Impact of Bariatric Surgery on Myosteatosis in Morbidly Obese Patients

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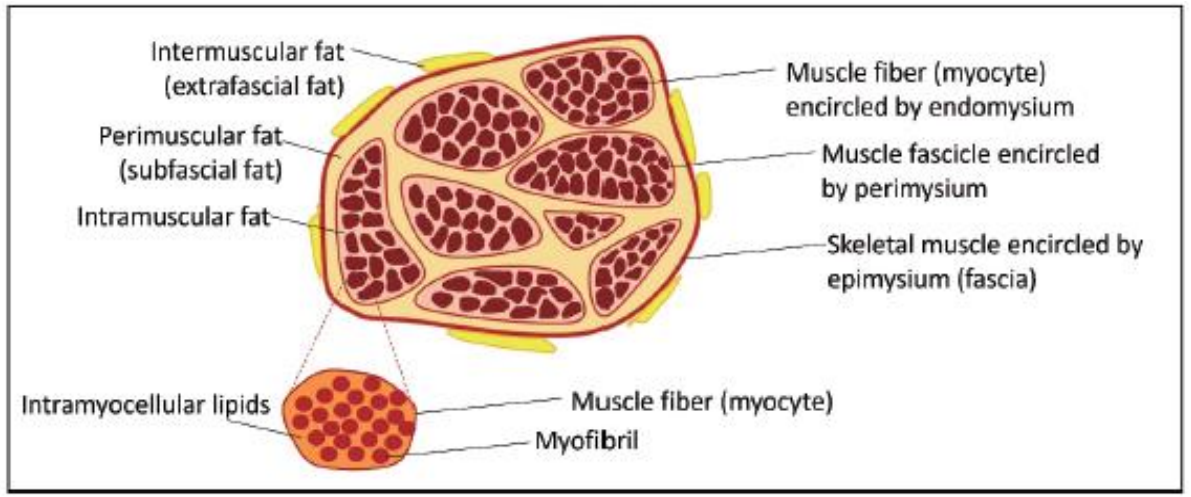
Introduction

- ✓ **Myosteatosis ;**
  1) Ectopic adipose tissue infiltration in skeletal muscle
  2) it is considered to be associated with metabolic disorder in recent studies
- ✓ CT-derived measurement of myosteatosis reveals **Muscle Quality**



- ✓ **Metabolic & bariatric surgery (MBS) ;** induces not only profound loss of fat mass, but also substantial loss of lean mass **-> Does MBS negative affect muscle quantity and quality?**

Purpose

This study aims to assess **the influence of bariatric surgery on myosteatosis** in morbidly obese patients

Patients and Methods

- **Patients**

  (1) Prospective longitudinal observation for postoperative 1 yr with informed consent

  (2) From 2019.11 to 2022.03 at Seoul National University Hospital (SNUH)

  (3) **Morbidly obese group (n=40)** : patients receiving bariatric surgery with BMI ≥ 30kg/m^2

  (4) **Non-obese group (n=41)**: patients receiving gastrectomy for EGC with BMI < 25kg/m^2

<Definition of muscle area>

- Total abdominal muscle area (Total AMA)
- Normal attenuation muscle area (Normal AMA) : +30 ~ +150 HU
- Low attenuation muscle area (Low AMA) : -29 ~ +29 HU
- NAMA/TAMA index = NAMA/TAMA x 100

- **Clinical data collection for 1yr after surgery ;**

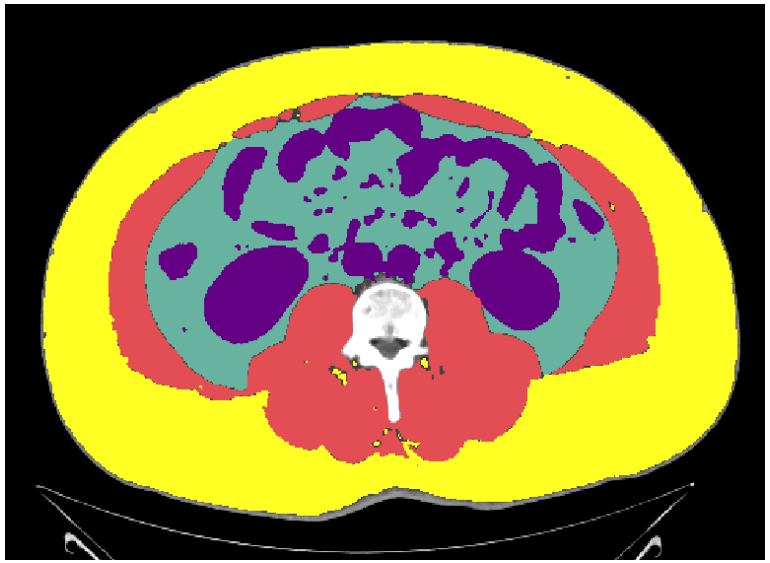
  age, sex, BMI, comorbidity, type of surgery, lab data incl. DM & lipid panels

