26.67)	8 (17.78)	0.41
Hypertension, n (%)	4 (13.33)	9 (60)	13 (28.89)	**0.004**
Ischaemic heart disease, n (%)	1 (3.33)	0 (0)	1 (2.22)	1
Osteoarthritis, n (%)	2 (6.67)	5 (33.33)	7 (15.56)	**0.032**
Anthropometrics				
BMI (kg/m^2) Mean (SD)	41.4(5.0)	42.0(5.7)	41.6(5.2)	0.7241
Weight (kg) Mean (SD)	115.4(16.7)	115.8(19.3)	115.5(17.4)	0.9474
Overall Body Composition				
Fat Mass (kg), Mean (SD)	56.9(12.3)	58.4(14.3)	57.4(12.8)	0.6965
Lean Body Mass (kg), Mean (SD)	55.6(9.3)	53.5(9.9)	54.9(9.5)	0.4979
Bone Mineral Content (kg), Mean (SD)	2.88(0.40)	2.77(0.49)	2.84(0.43)	0.4245

Results

Change over 12 months…

Body Composition Measurements	SG (n = 30)	RYGB (n = 15)	All patients (n = 45)	Difference between groups	P-value
Anthropometrics					
BMI (kg/m^2), Mean (SD)	11.2 (3.8)	11.0(3.6)	11.1(3.7)	0.2	0.8340
Weight (kg), Mean (SD)	31.3 (10.8)	30.6(10.8)	31.0(10.7)	0.7	0.8388
Total weight loss (%), Mean (SD)	27.2(9.3)	26.3(8.2)	26.9(8.9)	0.9	0.7575
Body Composition					
Fat mass (kg), Mean (SD)	25.7(10.7)	24.2(10.1)	25.2(10.4)	1.5	0.6731
Lean body mass (kg), Mean (SD)	5.7(2.6)	5.2 (3.4)	5.5(2.9)	0.5	0.5336
Bone mineral content (kg), Mean (SD)	0.11 (0.08)	0.17 (0.08)	0.13(0.08)	0.06	**0.0223***

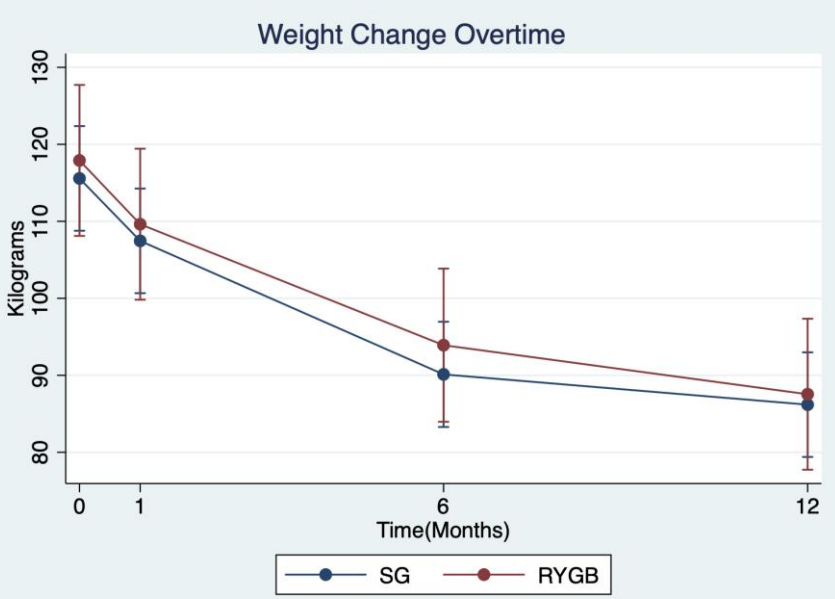
Results

At 12 months post-operatively:

- Mean %TWL of 26.94%
- Mean BMI reduction of 11.12 kg/m2
- Statistically significant reduction of all body composition parameters
- Ratio of mean loss of FM-to-LBM was similar between SG and RYGB
- LBM comprised 17.8% of weight loss

LBM loss reached a plateau at 6-months following both procedures, although the RYGB cohort did demonstrate a significant regain in LBM after from 6-to-12-months post-operatively

