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Tumor Growth Rate as a Prognostic Marker in First-Line Immune Checkpoint Inhibitor Monotherapy and Chemo- Immunotherapy for NSCLC

Teruhisa Nemoto¹⁾, Ryo Ariyasu¹⁾, Hayato Akaishi¹⁾, Sae Takashima¹⁾, Masahiro Ito¹⁾, Ryosuke Tsugitomi¹⁾,
Yoshiaki Amino¹⁾, Ken Uchibori¹⁾, Noriko Yanagitani¹⁾, Makoto Nishio¹⁾

1) The Cancer Institute Hospital of Japanese Foundation for Cancer Research, Tokyo, Japan.

Introduction

- Clinically useful prognostic markers for non-small cell lung cancer (NSCLC) treated with immune checkpoint inhibitor monotherapy (ICI-mono) or chemo-immunotherapy (ICI-chemo) remain needed.
- Tumor growth rate (TGR) has been reported as a prognostic biomarker in patients receiving ICI-mono; however, its impact on ICI-chemo remains unknown.

Methods

- This single-center retrospective study included patients with advanced or recurrent NSCLC who received first-line ICI-mono or ICI-chemo.
- Patients were required to have two CT scans obtained before first-line treatment, 2 weeks to 3 months apart, and measurable lesions.
- Baseline tumor growth rate (TGR) was calculated from the change in tumor size between the two CT scans and normalized per month.

$$\text{TGR} = 100 * [\exp(\text{TG}) - 1] \quad \text{TG} = (3 * \log(D_2/D_1)) / t \quad t = (\text{date}_2 - \text{date}_1 + 1) / 30.44$$

(D_1 and D_2 represent tumor size at the first and second CT scans.)

- Patients were classified into TGR-low ($\leq 25.3\%$ /month) and TGR-high ($> 25.3\%$ /month) groups based on a prior report¹⁾.

1) He Y, et al. Front Oncol. 2021;10:621329.

Methods

Primary objective

- To evaluate baseline TGR as a prognostic marker in patients receiving ICI-mono or ICI-chemo.

Additional objective

- To assess survival differences between ICI-mono and ICI-chemo in the TGR-low and TGR-high groups.

Statistical analysis

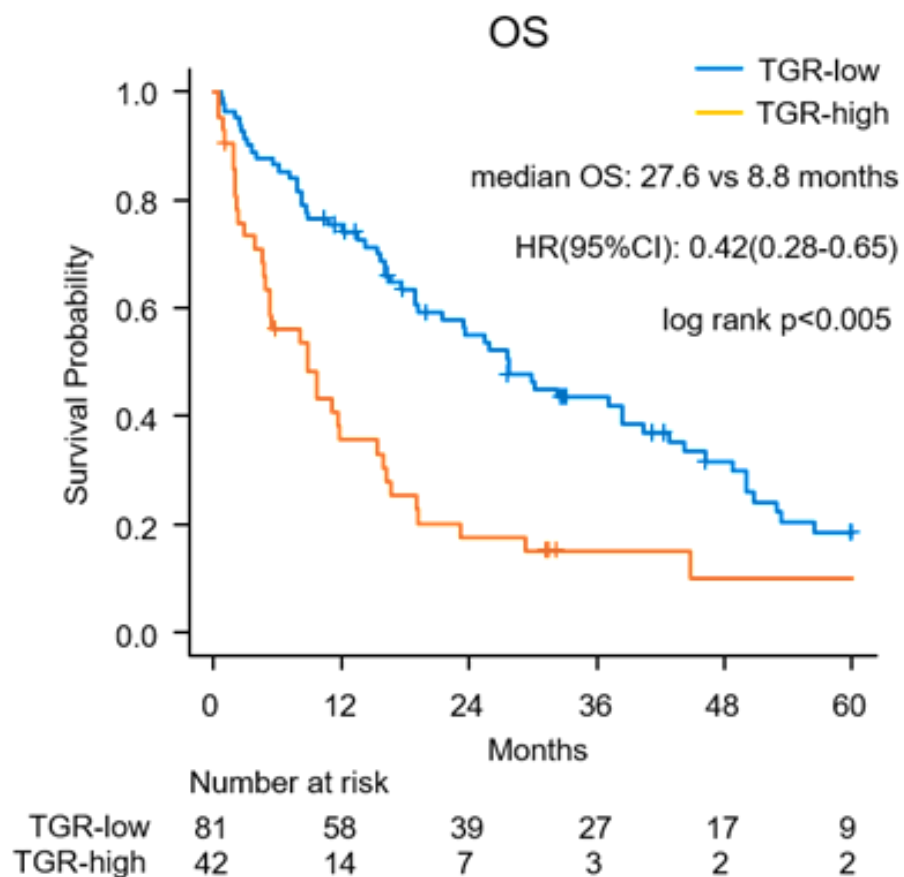
- Overall survival (OS) was estimated using the Kaplan–Meier method.
- Survival differences were compared using the log-rank test.
- A p value <0.05 was considered statistically significant.

