Research Square

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The utility of G8 screening for clinical practice of chemotherapy in older patients with gastrointestinal cancer

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Abstract

Background:

Geriatric 8 (G8) is a useful screening tool for geriatric assessment for predicting survival or risk of serious adverse events (SAEs) in older cancer patients. However, the clinical utility of G8 is not well known in older patients with gastrointestinal (GI) cancer developing malnutrition. We investigated the association between G8 score and clinical outcomes in older patients with GI cancer.

Methods:

We retrospectively registered patients with GI cancer aged ≥65 years who received a G8 questionnaire at first visit from April 2018 to March 2020. The G8 score, SAE, dose reduction rate, discontinuation rate, and overall survival (OS) were evaluated. Safety was assessed in all patients and OS in GI cancer patients with unresectable tumors.

Results:

In a total of 207 patients (median age: 75, range: 65–92, 56% of unresectable cancer), the median G8 score was 10.5 and the percentage of normal G8 score was only 6.8%. There was no clear association between G8 score and OS or SAEs in 143 (69%) patients received chemotherapy (CT). However, the median G8 score was significantly higher in patients with CT compared to those without CT (11.5 vs 10.0 months, $p < 0.0001$). One-hundred seven of 129 (83%) older patients with abnormal G8 score were treated with CT by treatment modification such as dose reduction, and they had no unexpected SAEs and better prognosis than those without CT. The rate of normal instrumental activity of daily life (IADL) was significantly higher in patients with CT compared to those without CT (64% vs. 23%, $p < 0.0001$). In addition, there was a significant difference in OS according to IADL even in patients with abnormal G8 score.

Conclusions:

There was no association between G8 score and OS or SAE in older patients with GI cancer; however, most patients with abnormal G8 score could receive CT safely and effectively through treatment modification. The IADL may be clinically useful to predict prognosis and determine the treatment plan for older patients.

Introduction

The number of older patients with cancer has increased worldwide as the population has aged and older patients aged ≥65 years account for more than 70% of all cancers in Japan, which represents elderly society. [1] Serious adverse events (SAEs) occur more frequently in older patients undergoing chemotherapy (CT), because older patients are a heterogenous group with varying comorbidities as well as compromised physical and organ function. [2] Therefore, it is important to consider the tolerability of CT

in older patients. The International Society of Geriatric Oncology has recommended a geriatric assessment (GA) for older patients with cancer to predict overall survival (OS) and treatment-related toxicity in consideration of optimal disease management. [3,4]

There are several screening tools for GA and the geriatric 8 (G8) is representative which mainly consists of items from the mini nutritional assessment (MNA) questionnaire. [5] The G8 has been validated with respect to predicting survival in various cancers with high sensitivity, similar to that of the full GA.[6,7] The American Society of Clinical Oncology guidelines for geriatric oncology has recommended a G8 assessment for older patients with cancer receiving CT as practical for the management of toxicity. [8] A cut-off score ≤14 is considered abnormal and is associated with poor prognosis. [5,6]

Patients with advanced cancers often suffer from malnutrition, especially for those with gastrointestinal (GI) cancer. It is also controversial that the cut-off value for the G8 score is the same in all cancer types and ethnic groups. There have been several reports in older patients with solid tumors, including GI cancers, that showed 68%–83% exhibited abnormal G8 score. [5,6,9-11] And some Japanese reports indicated that the cut-off value lower than 14 might predict prognosis in older patients with various cancers. [11-14] However, the clinical utility of G8 scoring is not well known and there has been little information regarding the relationship between G8 score and OS or SAE in older patients with GI cancer. Therefore, we investigated the association between G8 score and clinical outcomes to evaluate the clinical utility of G8 scoring in older patients with GI cancer.

Patients And Methods

Patient population

We retrospectively reviewed the medical records and registered patients aged ≥65 years with gastric, pancreatic, and colorectal cancer who visited for treatment and received a G8 questionnaire from April 2018 to March 2020. This retrospective study was carried out in the Department of Medical Oncology, St. Marianna University Hospital.

