The Percentage Alterable Weight Loss - A New Metric for Outcomes Reporting After Laparoscopic Sleeve Gastrectomy for Obesity

Ching Siok Siong, Andrew Wong Siang Yih, Lin Jinlin, Annalisa Ng Ya-Lyn, Loh Wann Jia, Joan Khoo Joo Ching, Lee June
Department of Surgery and Department of Endocrinology, Changi General Hospital

Introduction: Clinically significant and sustained weight loss is one of the important outcomes of bariatric surgery. Hence standardization of reporting on efficacy of weight loss is important. The ideal metric needs to be appropriate for comparing outcomes within the same cohort independent of the initial body mass index (BMI), between various surgical techniques, applicable across different ethnic groups, age groups and genders, and consistent over the long term.

The %AWL algorithm was found in 2013, and not (yet) a well-known outcome measure. It is calculated based on non-alterable, inert part of body mass (bone and connective tissues) that cannot be influenced by surgical interventions regardless of gender and age in adult patients. The universal alterable part (fat, muscle, water), is defined as BMI minus 13 kg/m² whereas for gender-specific %AWL, the alterable parts are defined as BMI minus 17 kg/m² for males and BMI minus 10 kg/m² for females.

Aim: This study aims to validate %AWL metric in consecutive patients who had undergone LSG from March 2008 to January 2020.

Methods: Data on age, gender, initial BMI at the time of surgery and body weight at the defined intervals after surgery were collected.

Weight loss outcomes are presented as BMI, %EWL, %TWL, %AWL (universal and gender-specific). The patients were classified into subgroups based on their initial BMI: 2 halves of lower BMI (H1) and higher BMI (H2) groups; 4 quarters (Q1 to Q4) in ascending order of BMI.
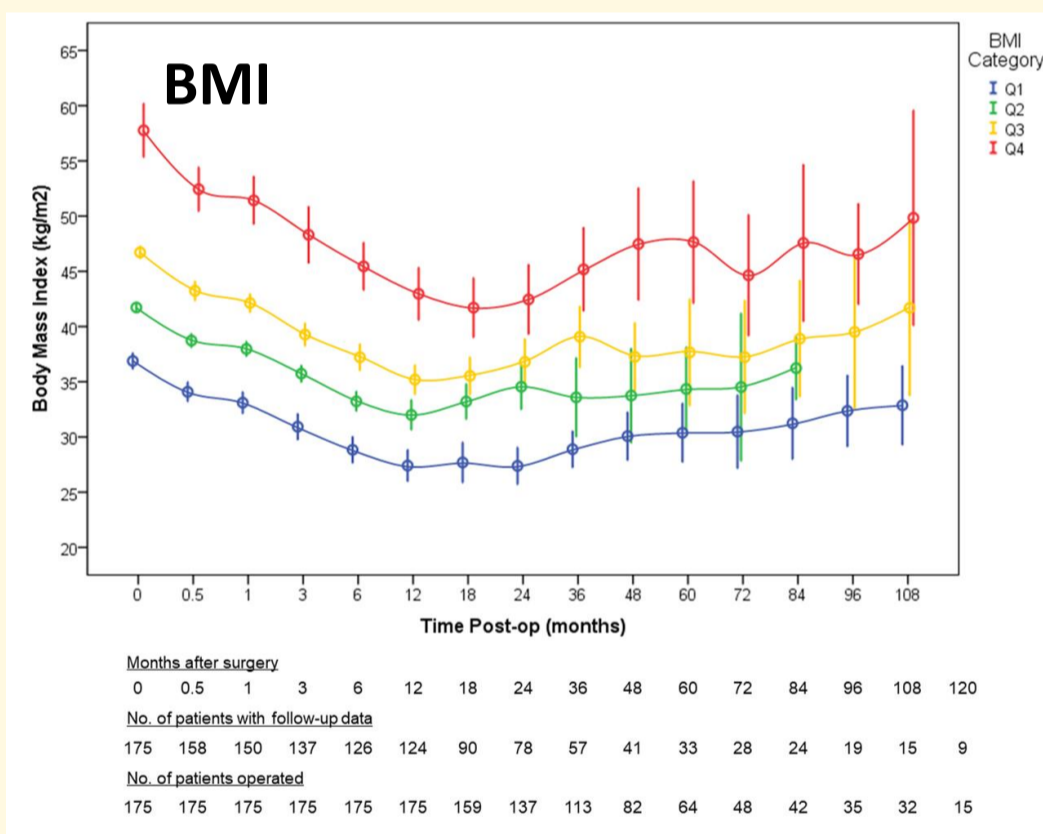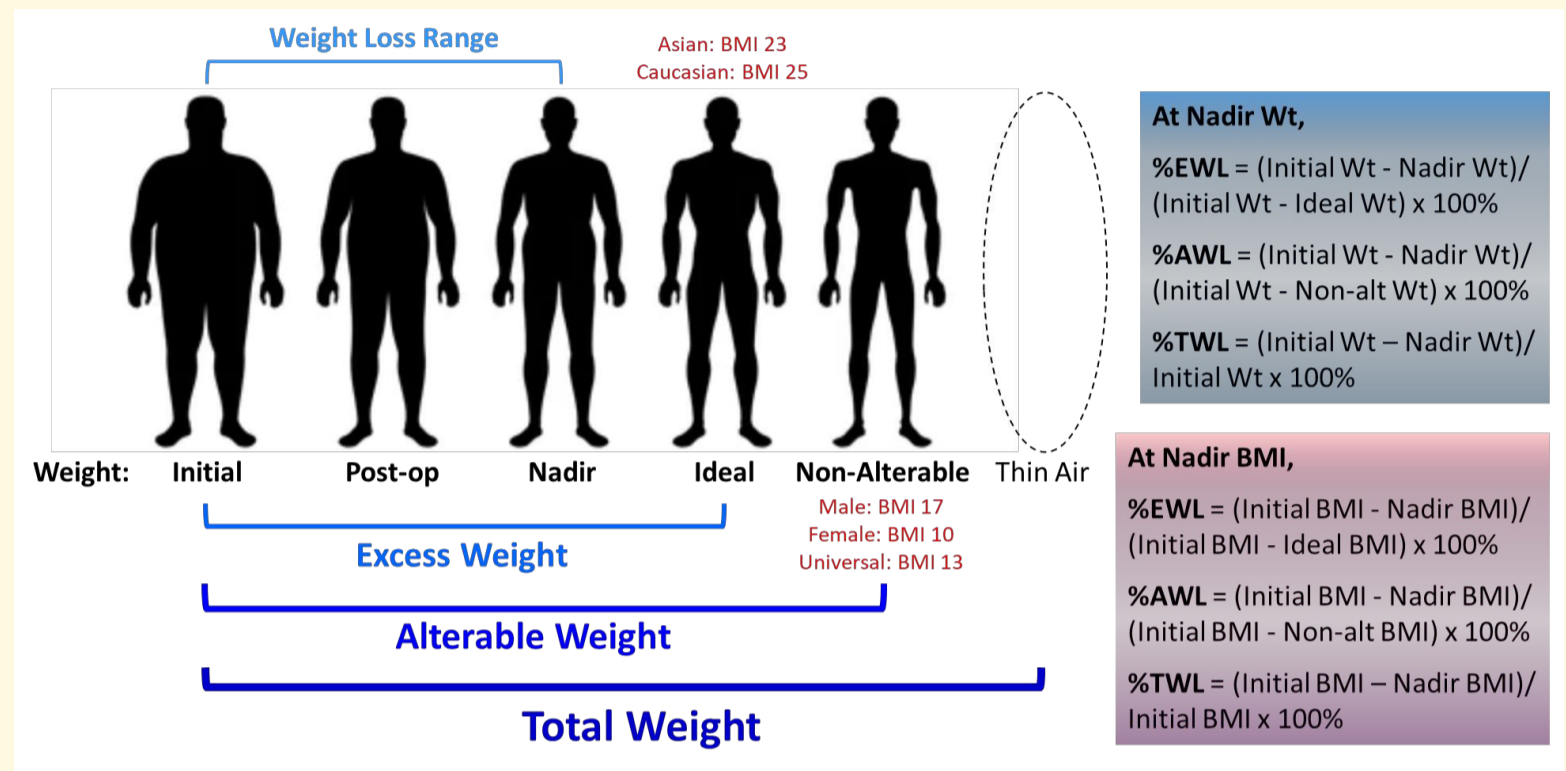

