



ABSTRACT

**Background:** Cancer cachexia negatively affects prognosis in advanced cancer, yet the comparative utility of diagnostic criteria remains unclear. This study evaluated the Asian Working Group for Cachexia (AWGC) and European Palliative Care Research Collaborative (EPCRC) criteria in patients with metastatic colorectal cancer (mCRC).

**Methods:** In this retrospective study, 313 mCRC patients who began first-line chemotherapy between 2013 and 2023 were assessed for cachexia using AWGC ( $\geq 2\%$  weight loss + anorexia or elevated CRP), EPCRC ( $\geq 5\%$  weight loss, or  $\geq 2\%$  if BMI  $< 20$ ), and the Modified Glasgow Prognostic Score (mGPS). Cumulative incidence and time-dependent Cox regression were used to analyze outcomes.

**Results:** One-year cachexia incidence varied by criteria: 69% with AWGC, 44% with EPCRC, and 73% (score 1) and 39% (score 2) with mGPS. Both AWGC- and EPCRC-defined cachexia were significantly associated with poorer survival (AWGC: HR=2.41; EPCRC: HR=2.02; both  $p < 0.001$ ). Prognostic trends were similarly observed with mGPS.

**Discussion:** AWGC criteria identified cachexia earlier than EPCRC, suggesting higher sensitivity. mGPS may offer a practical alternative to weight-based definitions. These findings support early diagnosis strategies to improve outcomes in mCRC.

# INCIDENCE AND PROGNOSTIC IMPACT OF CANCER CACHEXIA BASED ON ASIAN AND EUROPEAN CRITERIA IN METASTATIC COLORECTAL CANCER CHEMOTHERAPY

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INTRODUCTION

**What's the problem?**  
Cancer cachexia leads to progressive weight and muscle loss, and significantly shortens survival. **Two different diagnostic standards exist — EPCRC and AWGC criteria — creating a dual-standard situation.** However, it's still unclear which of these should be applied to Japanese patients.

**What makes it difficult?**  
**Frequent regular weight monitoring is challenging in clinical practice.** The modified Glasgow Prognostic Score (mGPS), based on routine laboratory values, may serve as a more feasible alternative assessment method.

**What did we do?**  
To determine which standard is **more effective for early detection** of cachexia, we compared the **incidence rates** using both EPCRC and AWGC criteria in Japanese patients with metastatic colorectal cancer (mCRC). We also tested if mGPS could serve as a **practical alternative marker**.

METHODS AND MATERIALS

**Study Design and Patients**  
We conducted a retrospective study using electronic medical records at our institution. Patients with mCRC who started first-line chemotherapy between Jan 2013 and Dec 2023 were included. Approved by the Gifu University Ethics Committee (No. 2023-289).

**Cachexia Diagnosis**  
➢ **EPCRC criteria:**  
Weight loss  $> 5\%$  in 6 months, or  $> 2\%$  with BMI  $< 20$  kg/m<sup>2</sup>  
*Sarcopenia not assessed (no imaging)*  
➢ **AWGC criteria:**  
Weight loss  $> 2\%$  over 3–6 months, plus  $\geq 1$  of:  
- Anorexia - CRP  $> 0.5$  mg/dL  
*Grip strength not assessed (retrospective limitations)*

**mGPS Assessment**  
Used to evaluate inflammation/nutritional status:  
➢ Score 0: CRP  $\leq 0.5$  (mg/dL) & Alb  $\geq 3.5$  (g/dL)  
➢ Score 1: CRP  $> 0.5$  (mg/dL) & Alb  $\geq 3.5$  (g/dL)  
➢ Score 2: CRP  $> 0.5$  (mg/dL) & Alb  $< 3.5$  (g/dL)

**Anorexia Assessment**  
Based on CTCAE v4.0; Grade  $\geq 1$  defined as symptomatic.

**Statistical Analysis**  
We calculated the one-year cumulative incidence of cachexia and used time-dependent Cox regression models to assess survival outcomes. R v4.2.2 used; two-sided  $P < 0.05$  considered significant.