This study was approved by the institutional review board of St. Marianna University School of Medicine bioethics committee (No. 5465), and the need for informed consent was waived by the bioethics committee of St. Marianna University School of Medicine since the study was retrospective and personal information was anonymized. All methods were carried out in accordance with relevant guidelines and regulations.

G8 assessment and other measures

We performed G8 scoring in registered patients using the G8 questionnaire form. The G8 score ≤14 was considered abnormal according to the conventional classification. [5] We collected data for several patient characteristics including G8 score, instrumental activities of daily living (IADL), living situation,

treatment decision, dose reduction, SAE, and OS. AEs were assessed according to the National Cancer Institute Common Terminology Criteria for Adverse Events (NCI-CTCAE version 4.0). The SAE was defined as Grade 3–5 hematologic and non-hematologic AEs or AEs requiring hospitalization. The OS was defined as the period from assessment for G8 to the date of death from any cause. We investigated the association between G8 score or the results of other measures of GA and clinical outcomes in this patient population.

Statistical analysis

Differences in G8 score and each G8 item between patients with or without CT were analyzed by the Wilcoxon test and Fisher's exact test. In addition, differences in other measures of GA were analyzed by Fisher's exact test. The correlation between G8 score and SAE was determined by Pearson's correlation analysis. OS was estimated using the Kaplan-Meier method and it was compared between two groups by a log-rank test. The odds ratio was calculated using logistic regression analysis to evaluate relative factors for clinical outcomes. For all analyses, $p < 0.05$ was considered statistically significant. All data were analyzed using JMP 12 software (SAS Institute Inc., Cary, NC, USA).

Results

Patient characteristics

A total of 207 patients aged ≥ 65 years with GI cancers were registered in this study. The patient characteristics are listed in Table 1. The median age of the patients was 75 years-old (range, 65–92) and 53% of the patients were males. Most patients (90%) had a favorable Eastern Cooperative Oncology Group performance status (ECOG PS) of 0–1. The mean body mass index (BMI) value was 20.8 (range, 13.5–31.6). The types of cancers were colorectal (52%), pancreas (29%) and gastric (19%) and 56% of them were unresectable advanced stage cancers including metastatic, recurrent, and borderline resectable disease that were not treated with surgery. For all registered patients,143 (69%) received CT (63 with adjuvant CT and 80 with palliative CT). For patients not receiving CT, the main reasons for avoiding CT were patient decision (66%), poor PS (25%), old age (19%), and some reasons were overlapping. Patients who were not treated with CT were significantly older and had worse PS compared with those who underwent CT ($p < 0.0001$ and $p = 0.0293$, respectively).

Table 1
Patient characteristics

		All patients (n = 207), n (%)	With CT (n = 143), n (%)	Without CT (n = 64), n (%)
Age, year	Median (range)	75 (65–92)	73 (65–86)	80 (66–92)
Sex	Male	109 (53)	76 (53)	33 (52)
	Female	98 (47)	67 (47)	31 (48)
PS	0	98 (47)	83 (58)	15 (23)
	1	88 (43)	58 (41)	30 (47)
	≥ 2	15 (7)	1 (1)	14 (22)
	Unknown	24 (12)	1 (1)	5 (8)
BMI	Median (range)	20.8 (13.5–31.6)	21.0 (13.5–31.6)	20.0 (14.8–27.5)
Cancer type	Colon/Rectum	108 (52)	75 (52)	33 (52)
	Pancreas	60 (29)	41 (29)	19 (30)
	Stomach	39 (19)	27 (19)	12 (19)
Staging	Resectable	92 (44)	63 (44)	27 (42)
	Unresectable	115 (56)	80 (56)	37 (58)
Treatment	Palliative CT	80 (39)	80 (56)	-
	Adjuvant* CT	63 (30)	63 (44)	-
	No CT	64 (31)	-	64 (31)