Patient Characteristics

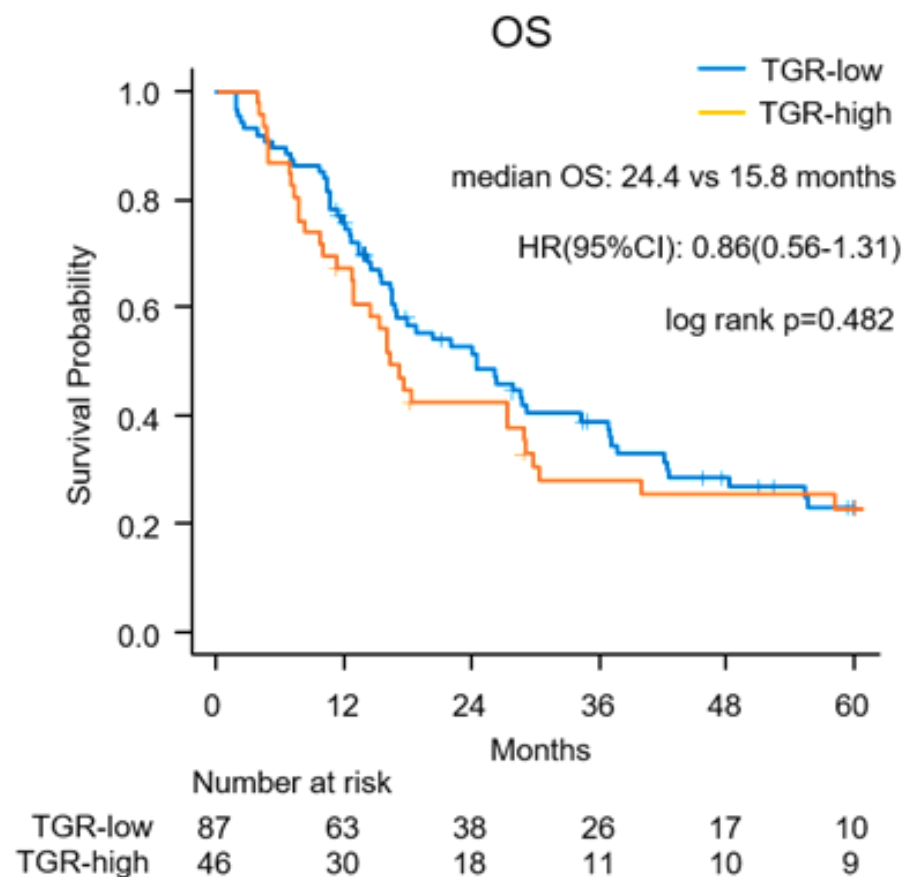
Characteristics	Overall (n=256)	ICI-mono (n=123)		ICI-chemo (n=133)	
		TGR-low (n=81)	TGR-high (n=42)	TGR-low (n=87)	TGR-high (n=46)
Median age [range], year	69.0 [35-89]	68.0 [35-89]	70.0 [45-86]	69.0 [43-84]	69.5 [43-84]
Sex , n (%)					
Male	181 (70.7)	61 (75.3)	33 (78.6)	57 (65.5)	30 (65.2)
Female	75 (29.3)	20 (24.7)	9 (21.4)	30 (34.5)	16 (34.8)
Smoking status , n (%)					
Never	44 (17.2)	9 (11.1)	5 (11.9)	21 (24.1)	9 (19.6)
Former or Current	212 (82.8)	72 (88.9)	37 (88.1)	66 (75.9)	37 (80.4)
ECOG-PS , n (%)					
0-1	226 (88.3)	74 (91.4)	37 (88.1)	76 (87.4)	39 (84.8)
≥2	30 (11.7)	7 (8.6)	5 (11.9)	11 (12.6)	7 (15.2)
Histology , n (%)					
Non-squamous cell carcinoma	182 (71.1)	50 (61.7)	24 (57.1)	70 (80.5)	38 (82.6)
Squamous cell carcinoma	74 (28.9)	31 (38.3)	18 (42.9)	17 (19.5)	8 (17.4)
Disease status , n (%)					
Recurrent	71 (27.7)	32 (39.5)	17 (40.5)	12 (13.8)	10 (21.7)
Advanced	185 (72.3)	49 (60.5)	25 (59.5)	75 (86.2)	36 (78.3)
PD-L1 expression , n (%)					
0-49%	86 (33.6)	9 (11.1)	9 (21.4)	45 (51.7)	23 (50.0)
≥50%	118 (46.1)	57 (70.4)	24 (57.2)	21 (24.1)	16 (34.8)
Unknown	52 (20.3)	15 (18.5)	9 (21.4)	21 (24.1)	7 (15.2)
Baseline maximum tumor size (mm)					
Median (IQR)	47.0 (30.8-67.3)	46.0 (29.0-63.0)	50.5 (33.0-72.3)	44.0 (30.5-61.0)	52.0 (31.3-77.0)

