original reports

Impact of Geriatric Assessment and Management on Quality of Life, Unplanned Hospitalizations, Toxicity, and Survival for Older Adults With Cancer: The Randomized 5C Trial

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abstract

PURPOSE American Society of Clinical Oncology recommends that older adults with cancer being considered for chemotherapy receive geriatric assessment (GA) and management (GAM), but few randomized controlled trials have examined its impact on quality of life (QOL).

PATIENTS AND METHODS The 5C study was a two-group parallel 1:1 single-blind multicenter randomized controlled trial of GAM for 6 months versus usual oncologic care. Eligible patients were age 70+ years, diagnosed with a solid tumor, lymphoma, or myeloma, referred for first-/second-line chemotherapy or immunotherapy or targeted therapy, and had an Eastern Cooperative Oncology Group performance status of 0-2. The primary outcome QOL was measured with the global health scale of the European Organisation for the Research and Treatment of Cancer QOL questionnaire and analyzed with a pattern mixture model using an intent-to-treat approach (at 6 and 12 months). Secondary outcomes included functional status, grade 3-5 treatment toxicity; health care use; satisfaction; cancer treatment plan modification; and overall survival.

RESULTS From March 2018 to March 2020, 350 participants were enrolled. Mean age was 76 years and 40.3% were female. Fifty-four percent started treatment with palliative intent. Eighty-one (23.1%) patients died. GAM did not improve QOL (global QOL of 4.4 points [95% CI, 0.9 to 8.0] favoring the control arm). There was also no difference in survival, change in treatment plan, unplanned hospitalization/emergency department visits, and treatment toxicity between groups.

CONCLUSION GAM did not improve QOL. Most intervention group participants received GA on or after treatment initiation per patient request. Considering recent completed trials, GA may have benefit if completed before treatment selection. The COVID-19 pandemic may have affected our QOL outcome and intervention delivery for some participants.

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ASSOCIATED CONTENT

Data Supplement

Protocol

Author affiliations and support information (if applicable) appear at the end of this article.

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INTRODUCTION

Cancer affects predominantly older adults. Geriatric assessment (GA) and management (GAM) has been recommended to optimize treatment selection for chemotherapy by the US National Comprehensive Cancer Network[1] and American Society of Clinical Oncology[2] for patients age 65+ years, and by the International Society of Geriatric Oncology[3] for those age 75+ years.

GAM identifies issues that can interfere with cancer treatment delivery and outcomes and includes a care plan to address the identified problems. We hypothesized that GAM could improve cancer treatment delivery by increasing awareness of the geriatric issues and improve quality of life (QOL) by addressing the geriatric issues identified (Fig 1). In the past 2 years, six randomized controlled trials (RCTs) were completed studying the effectiveness of GAM for older adults with cancer.[4-9] Two RCTs showed a significant 10%-20% reduction of grade 3-5 toxicity,[4,7] and one RCT showed a reduction in admissions, emergency department (ED) visits, and shorter length of stay.[6] Furthermore, one RCT showed that the intervention had a significant impact on the Elderly Functional Index Score and the European Organisation for the Research and Treatment of Cancer (EORTC) QOL subscales physical function, role function, social function,

CONTEXT

Key Objective

Geriatric assessment and management (GAM) is recommended by professional organizations including American Society for Clinical Oncology for older adults with cancer for whom chemotherapy is considered despite few randomized controlled trials (RCTs) supporting this recommendation. This multicenter GAM RCT examined quality of life (QOL) as the primary end point.

Knowledge Generated

Our study showed no effect of GAM on QOL, overall survival, modification of treatment plans, treatment toxicity, unscheduled hospitalizations, or emergency department visits.

Relevance *(S.B. Wheeler)*

This Canadian RCT across eight hospitals indicating no benefit of GAM on QOL, overall survival, or health care utilization when conducted before treatment selection may point to future opportunities to further investigate and optimize when and how GAM is used in clinical practice.*

*The Relevance section written by *JCO* Associate Editor Stephanie B. Wheeler, PhD, MPH.

and mobility,[6] and another RCT showed significant impact on the EORTC Elderly 14-item subscales mobility and burden of illness.[8] At the start of our study, no large RCT of GAM had been completed using QOL as the primary end point, which is an important outcome for older adults considering cancer treatment and recommended end point for clinical trials for older adults.[10,11] Our primary objective was to determine the clinical effectiveness of GAM (at 6 and 12 months) on maintaining/improving QOL in older adults ≥ 70 years referred for first-/second-line chemotherapy, immunotherapy, or targeted therapy compared with usual oncology care.