PS: performance status, BMI: body mass index, CT: chemotherapy

G8 score and other measures of GA

The G8 score and other GA measures are shown in Table 2. The median G8 score was 10.5 (range, 2–16) and 192 (93%) of 207 patients had abnormal G8 score, whereas the percentage of patients with normal G8 score was only 6.8%. As background for low G8 score, less than half of the patients had full score with respect to food intake, weight loss, BMI, prescription drug, and self-perception of health. There was a significant difference in median G8 score between patients with or without CT (median G8 11.5 vs. 10.0, $p < 0.0001$). Patients with CT had significantly higher score in terms of mobility ($p < 0.0001$), neuropsychological problems ($p = 0.0005$), and age ($p < 0.0001$) compared to those without CT

(**Supplementary Table S1**). In addition, there was a significant difference in median G8 score between patients with and without CT (median G8 10.5 vs. 9.0, $p = 0.0007$) in patients with abnormal G8 score (**Supplementary Table S2**).

Table 2
G8 score and other measures of GA

		All patients (n = 207), n (%)	With CT (n = 143), n (%)	Without CT (n = 64), n (%)	*P*-value*
G8 score	Median (range)	10.5 (2–16)	11.5 (6–16)	10 (2–16)	< 0.0001
IADL	Normal	107 (52)	92 (64)	15 (23)	< 0.0001
	Abnormal	81 (39)	37 (26)	44 (69)	
	Unknown	19 (8)	14 (10)	5 (8)	
Living situation	With others together	163 (79)	111 (78)	52 (81)	0.068
	Alone	42 (20)	32 (22)	10 (16)	
	Nursing home	2 (1)	0 (0)	2 (3)	

G8: geriatric 8, IADL: instrumental activities of daily living

*Difference in G8 score between patients with or without CT was analyzed by the Wilcoxon test. Differences in IADL and living situation between patients with or without CT were determined by Fisher's exact test.

Association between G8 score and clinical outcomes

We assessed the utility of cut off value of G8 for prognostic prediction by using the Kaplan-Meier survivals curve according to the quartile of G8 score. We classified patients into 4 groups by G8 score based on the quartile: quartile 1 (< 8), quartile 2 (8-10.5), quartile 3 (10.5–12.5), quartile 4 (> 12.5). We estimated survival functions score according to G8 score group by using the Kaplan-Meier method and a log-rank test in the 207 registered patients. The OS curve appeared to be separated according to the quartile; however, there was no significant difference in OS between the quartile 4 (> 12.5) and the quartile 3 (10.5–12.5) although the cutoff value for the G8 score is defined as 14 ($p = 0.36$) (Fig. 1). Also, in 143 patients who received CT, no significant difference was observed in OS between the 2 groups ($p = 0.27$). The G8 score did not correlate with SAE ($R^2 = 0.0002$) in patients treated with CT. These results represented that there was no clear association between G8 score and survival time or safety of CT in older patients with GI cancer.

There was no significant difference in other clinical outcomes such as dose reduction, discontinuation between patients with normal and abnormal G8 score (Table 3). As a result of odds ratio, the cut off value

of G8 was not relative factor for dose reduction at start (OR = 2.44), SAE (OR = 1.51) and other outcomes. The multivariate analysis with variables of age, PS, and drug number did not show any significant difference (data not shown). The percentage of patients who had dose reduction at the start of CT and at least once during entire course were 40% and 83%, respectively. Patients with abnormal G8 score had a higher rate of dose reduction at the start of CT compared to those with normal G8 score, although the difference was not significant. The reasons for dose reduction at the start of CT were old age (45%), impaired renal function (37%), poor PS (18%), cognitive function decline (2%), living alone (2%), and so on. There were 2 or more reasons in 22% of them. In addition, the percentage of SAEs and discontinuation of CT were 53% and 19%, whereas the percentage of hematological and non-hematological SAEs were both 26%. The rate of SAEs was numerically higher in patients with abnormal G8 score compared to those with normal G8 score; however, the difference was not significant (53% vs. 43%, $p = 0.58$). Neutropenia was the most common SAE (41%), whereas febrile neutropenia (FN) occurred in only a few patients (3%). Both treatment-related death and death from complication unrelated to CT occurred in only one patient.