- **CT scan image measurement at preop & postop 1 yr ;**

  - muscle volume & Hounsfield unit (HU) at L3 level

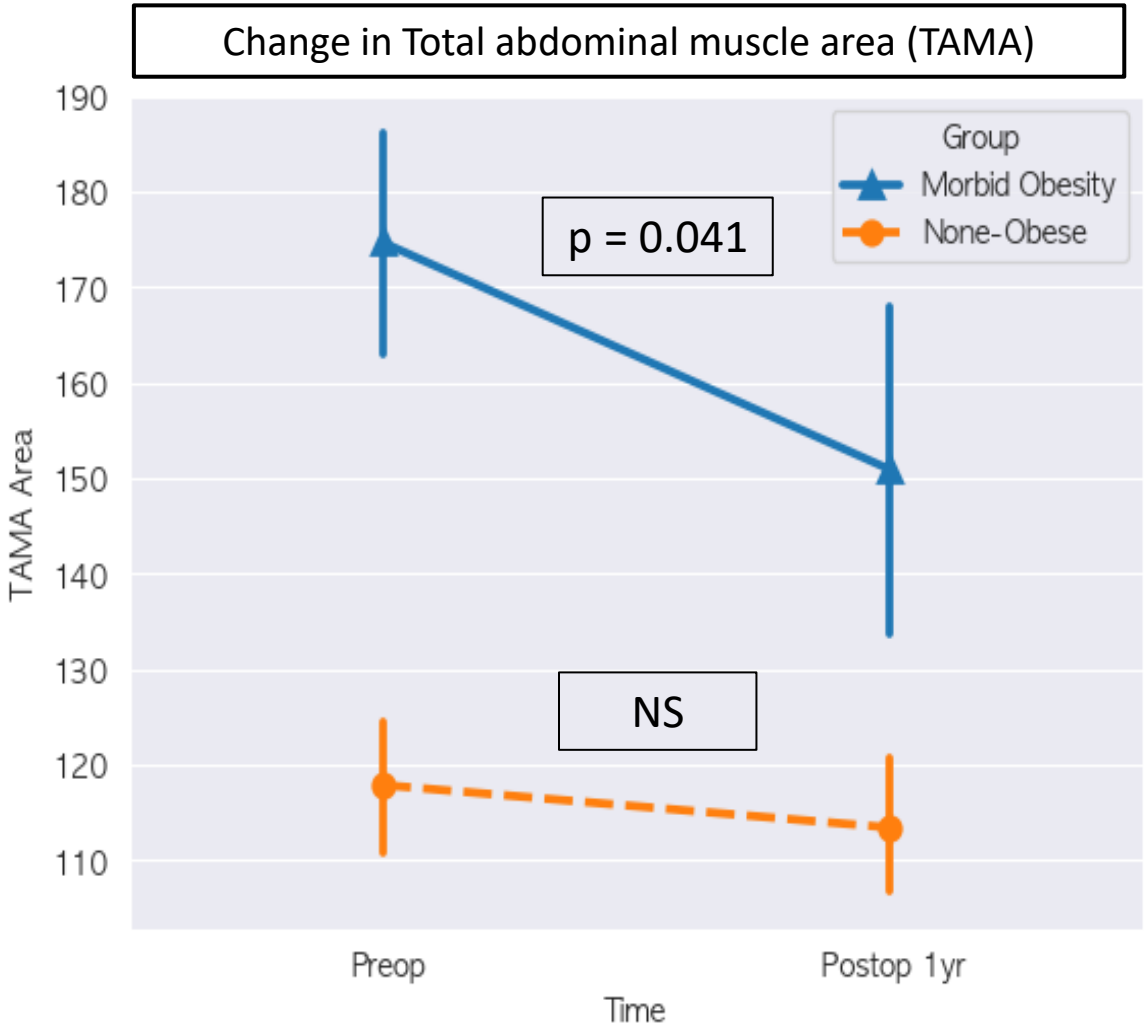
  - analyzed by Deep learning-based body composition analysis

  (DEEPCATCH, version 1.2.0, MEDICALIP Co. Ltd.)



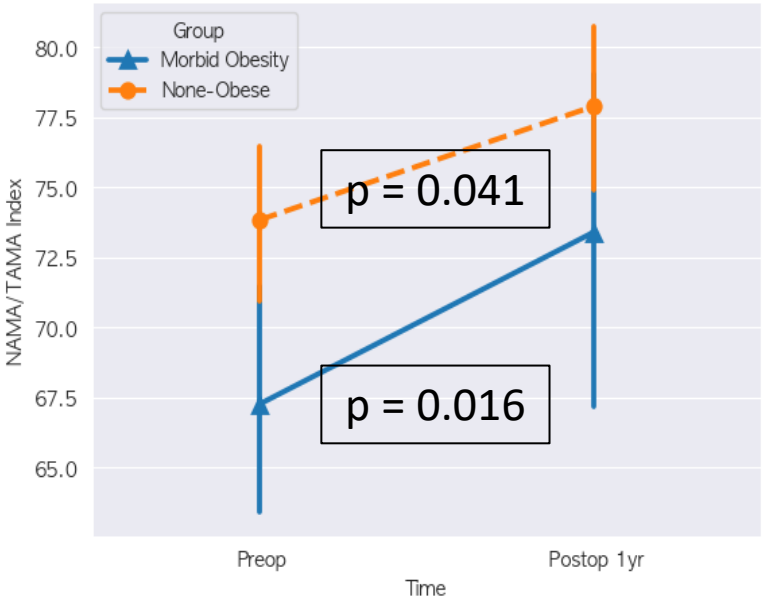
Results (1)