PATIENTS AND METHODS

A multicenter two-group parallel 1:1 single-blind RCT was conducted of usual care ± GAM (Data Supplement, online only). Our study Protocol (online only) has been previously published[12] and is summarized below. Approval from each institutional research ethics board was obtained.

Outcome data were collected monthly for the first 6 months and then at nine and 12 months. Participants were also asked to return health care use diaries every 3 months, which included questions about health care utilization.

We used the randomization module in REDCap (Vanderbilt University, Nashville, TN) to randomly allocate participants to the intervention or control group in a 1:1 ratio applying curative/adjuvant versus palliative treatment intent and study center as stratification factors.

Our study was single-blinded. The independent statistician conducting the clinical effectiveness outcomes was blinded to group allocation.

Participants

Eligible patients were age 70+ years with any solid tumor or lymphoma/myeloma and were referred for first-/second-line adjuvant/curative or palliative chemotherapy, immunotherapy, or targeted therapy (no more than one cycle at the time of consent, or time on treatment < 6 weeks). In addition, to be eligible, patients had to be able to speak English or French, have a life expectancy > 6 months estimated by their oncologist, have an Eastern Cooperative Oncology Group performance score of 0-2, and able to provide informed consent.

Patients were ineligible if they were followed by a palliative care physician/comprehensive supportive care program at recruitment or were seen by a geriatrician/geriatric oncology team in the previous 12 months or were already participating in another psychosocial/educational study.

Participants were recruited in eight hospitals across Canada. In each hospital, the clinic lists were screened by research staff to identify potential participants who were approached by their clinical team about the study.

Intervention

Our standardized GA protocol (Data Supplement) included functional status,[13] mood,[14] cognition,[15] nutritional status, medications, comorbidity,[16] mobility and falls,[17,18] and social support.[19-22] It aligns with the ASCO geriatric oncology guideline[23] despite our study being designed before the guideline publication.

The GA was completed at baseline by a registered nurse (RN), geriatric oncology fellow in two centers, and geriatrician (and repeated if deemed clinically necessary) at an appointment time and location convenient for the patient (eg, oncology clinic, treatment center, etc) to avoid extra visits for the patient. Other allied health professionals required a referral. On the basis of the GA results, predefined evidence-based interventions (Data Supplement) that were deemed relevant by the intervention team together with the participant were implemented. For the two hospitals that

