

Table 1. Demographics and clinical characteristics of women with clinically stable estrogen receptor positive metastatic breast cancer stratified by sarcopenia^a

Characteristic	Total N=41	Non-sarcopenic n=27	Sarcopenic ^b n=14	P value
Age, years (median, IQR)	62 (53-67)	59 (48-65)	66 (61-71)	0.031
Race/ethnicity (n, %)				
Non-Hispanic White	30 (73.2)	17 (63.0)	13 (92.9)	0.023
African-American	4 (9.8)	4 (14.8)	0 (0.0)	
Hispanic	6 (14.6)	6 (22.2)	0 (0.0)	
Other	1 (2.4)	0 (0.0)	1 (7.1)	
Living Situation (n, %)				
Alone	7 (17.1)	4 (14.8)	3 (21.4)	0.85
Spouse and/or family	31 (75.6)	21 (77.8)	10 (71.4)	
Other	3 (7.3)	2 (7.4)	1 (7.1)	
Employment Status (n, %)				
Working full time	11 (26.8)	8 (29.6)	3 (21.4)	0.62
Working part time	7 (17.1)	5 (18.5)	2 (14.3)	
Retired without disability	3 (7.3)	3 (11.1)	0 (0.0)	
Retired with disability	12 (29.3)	6 (22.2)	6 (42.9)	
Unemployed	8 (19.5)	5 (18.5)	3 (21.4)	
<i>De novo</i> disease (n, %)	12 (29.3)	9 (33.3)	3 (21.4)	0.49
Duration of MBC , months (median, IQR)	14 (5-33)	14 (5-33)	12 (5-48)	0.61
Metastatic sites (n, %)				
1-2	33 (80.5)	22 (81.5)	11 (78.6)	0.99
>2	8 (19.5)	5 (18.5)	3 (21.4)	
Metastatic disease location ^d (n, %)				
Bone	28 (68.3)	19 (70.4)	9 (64.3)	0.73
Liver	10 (24.4)	7 (25.9)	3 (21.4)	0.99
Lung	10 (24.4)	5 (18.5)	5 (35.7)	0.27
Brain	5 (12.2)	4 (14.8)	1 (7.1)	0.64
Other	13 (31.7)	8 (29.6)	5 (35.7)	0.73

Radiation therapy for metastases, yes (n, %)	13 (31.7)	7 (25.9)	6 (42.9)	0.24
Surgery for breast cancer (n, %)				
None	11 (26.8)	9 (33.3)	2 (14.3)	0.41
Lumpectomy	18 (43.9)	10 (37.0)	8 (57.1)	
Mastectomy	12 (29.3)	8 (29.6)	4 (28.6)	
Currently prescribed medications (n, %) ^d				
Anti-estrogens	28 (68.3)	17 (63.0)	11 (78.6)	0.48
Chemotherapy	19 (46.3)	13 (48.1)	6 (42.9)	0.99
Targeted therapies	20 (48.8)	17 (63.0)	3 (21.4)	0.020
ECOG (n, %) ^a				
0	16 (39.0)	10 (37.0)	6 (42.9)	0.99
1	24 (58.5)	16 (59.3)	8 (57.1)	
2	1 (2.4)	1 (3.7)	0 (0.0)	

^a Abbreviations: MBC = Metastatic breast cancer; IQR = interquartile range; ECOG=Eastern

Cooperative Oncology Group; FACT-B= Functional Assessment of Cancer Therapy Breast Quality of life;

^b Sarcopenia defined as lumbar SMI $\leq 41 \text{ cm}^2/\text{m}^2$ proposed by Martin et al (8)

^c ECOG scores range from 0-5 with 0 =full activity and 5= death.

^d Not mutually exclusive since multiple therapies can be used simultaneously.

Table 2. Body composition, lifestyle factors, quality of life and serum biomarkers of inflammation of women with clinically stable estrogen receptor positive metastatic breast cancer stratified by sarcopenia^a

Characteristic	Total N=41	Non-sarcopenic n=27	Sarcopenic n=14	P value^j
Body weight, kgs (median, IQR)	72.9 (63.0-89.0)	77.0 (66.3-97.8)	64.1 (54.5-73.5)	0.01
Body mass index, kg/m² (median, IQR)	27.3 (24.1-32.8)	29.3 (25.6-36.9)	23.5 (20.7-25.2)	<0.001
Body mass index category, kg/m² 18.5 -24.9 kg/m ² (n, %)	12 (29.3)	3 (11.1)	9 (64.3)	0.01
25.0-29.9 kg/m ² (n, %)	15 (36.6)	11 (40.7)	4 (28.6)	
≥ 30.0 kg/m ² (n, %)	14 (34.1)	13 (48.1)	1 (7.1)	
Whole body SM,^b kg (median, IQR)	40.9 (36.5-47.4)	42.2 (39.8-48.9)	36.1 (34.7-37.2)	<0.001