Characteristics (n=81)		**Morbid Obese (N = 40)**	Non-obese (N=41)	p value
Age (year ± SD)		**36.1±11.8**	63.6±9.8	<0.001
Sex	Male	**16 (40.0%)**	24 (59.0)	1.000
	Female	**24 (60.0%)**	17 (41.0)	
BMI (kg/m^2 ± SD)		**40.1±5.5**	22.9±2.0	<0.001
Surgery type	Sleeve	**35 (87.5%)**		
	Bypass	**5 (12.5%)**		
Diabetes		**21 (52.0%)**	21 (51.0%)	1.000
FBS (mg/dL)		**130.0±59.9**	112.7±26.3	0.482
HbA1c (%)		**6.8±1.8**	6.3±0.8	0.596
HOMA-IR		**7.0±6.0**	2.3±1.0	<0.001
subcutaneous fat area (SFA, cm^2)		**428.6±132.5**	120.8±46.6	<0.001
abdominal visceral fat area (AVF, cm^2)		**232.7±85.9**	86.2±56.7	<0.001
AVF/SFA Ratio		**0.62±0.40**	0.81±0.61	0.331
Total AMA (cm^2)		**174.7±40.5**	117.9±22.7	<0.001
Normal AMA (cm^2)		**118.7±40.5**	88.0±24.5	<0.001
Low AMA (cm^2)		**52.3±22.4**	28.5±8.4	<0.001
NAMA/TAMA		**67.3±12.8**	73.8±9.2	<0.05

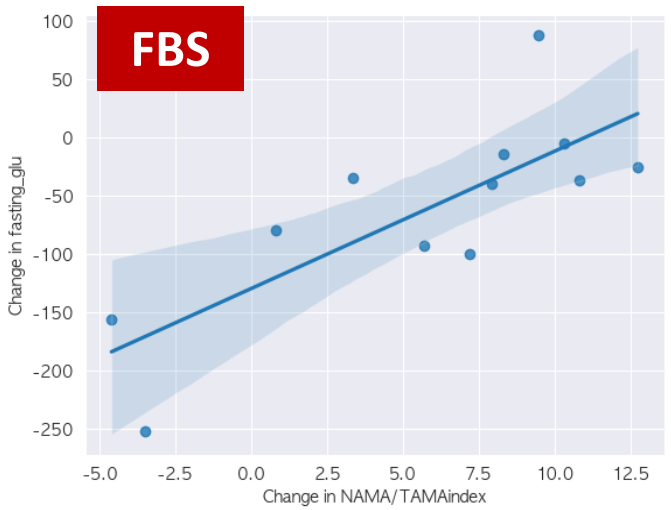


Results (2)

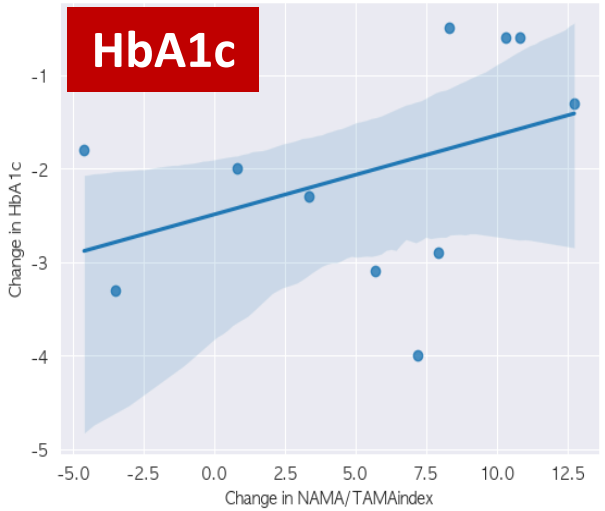
Change in NAMA/TAMA index



Relationship Between NAMA/TAMA Index improvement & FBS, HbA1c in Obese diabetic patients



r= 0.780
p=0.002



r= 0.404
p=0.217

Conclusion

- Changes in body composition after bariatric surgery → Not only **fat** but also **muscle quantity** **decreases.**
- **Myosteatosis** associated with **muscle quality,** measured by **NAMA/TAMA index**, is improved after bariatric surgery.