Table 3
Clinical outcomes according to G8 score in patients treated with chemotherapy

	All patients (n = 143), n (%)	With normal G8 (n = 14), n (%)	With abnormal G8 (n = 129), n (%)	OR (95%CI)
DR at start	55 (38)	3 (21)	51 (39)	2.44 (0.65–9.19)
DR during CT	109 (76)	12 (86)	96 (74)	0.49 (0.1–2.3)
DR ≥ 2	43 (30)	3 (21)	40 (31)	1.65 (0.44–6.23)
SAEs	74 (52)	6 (43)	68 (53)	1.51 (0.5–4.59)
Hematological AEs	37 (26)	4 (29)	33 (26)	0.86 (0.25–2.93)
Non-hematological AEs	37 (26)	3 (21)	34 (26)	1.31 (0.35–4.99)
Discontinuation	25 (17)	0 (0)	25 (19)	-

G8: geriatric 8, CT: chemotherapy, DR: dose reduction, SAEs: serious adverse events, AEs: adverse events, OR: odds ratio, CI: confidence interval

Clinical outcomes in patients with abnormal G8 score

We evaluated the detailed information of 192 patients with abnormal G8 score. The median age of the patients was 73 years-old (range, 65–92) with 52% males. The mean BMI value was 20.3 (range, 13.5–29.3) and 90% had a favorable ECOG PS of 0–1, which was remarkably similar to all patients in this study. One hundred twenty-nine (67%) of the 192 patients received CT (57 with adjuvant CT and 72 with palliative CT). For patients with abnormal G8 score, patients receiving CT were significantly younger (median age 73 years vs. 80 years, $p < 0.0001$), had a higher favorable PS of 0–1 (98% vs. 72%, $p < 0.0001$) (**Supplementary Table S2**).

In this study, the patients receiving palliative CT in the first-line setting had significantly longer OS than those without CT (median OS 12 months vs. 4.1 months, $p = 0.03$). We also analyzed the OS in patients

with abnormal G8 score on the same conditions. Of 101 patients with unresectable tumors and no prior CT, 94 patients had abnormal G8 score and 63 of 94 patients received palliative CT as first-line treatment. Of the 94 patients, OS was significantly longer in patients with CT compared to those without CT (median OS 14.3 months vs. 6.2 months, $p = 0.0007$) (Fig. 2).

Of 63 patients receiving palliative CT, 52% of them were treated with dose reduction at the start of CT and the percentage of SAEs and discontinuation of CT was 62% and 24%, respectively. The rate of hematological SAEs and non-hematological SAEs was 62% and 27%, respectively, and the overlap was 10%.

Association between IADL and clinical outcomes

In all patients, the rate of abnormal IADL representing one or more impaired IADL was 39%. There was a significant difference in the rate of normal IADL between patients with and without CT (64% vs. 23%, $p < 0.0001$), whereas living situation was not different between the 2 groups (Table 2). The patients receiving CT had significantly higher rate of normal IADL (62% vs. 22%, $p < 0.0001$) compared to those without CT even in population with abnormal G8 score (**Supplementary Table S2**).

We also analyzed association between IADL and clinical outcomes in patients treated with CT. There was no association between IADL and SAE. However, there was a significant difference in OS between patients with normal and abnormal IADL (median OS 12.4 months vs. 7.0 months, $p = 0.003$) (**Supplementary Table S3**). Furthermore, we found a significant difference in OS according to IADL even in patients with abnormal G8 (median OS 12.6 months vs. 7.0 months, $p = 0.0018$) (**Supplementary Figure S1**).

Discussion

Our study showed that the percentage of patients with normal G8 score of more than 14 was only 6.8% in older patients with GI cancer. The rate was much lower in patients registered in our study compared with 17–32% in previous reports involving older patients with solid tumors. [5,6,9–11] In addition, the cut off value of G8 score did not work to predict either OS or SAEs, which was not consistent with previous reports. [6,7] These results indicated that the value of 14 which is defined as cut off value of G8 score may not be clinically useful in older patients with GI cancer, most of whom had abnormal G8.