SMHU (median, IQR)	35.0 (31.3-44.1)	35.3 (31.7-44.1)	34.2 (29.4-46.3)	0.75
Myosteatorsis^c (n, %)	20 (49)	11 (41)	9 (64)	0.20
VAT (cm ²) (median, IQR)	95.7 (41.8-142.3)	119.9 (68.4-176.6)	34.8 (22.6-99.9)	0.003
SAT (cm ²) (median, IQR)	222.6 (171.5-400.7)	259.6 (190.4-431.8)	151.2 (103.3-207.8)	0.001
TAT (cm ²) (median, IQR)	339.3 (227.5-545.3)	396.5 (273.5-628.2)	203.1 (144.4-321.2)	0.001
C-reactive protein (μ/ml) ⁱ (median, IQR)	0.6 (0.3-14.6)	3.3 (0.4-18.6)	0.4 (0.4-3.0)	0.12
Interleukin-6 (pcg/ml) ⁱ (median, IQR)	0.2 (0.2-2.4)	0.2 (0.2-2.3)	0.9 (0.2-2.9)	0.24
TNF-α (pcg/ml) ⁱ (median, IQR)	1.0 (0.7-1.3)	1.0 (0.7-1.5)	0.9 (0.4-1.3)	0.41
Dominant handgrip strength , kg (median, IQR)	24.2 (20.3-27.9)	24.2 (20.3-28.0)	24.2 (18.9-26.0)	0.62

Handgrip strength < 20 kg (n, %)	10 (24)	6 (22)	4 (29)	0.71
abPGSGA scores^d				
Any nutrition impact symptoms (n, %)	14 (34)	12 (44)	2 (14)	0.08
Score ≥ 6 points (n, %)	12 (29%)	10 (37%)	2 (14%)	0.12
Fruit & Vegetable intake (servings/day; median, IQR)	4 (3-4)	4 (3-4)	3 (3-5)	0.77
Fiber intake (g/day; median, IQR)	12 (10-15)	12 (10-15)	10 (9-15)	0.41
Leisure time exercise habits (median, IQR) ^e	6 (0-28)	6 (0-19)	26 (3-36)	0.05
FACT-Breast Total Score^f (median, IQR)	106 (91-118)	100 (87-118)	108 (93-119)	0.29
FACT-ES Total Score^{fe} (median, IQR)	169 (145-183)	158 (142-178)	174 (151-191)	0.10

Total fatigue^g (median, IQR)	4.0 (1.3-6.4)	4.7 (1.2-6.6)	2.3 (1.3-6.0)	0.45
Daily pain rating^h (median, IQR)	3.0 (2.0-5.0)	3.0 (2.0-5.0)	3.5 (1.0-4.0)	0.67

^a Abbreviations: abPGSGA= Abridged Patient Generated Subjective Global Assessment; IQR = interquartile range; FACT = Functional

Assessment of Cancer Therapy; FACT-ES= Functional Assessment of Cancer Therapy- Endocrine Symptoms; SD= standard deviation; SM= skeletal muscle; SMHU= skeletal muscle Hounsfield Units; Tumor necrosis factor- alpha = TNF- α

^b Estimates of whole-body skeletal muscle (kg) calculated from the regression equation of Mourtzakis et al (23) as follows: $0.30 \times [\text{skeletal muscle at L3 region using CT (cm}^2\text{)}] + 6.06$

^c Myosteatorsis is defined as SMHU <41 HU for BMI <24.9 kg/m² and SMHU <33 HU for BMI \geq 25.0 kg/m², using the cut-points of Martin et al (7)

^d abPGSGA Scores of ≥ 6 correlate with a diagnosis of malnutrition when the full version of the PG-SGA is administered per Gabrielson et al (21)

^e Higher scores indicate greater frequency of leisure time exercise activity.

^f Higher scores are indicative of better QOL for each of the FACT measures.

^g Higher fatigue scores are indicative of worse fatigue.

^h Higher scores on indicate worse pain on a scale of 0-10.

ⁱ Analyses based on 39 participants.