RESULTS

**Table 1. Patient characteristics**

Variable	N	Median (IQR) / Count (%)	Unknown (n)
Age	311	68 (59, 74)	2
Male	313	176 (56.2%)	0
Weight (kg)	313	56.0 (49.4, 64.0)	0
BMI	308	21.7 (19.2, 24.5)	5
Albumin (mg/dL)	297	4.0 (3.6, 4.2)	16
Total Protein (mg/dL)	290	6.8 (6.4, 7.2)	23
AST (U/L)	297	20.0 (17.0, 29.0)	16
ALT (U/L)	297	16.0 (11.0, 24.0)	16
T-Bil (mg/dL)	295	0.6 (0.5, 0.8)	18
WBC Count (/ $\mu$ L)	298	5,620 (4,750, 6,870)	15
Neutrophil Count (/ $\mu$ L)	297	3,440 (2,567, 4,680)	16
Lymphocyte Count (/ $\mu$ L)	298	1,450 (1,158, 1,917)	15
CRP (mg/dL)	299	0.2 (0.1, 0.8)	14
Neutrophil-to-Lymphocyte Ratio	296	2.3 (1.7, 3.6)	17
Modified Glasgow Prognostic Score	297	1: 30 (10.1%) 2: 32 (10.8%)	16
CEA (ng/mL)	302	14.9 (4.3, 74.7)	11

**Table 2. Time-dependent Cox proportional hazards regression to assess the prognostic impact of cancer cachexia according to EPCRC, AWGC, and mGPS (1 and 2)**

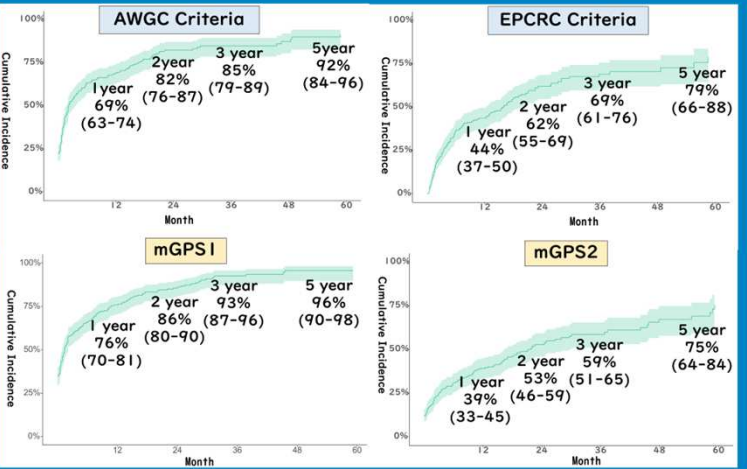
Factors	Hazard ratio	95% CI	P value
AWGC Criteria	<b>2.60</b>	1.60–3.61	$< 0.001$
EPCRC Criteria	<b>2.05</b>	1.47–2.78	$< 0.001$
mGPS [1]	<b>5.66</b>	3.19–10.0	$< 0.001$
mGPS [2]	<b>3.41</b>	2.31–4.68	$< 0.001$

※Adjusted by age, sex, and NLR

DISCUSSION AND CONCLUSIONS

AWGC criteria detected cachexia earlier than EPCRC and showed **stronger association with poor outcomes** in Japanese patients with mCRC. When weight monitoring is challenging, **mGPS may serve as a practical alternative**, with interventions recommended from **score 1**.

**Figure 1. Cumulative incidence of cancer cachexia (EPCRC and AWGC Criteria) and mGPS after chemotherapy initiation in patients with metastatic colorectal cancer**



**Figure 2. Simon and Makuch's Modified Kaplan-Meier Curves for Overall Survival Based on Cancer Cachexia (EPCRC and AWGC Criteria) and mGPS in patients with metastatic colorectal cancer**