12 Month Weight Trajectory



24 Month Weight Trajectory

Subgroup Analysis

Results

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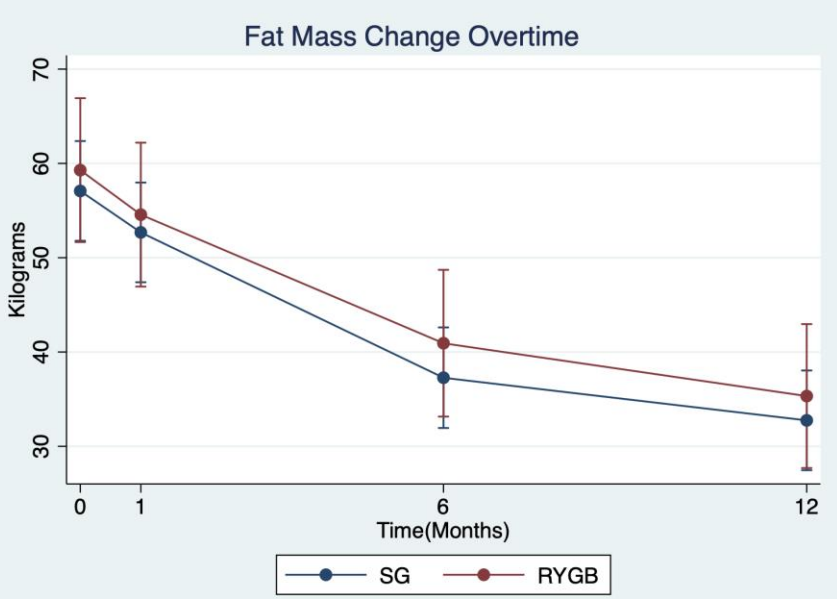
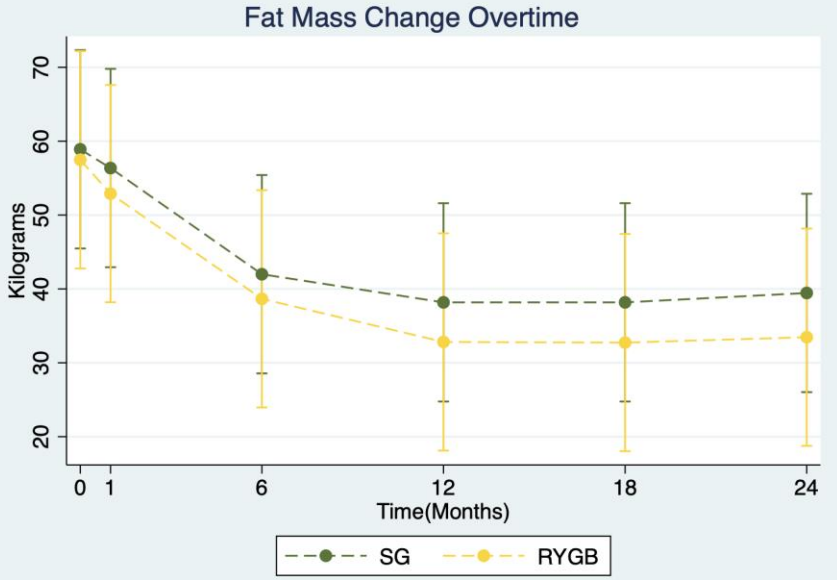
12 Month Fat Mass Trajectory



24 Month Fat Mass Trajectory

Subgroup Analysis



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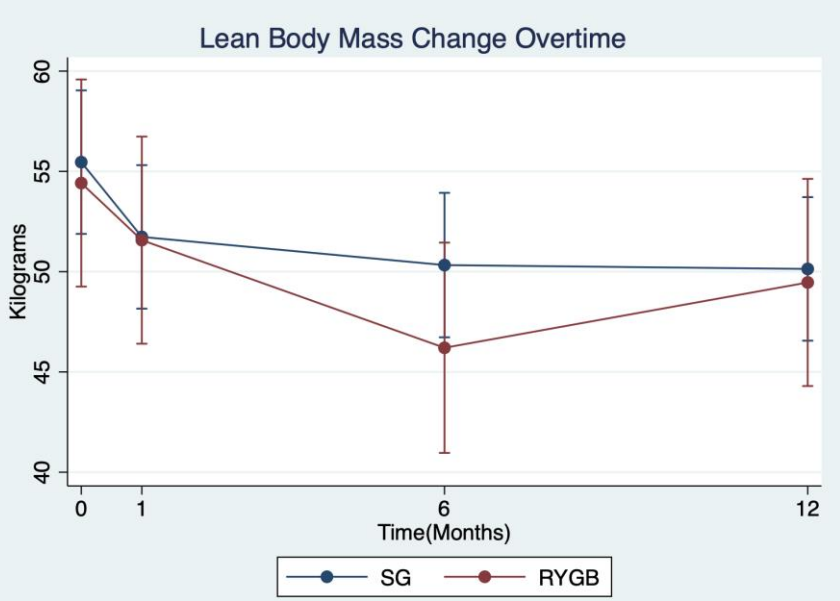
12 Month Lean Mass Trajectory