^j P value for non-sarcopenic vs. sarcopenia

Table 3. Body composition, lifestyle factors, quality of life and serum biomarkers of inflammation of women with clinically stable estrogen receptor positive metastatic breast cancer stratified by obesity using body mass index^a

Characteristic	Total	Non-obese (BMI < 30.0)	Obese (BMI ≥ 30.0)	P value^j
	N=41	n=27	n=14	
Body weight, kgs (median, IQR)	72.9 (63.0-89.0)	63.0 (51.0-70.0)	98.2 (89.0-122.0)	<.0001
Body mass index, kg/m² (median, IQR)	27.3 (24.1-32.8)	25.1 (22.6-27.3)	37.2 (32.8-46.7)	<.0001
Body mass index category, kg/m² 18.5 -24.9 kg/m ² (n, %)	12 (29.3)	12	0	<.0001
25.0-29.9 kg/m ² (n, %)	15 (36.6)	15	0	
≥ 30.0 kg/m ² (n, %)	14 (34.1)	0	14	
Whole body SM,^b kg (median, IQR)	40.9 (36.5-47.4)	37.2 (35.4-41.6)	47.8 (41.9-50.3)	<.001

SMHU	35.0	40.7	31.9	0.02
(median, IQR)	(31.3-44.1)	(31.5-45.8)	(28.7-35.0)	
Myosteatorsis^c (n, %)	20	11	9	0.20
	(49)	(41)	(64)	
VAT (cm²)	95.7	55.6	172.3	<0.0001
(median, IQR)	(41.8-142.3)	(22.8-99.9)	(136.0-208.0)	
SAT (cm²)	222.6	187.5	433.9	<0.0001
(median, IQR)	(171.5-400.7)	(135.4-222.6)	(345.7-539.4)	
TAT (cm²)	339.3	246.4	661.8	<0.0001
(median, IQR)	(227.5-545.3)	(162.8-343.5)	9545.3-747.5)	
C-reactive protein (μ/ml)ⁱ	0.6	0.5	10.2	0.06
(median, IQR)	(0.3-14.6)	(0.3-8.1)	(0.4-24.8)	
Interleukin-6 (pcg/ml)ⁱ	0.2	0.7	0.2	0.03
(median, IQR)	(0.2-2.4)	(0.2-2.9)	(0.2-0.5)	
TNF-α (pcg/ml)ⁱ	1.0	0.9	1.2	0.03
(median, IQR)	(0.7-1.3)	(0.6-1.3)	(0.9-1.8)	
Dominant handgrip strength, kg	53.3	52.0	57.0	0.32
(median, IQR)	(44.6-61.3)	(43.9-60.3)	(48.3-62.4)	

Handgrip strength < 20 kg (n, %)	10 (24)	7 (26)	3 (21)	0.75
abPGSGA scores^d				
Any nutrition impact symptoms (n, %)	14 (34)	22 (82)	11 (79)	0.50
Score ≥ 6 points (n, %)	12 (29%)	7 (26)	5 (36)	0.42
Fruit & Vegetable intake (servings/day; median, IQR)	4 (3-4)	4 (3-4)	4 (3-4)	0.69
Fiber intake (g/day; median, IQR)	12 (10-15)	11 (10-15)	13 (9-14)	1.0
Leisure time exercise habits (median, IQR) ^e	6 (0-28)	16 (3-35)	2 (0-12)	0.07
FACT-Breast Total Score^f (median, IQR)	106 (91-118)	108 (93-123)	95 (85-111)	0.07
FACT-ES Total Score^{fe} (median, IQR)	169 (145-183)	172 (150-186)	143 (123-170)	0.02

Total fatigue^g (median, IQR)	4.0 (1.3-6.4)	3.5 (1.2-5.9)	6.0 (1.5-6.6)	0.22
Daily pain rating^h (median, IQR)	3.0 (2.0-5.0)	3.0 (1.0-4.0)	4.5 (3.0-6.0)	0.09

^a Abbreviations: abPGSGA= Abridged Patient Generated Subjective Global Assessment; IQR = interquartile range; FACT = Functional Assessment of Cancer Therapy; FACT-ES= Functional Assessment of Cancer Therapy- Endocrine Symptoms; SD= standard deviation; SM= skeletal muscle; SMHU= skeletal muscle Hounsfield Units; Tumor necrosis factor- alpha = TNF- α

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ⁱ Analyses based on 39 participants.

^j P value for non-obese vs. obese