At Nadir Wt,

%EWL = (Initial Wt - Nadir Wt)/ (Initial Wt - Ideal Wt) x 100%

%AWL = (Initial Wt - Nadir Wt)/ (Initial Wt - Non-alt Wt) x 100%

%TWL = (Initial Wt – Nadir Wt)/ Initial Wt x 100%

At Nadir BMI,

%EWL = (Initial BMI - Nadir BMI)/ (Initial BMI - Ideal BMI) x 100%

%AWL = (Initial BMI - Nadir BMI)/ (Initial BMI - Non-alt BMI) x 100%

%TWL = (Initial BMI – Nadir BMI)/ Initial BMI x 100%

Results:

Table 2. Anthropometric outcomes calculated with nadir BMI (n=144)

	Included patients	H1 (n=72)	H2 (n=72)	P value
Initial BMI cut points		< 44.0	≥ 44.0	
Age (years)	39.5 ± 10.0	38.9 ± 10.7	40.2 ± 9.2	0.455
Initial BMI (kg/m²)	45.7 ± 8.9	39.3 ± 3.1	52.1 ± 8.2	**< 0.001**
Months to nadir	16.5 ± 11.9	16.1 ± 12.6	17.0 ± 11.3	0.646
Nadir BMI (kg/m²)	33.8 ± 7.2	29.1 ± 4.0	38.5 ± 6.7	**< 0.001**
Nadir %EWL	56.0 ± 21.1	64.7 ± 22.9	47.3 ± 14.9	**< 0.001**
Nadir %TWL	26.0 ± 8.0	26.0 ± 7.9	25.9 ± 8.2	0.918
Nadir %AWL (universal)	36.9 ± 11.6	39.1 ± 12.1	34.7 ± 10.8	**0.022**
Nadir %AWL (gender-specific)	37.1 ± 12.7	39.1 ± 13.4	35.0 ± 11.6	0.051