One reason for the low G8 score in patients with GI cancer was digestive symptoms, such as appetite loss, which causes malnutrition and low BMI. The nutritional status is well reflected in the score, since the G8 score consists of an MNA questionnaire, which primarily focuses on nutrition. A previous study showed that the proportion of abnormal G8 score was significantly different among cancer types. [10] GI cancers, which are prone to low nutrition, are predicted to have lower G8 score compared with other cancer types. In the present study, the score for items related to digestive symptoms was lower compared to patients with other cancer types, whereas the score for other items was similar.[11] Based on these results, the lower score in items related to digestive symptoms would contribute to the lower G8 score in

older patients with GI cancer. The mean value for BMI of Japanese older patients was about 22 which was significantly lower compared with that of Western patients, which may contribute to the low G8 score. [15,16] A few Japanese reports recommended a revised G8 cut-off score of 9.5–11, however, it was controversial because of the heterogeneity of cancer types in small single institutional study.[11–14] The BMI varies among ethnic groups or cancer types; therefore, use of the same cut-off value of 14 may be inappropriate for all cancer patients in the world. We should consider G8 scores of each item unrelated to digestive symptoms when evaluating older patients with GI cancer.

In our study, the patients receiving CT had significantly higher total G8 score as well as better score in terms of mobility, neuropsychological problems, and age compared to those without CT, even with abnormal G8 score. We may put higher value on the three items than others as a reference to decide the tolerability for CT: better mobility, normal neuropsychological function, and younger age. These items would be clinically useful determinants when considering the treatment plan for older or vulnerable patients with GI cancer. In addition, the rate of independent IADL was significantly higher in patients with CT compared to those without CT, even with abnormal G8 score. The IADL is one of the important GA tools that is directly linked to independence of daily living. The IADL consists of question of ability to care for oneself including responsibility for own medications, which can affect the eligibility of CT. Moreover, there was significant difference in OS according to IADL even in G8 abnormal patients. The IADL was scarcely affected by malnutrition in contrast to G8 score that showed no association with OS. Most older patients with GI cancer suffered from malnutrition that led G8 abnormal score; therefore, IADL may be clinically useful to predict prognosis in older GI cancer patients. These findings suggest that an assessment using the GA tools which are little affected by malnutrition may potentially have the clinical utility to determine the optimal treatment plan more accurately in older patients with GI cancer.

In this study, about half of older patients started CT with dose reduction and they had acceptable toxicities even with abnormal G8 score. Recently, the favorable efficacy has been reported in older cancer patients treated with reduced doses.[17,18] In our study, 83% of the patients underwent dose reduction during entire course and most continued CT safely and the rate of SAEs and discontinuation was similar to that of previous reports in spite of most patients with abnormal G8 score.[19–21] Furthermore, the OS was longer in patients with palliative CT compared to those without CT, even with dose reduction. These results indicate that older GI cancer patients with abnormal G8 score would have a chance of receiving CT safely and effectively through adjusting the dose of the drugs.

There are several limitations in this study. First, this was a retrospective study with gastric, pancreatic, and colorectal cancer patients in a single institution. Therefore, there were several biases including patient selection and the various treatment regimens that could affect OS and AE frequency. Second, treatment choice was affected by multiple factors regardless of the G8 score in clinical practice; therefore, it would be necessary to verify the efficacy of G8 scoring for judging the tolerability of CT by randomized controlled study. Third, as the sample size of the patients with normal G8 score was small, we could not compare OS between patients with normal and abnormal G8 score. Therefore, we compared OS according to G8 score sub-group based on the quartile using the Kaplan-Meier method to evaluate the

association between G8 and survival time. Finally, we could not obtain detailed information about intervention such as nutritional guidance and rehabilitation. However, we obtained data regarding dose reduction, which was one of the interventions for patients with abnormal G8 score. [17,18]

Conclusion

This study demonstrated that there was no clear association between G8 score and OS or SAEs in older patients with GI cancer; however, most older patients with abnormal G8 score were treated with CT by treatment modification such as dose reduction and they had better prognosis compared to those without CT. The G8 scoring did not predict prognosis, whereas the IADL which is scarcely affected by malnutrition might serve as a predictor for OS. We may potentially clinically utilize the IADL for older patients with GI cancer.