Overall Survival by TGR

A ICI-mono

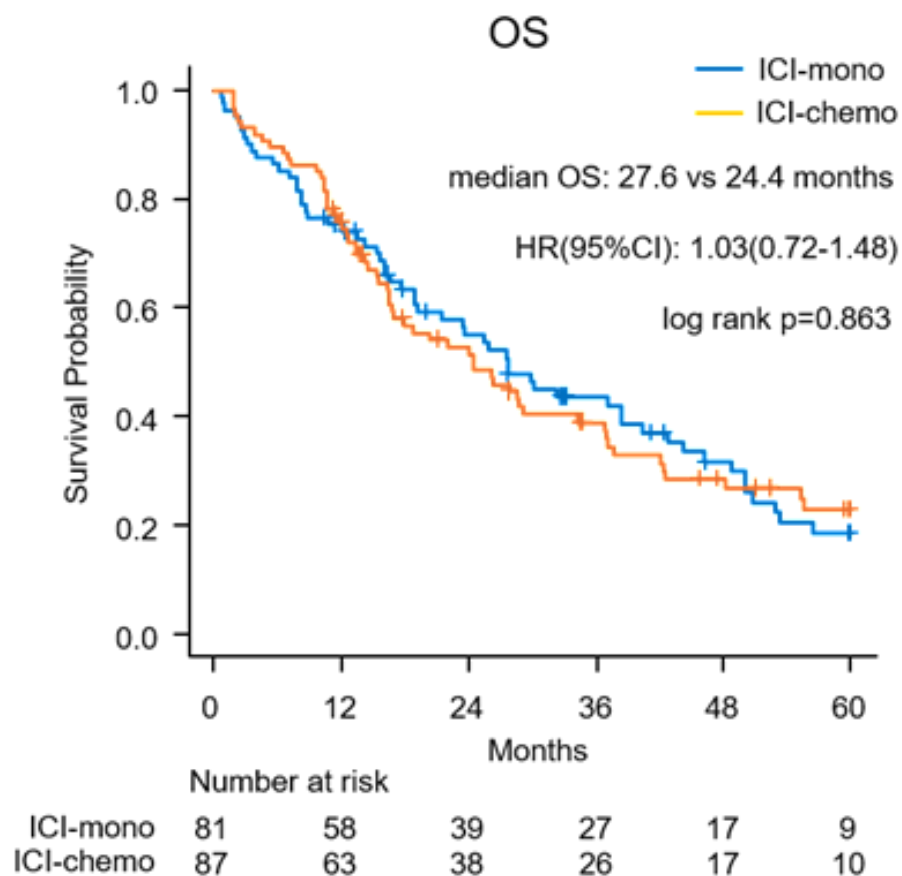


B ICI-chemo

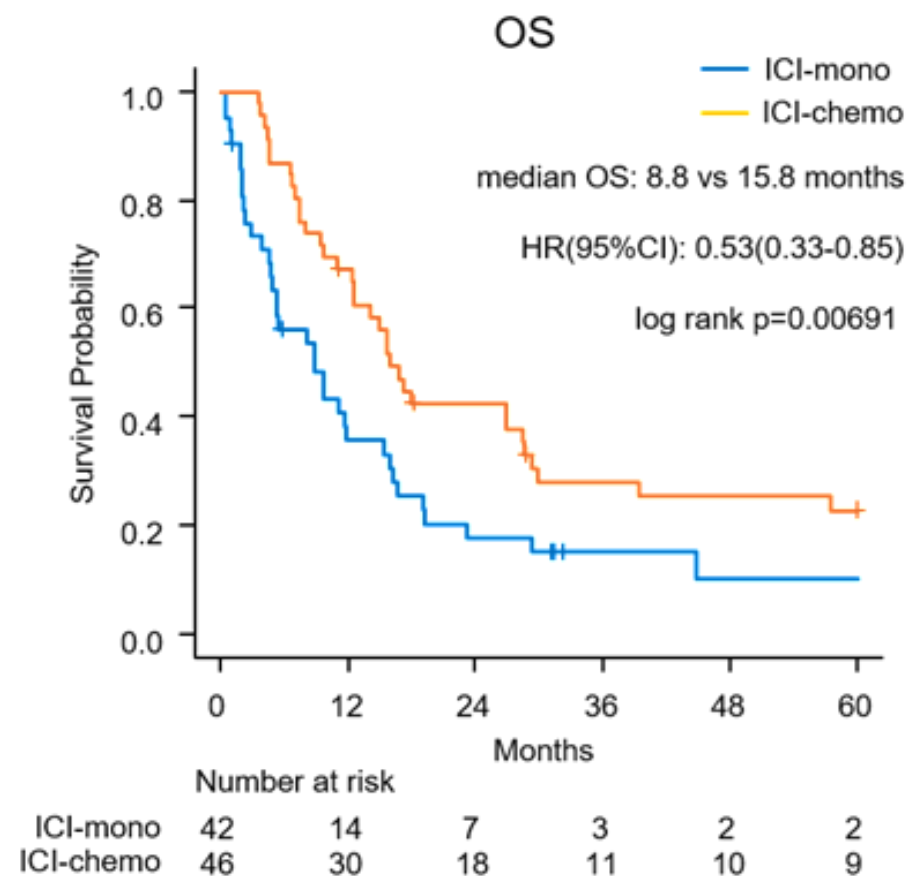


Overall Survival by Treatment

C TGR-low

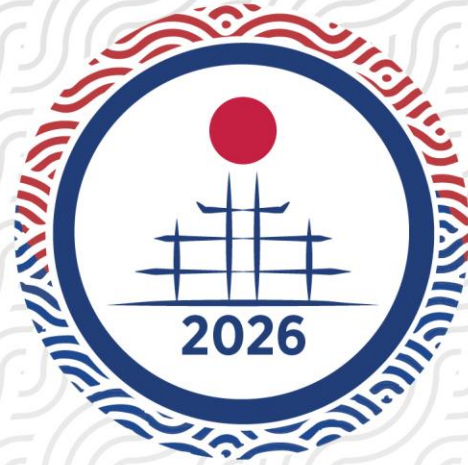


D TGR-high



Conclusion

- TGR was associated with OS in patients treated with ICI-mono, but not in those receiving ICI-chemo.
- Baseline TGR may help stratify patients with these treatment approaches.



Thank You.●

AI Use Disclosure: ChatGPT (OpenAI) was used only for language editing. All scientific content, data analysis, and conclusions were developed and approved by the authors.