Table 1. Baseline characteristics of patients (n=175)

	No. of patients (%)
Age (years)	39.2 ± 10.3
Female gender	107 (61.1%)
Race	
Malay	82 (46.9%)
Chinese	49 (28.0%)
Indian	29 (16.6%)
Others	7 (8.6%)
Initial body weight (kg)	124.3 ± 27.3
Initial BMI (kg/m²)	46.1 ± 9.0
Concurrent diseases	
Diabetes mellitus	47 (26.9%)
Hypertension	80 (45.7%)
Hyperlipidemia	66 (37.7%)
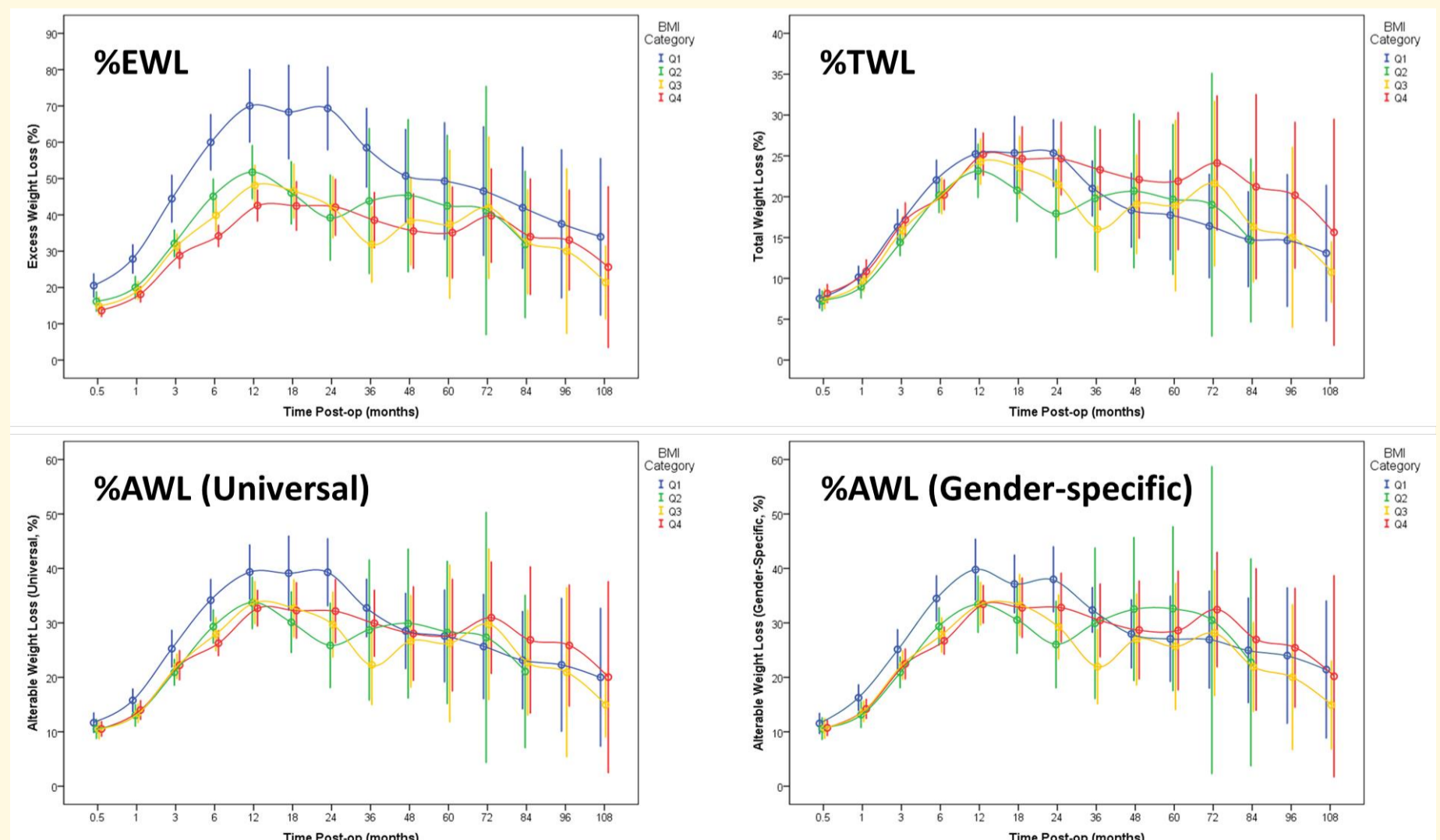
Conclusions: The perfect metric for reporting weight loss outcome after LSG is still not established. %EWL creates significant advantage for lower BMI subgroup and it should not be recommended. %TWL and %AWL should be recommended for reporting outcomes that are less dependent of initial BMI. %TWL appears most suitable for early outcome comparison. %AWL is more consistent over the long-term outcome comparison. This study on a multiethnic Asian population provides further validation of %AWL metric in LSG.