Abbreviations

G8: Geriatric 8; SAE: Serious Adverse Event; GI: Gastrrointestinal, OS: Overall Survival; CT: Chemotherapy; IADL: Instrumental Activity of Daily Life; GA: geriatric assessment; MNA: Mini-Nutritional Assessment; NCI-CTCAE: National Cancer Institute Common Terminology Criteria; ECOG PS: Eastern Cooperative Oncology Group performance status; BMI: Body Mass Index

Declarations

Ethics approval and consent to participate

This study was approved by the bioethics committee of St. Marianna University School of Medicine. Because of the retrospective nature of this study, written informed consent was waived by St. Marianna University School of Medicine bioethics committee.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and analyzed during the current study are available from corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Not applicable.

Author contributions

Doi A and Sunakawa Y designed and conducted research and drafted the manuscription. Doi A performed the data acquisition and prepared figures and tables. Doi A and Mizukami T performed statistical analysis and interpretation of data. All authors read and approved the final manuscript.

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References

1. Shimada H, Makizako H, Doi T, Yoshida D, Tsukamoto K, Anan Y, et al. Combined prevalence of frailty and mild cognitive impairment in a population of elderly Japanese people. J Ame Med Dir Assoc 2013;14:518–24.
2. Jotai A, Foster NR, Egner JR, Burch PA, Stella P, Rubin J, et al. Older versus younger patients with metastatic adenocarcinoma of the esophagus, gastroesophageal junction, and stomach: A pooled analysis of eight consecutive North Central Cancer Treatment Group (NCCTG) trials. Int J Oncol. 2010;36:601–6.
3. Wildiers H, Heeren P, Puts M, Topinkova E, Janseen-Heijnen ML, Extermann M, et al. International Society of Geriatric Oncology consensus on geriatric assessment in older patients with cancer. J Clin Oncol. 2014;32:2595–2603.
4. Caillet P, Laurent M, Bastuji-Garin S, Liuu E, Culine S, Lagrange JL, et al. Optimal management of elderly cancer patients: usefulness of the Comprehensive Geriatric Assessment. Clin Interv Aging. 2014;9:1645–60.
5. Bellera CA, Rainfray M, Mathoulin-Pelissier S, Mertens C, Delva F, Fonck M, et al. Screening older cancer patients: first evaluation of the G-8 geriatric screening tool. Ann Oncol. 2012;23:2166–72.
6. Kenis C, Decoster L, Van Puyvelde K, De Greve J, Conings G, Milisen K, et al. Performance of two geriatric screening tools in older patients with cancer. J Clin Oncol. 2013;32:19–26.
7. Decoster L, Van Puyvelde K, Mohile S, Wedding U, Basso U, Colloca G, et al. Screening tools for multidimensional health problems warranting a geriatric assessment in older cancer patients: an update on SIOG recommendations. Ann Oncol. 2015;26:288–300.
8. Mohile SG, Dale W, Somefield MR, Schonberg MA, Boyd SM, Burhenn PS, et al. Practical assessment and management of vulnerabilities in older patients receiving chemotherapy: ASCO guideline for geriatric oncology. J Clin Oncol. 2018;36:2326–47.
9. Soubeyran P, Bellera C, Goyard J, Heitz D, Cure H, Rousselot H, et al. Screening for vulnerability in older cancer patients: the ONCODAGE Prospective Multicenter Cohort Study. PLoS One. 2014;9:e115060.