24 Month Lean Mass Trajectory

Subgroup Analysis

Results

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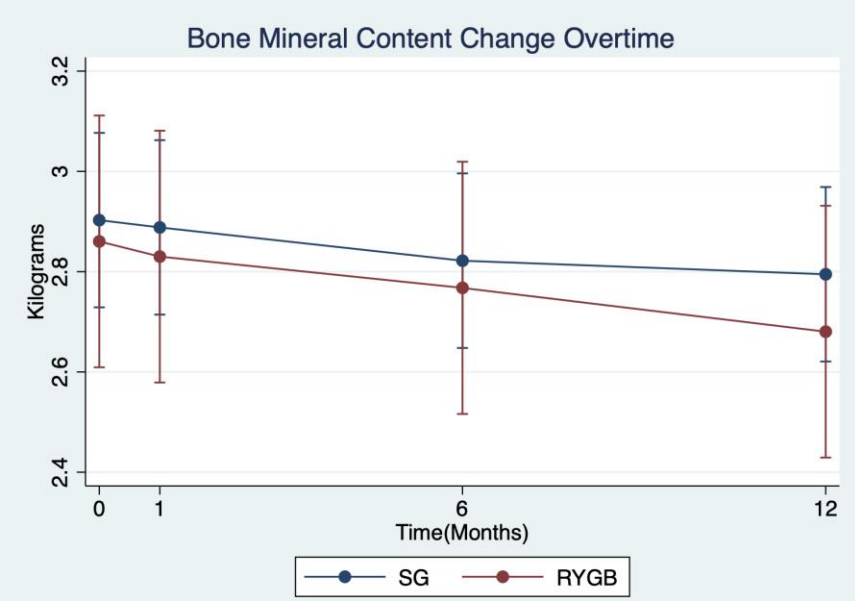
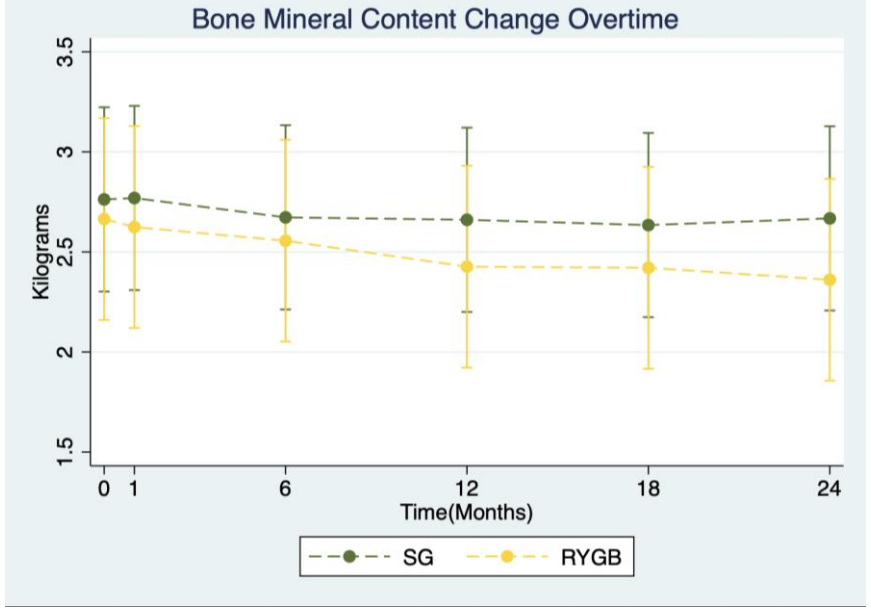
12 Month Bone Mineral Content Trajectory



24 Month Bone Mineral Content Trajectory

Subgroup Analysis



Clinical Impact

- Greatest lean body mass decline happened in early months post-operatively
  - Important to mitigate losses prior to stabilization phase
  - Neither bariatric procedure demonstrated advantage in lean body mass retention
- Significant but marginally higher bone mineral content reduction in RYGB
  - Previous studies supported RYGB's osteoporotic predisposition
  - Possible mechanism of this include malabsorption of intestinal bypass – calcium and vitamin D deficiency

Discussion

- Limitations
  - Lack of control/measurements on post-operative nutritional intake and physical activity
  - Small sample size
- Future research
  - Long-term body composition data needed
  - Controlled studies on strategies to mitigate lean body mass loss before 6-month post-operative mark

Conclusion

- SG and RYGB achieved substantial and comparable weight loss and similar body composition changes in the 12-month post-operative period
- Fat mass and lean body mass loss trajectory appeared to be similar in the early post-operative period
- Around one fifth weight loss was contributed by lean body mass, this predominantly happened in the initial 6 months after surgery