10. Liuu E, Canouci-Poitrine F, Toumigand C, Laurent M, Caillet P, Le Thuaut A, et al. Accuracy of the G-8 geriatric-oncology screening tool for identifying vulnerable elderly patients with cancer according to tumour site: the ELCAPA-02 study. J Geriatr Oncol. 2014;5:373–83.
11. Takahashi M, Takahashi M, Komine K, Yamada H, Kasahara Y, Chikamatsu S, et al. The G8 screening tool enhances prognostic value to ECOG performance status in elderly cancer patients: a retrospective, single institutional study. PLoS One. 2017;12:e0179694.
12. Agemi Y, Shimokawa T, Sasaki J, Miyazaki K, Misumi Y, Sato A, et al. Prospective evaluation of the G8 screening tool for prognostication of survival in elderly patients with lung cancer: a single-institutional study. PLoS One. 2019;14:e210499.
13. Oiwa K, Fujita K, Lee S, Morishita T, Tsukasaki H, Negoro E, et al. Utility of the geriatric 8 for the prediction of therapy-related toxicity in older adults with diffuse large B-cell lymphoma. Oncologist. 2021;26:215–23.
14. Ishii R, Ogawa T, Ohkoshi A, Nakanome A, Tkahashi M, Katori Y. Use of the geriatric-8 screening tool to predict prognosis and complication in older adults with head and neck cancer: a prospective, observational study. J Geriatr Oncol. 2021;S1879–4068.
15. Tamakoshi A, Yatsuya H, Lin Y, Tamakoshi K, Kondo T, Suzuki S, et al. BMI and all-cause mortality among Japanese older adults: findings from the Japan collaborative cohort study. Obesity. 2010;18:362–9.
16. Global BMI Mortaility Collaboration, Di Angelantonio E, Bhupathiraju ShN, Wormser D, Gao P, Kaptoge S, Berrington de Gonzalez A, et al. Body-mass index and all-cause mortarity: indivisual-participant-data meta-analysis of 239 prospective studies in four continents. Lancet. 2016;388: 776–86.
17. Mohile SG, Mohamed MR, Xu H, Culakova E, Loh KP, Magnuson A, et al. Evaluation of geriatric assessment and management on the toxic effects of cancer treatment (GAP70+): a cluster-randomized study. Lancet. 2021;398:1894–1904.
18. Hall PS, Swinson D, Cairns DA, Waters JS, Petty R, Allmark C, et al. Efficacy of reduced-intensity chemotherapy with oxaliplatin and capecitabine on quality of life and cancer control among older and frail patients with advanced gastroesophageal cancer: the GO2 phase 3 randomized clinical trial. JAMA Oncol. 2021;7:869–77.
19. Lund CM, Vistisen KK, Olsen AP, Bardal P, Schultz M, Dolin TG, et al. The effect of geriatric intervention in frail older patients receiving chemotherapy for colorectal cancer: a randomized trial (GERICO). Br J Cancer. 2021;124:1949–58.
20. Winther SB, Liposits G, Skuladottir H, Hofsli E, Shah CH, Poulsen LØ, et al. Reduced-dose combination chemotherapy (S-1 plus oxaliplatin) versus full-dose monotherapy (S-1) in older patients with metastatic colorectal cancer (NORDIC9): a randomized, open-label phase 2 trial. Lancet Gastroenterol Hepatol. 2019;4:376–88.
21. Gebbia V, Mare M, Cordio S, Valerio MR, Piazza D, Bordonaro R, et al. Is G8 geriatric assessment tool useful in managing elderly cancer patients with metastatic pancreatic carcinoma? J Geriatr Oncol. 2021;12:163–7.

Figures

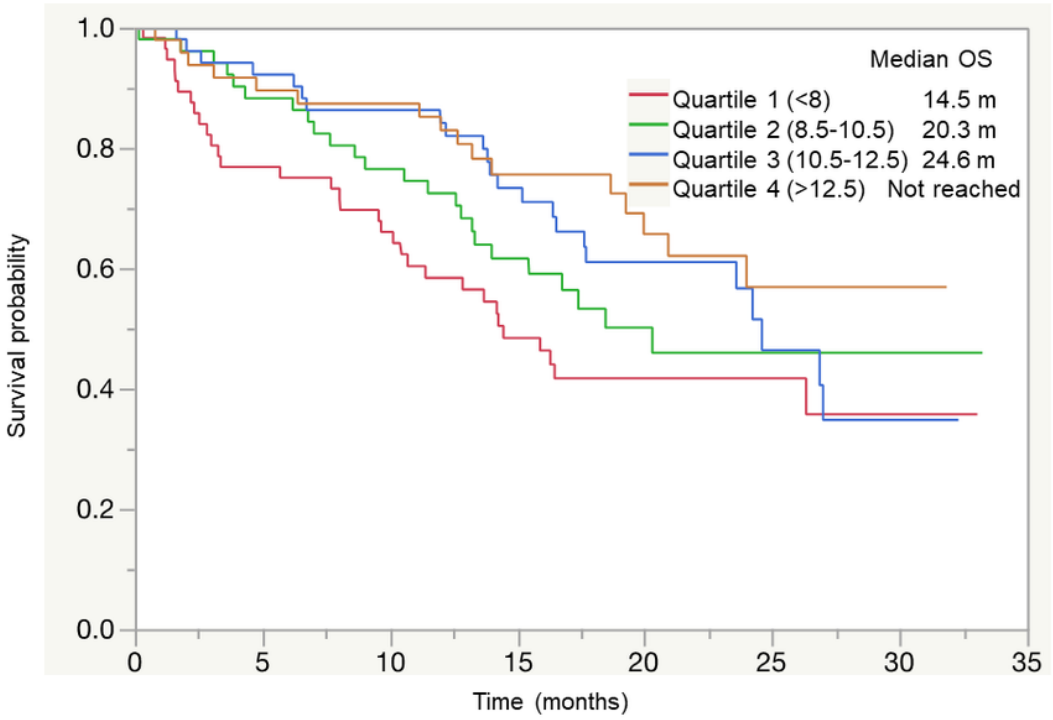

Figure 1

Overall survival according to the G8 score group**.** Overall survival according to the G8 score group based on the quartile in all registered patients. Four G8 score groups were quartile 1 (<8): red line, quartile 2 (8.5-10.5): green line, quartile 3 (10.5-12.5): blue line and quartile 4 (>12.5): yellow line.

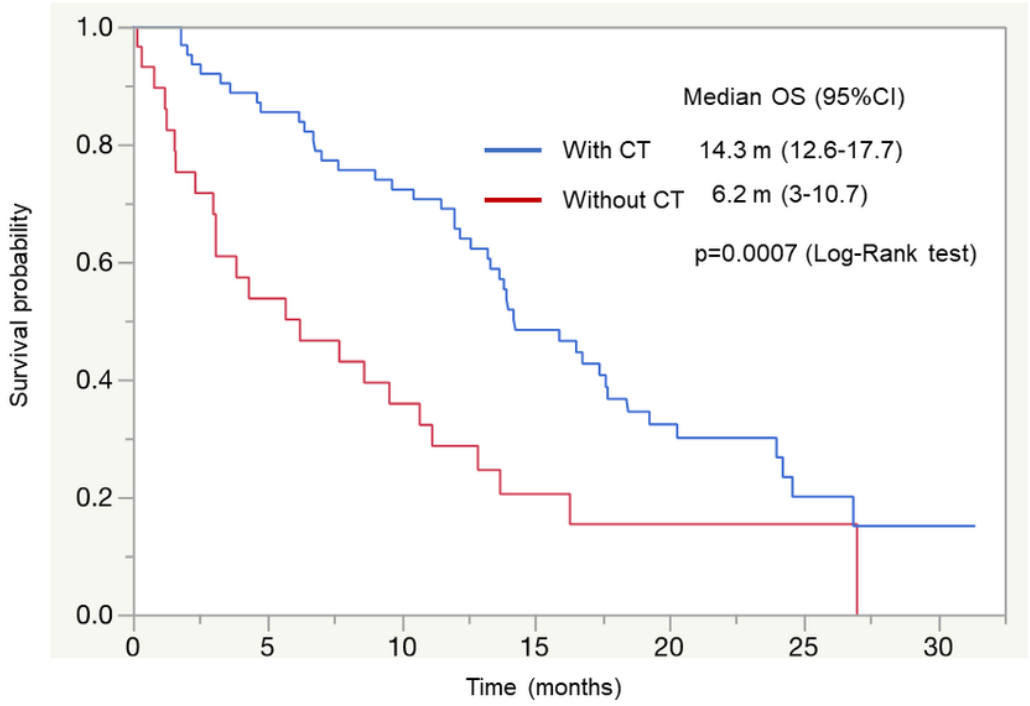

Figure 2

Overall survival according to chemotherapy in patients with abnormal G8 score**.** Overall survival according to chemotherapy in patients with unresectable disease and an abnormal G8 score.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

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