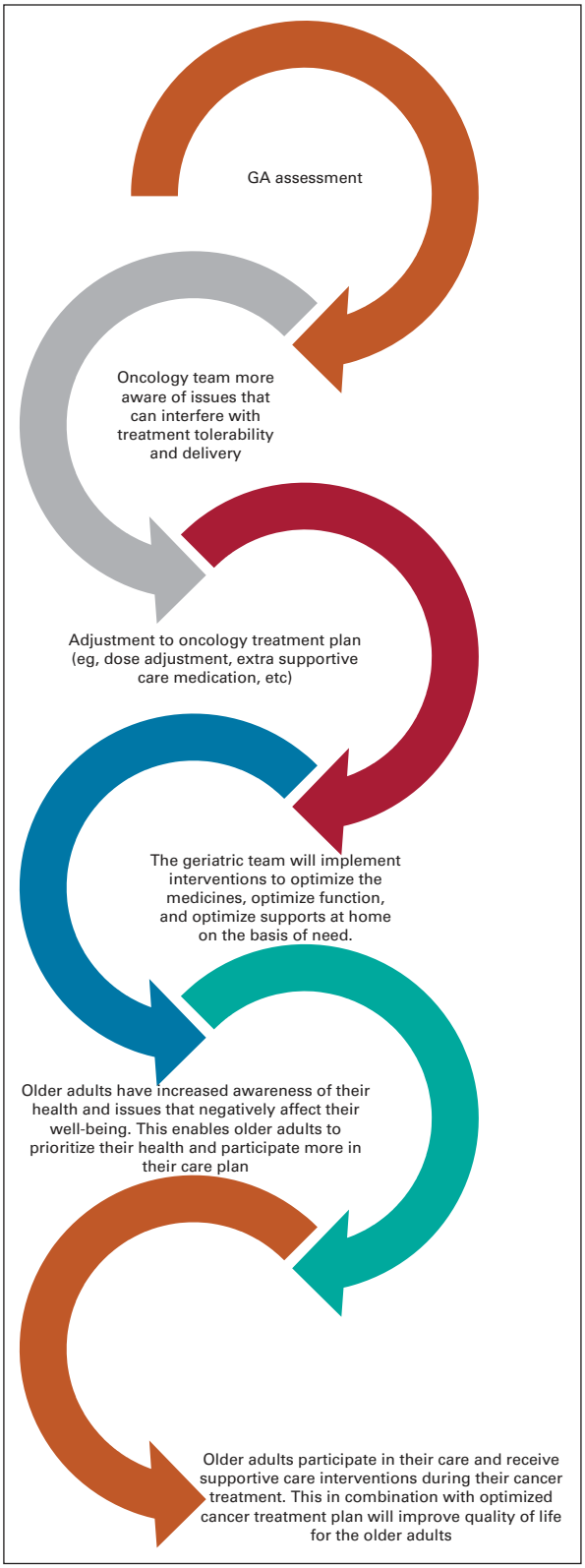

FIG 1. Study hypothesis. GA, geriatric assessment.

did not have a geriatrician on site, the RN/oncologist who conducted the GA discussed the results with the geriatric team at the coordinating site to develop the care plan.

The summary GA results were provided on paper to the oncologist within 24 hours, and the detailed GA results and recommendations were communicated to the oncologist and primary care team within 2 business days through a dictated note in the health record, allowing them to use the GA information for treatment decision making. After the GA visit, the RN from the intervention team called the participant at least monthly for 6 months to evaluate the care plan, assess changes in health, functional status, and new symptoms, and consulted with the geriatrician for new recommendations and to decide if a repeat visit with the geriatrician was needed (no formal criteria but on the basis of clinical judgment).

Participants allocated to the control group had access to standard care provided by their oncology team and healthy aging pamphlets.[24-28]

Outcomes

The primary outcome was QOL measured with the EORTC QOL Questionnaire core version 30 items (QLQ C30).[29,30] We chose the global QOL subscale as our primary end point as it is widely used, well validated, and our pilot study suggested clinically meaningful change in this outcome.[31]

Secondary outcomes included the EORTC QLQ C30 summary score,[29,30] functional status,[13] any grade 3-5 treatment toxicity (including laboratory toxicity), unplanned health care use, overall survival, patient satisfaction, cancer treatment plan modification, and adherence to the intervention (Table 1).

Sample Size

Using the minimal clinically important difference of 10 points on the EORTC QLQ C30 global QOL subscale,[29,30] a sample size of 350 was needed to provide 80% power, with alpha set at 0.05, to detect significant clinically meaningful change in QOL scores, assuming a 20% attrition rate.

Statistical Analyses

Descriptive statistics were used to summarize each group and assess balance between groups at baseline. Patterns of missing data were determined and evaluated across time and by treatment arm.[32,33] All analyses described below were undertaken using an intent-to-treat approach.

The primary outcome, the EORTC Global QOL subscale score (measured monthly) at 6 months, was assessed using latent curve modeling. Latent approaches to repeated measures modeling have the advantage of addressing both cross-sectional and longitudinal measurement error, as well as allowing for more flexible model specification.[34] Missing data over time were accounted for using full information maximum likelihood (see the Data Supplement[35] for details on the analyses). The results of both modeling types were reported and compared (Data Supplement). Analysis was performed using Mplus (version 7). See the Data Supplement for details on the analyses for secondary end points and the sensitivity analyses examining the impact of the COVID-19 pandemic on the results and the QOL

TABLE 1. Secondary Outcomes and Measurements Used

Secondary Outcomes	Measures Used
EORTC QLQ C30 summary score	EORTC QLQ C30[29,30]
Maintaining/improving functional status	The older American Resources and Services IADL questionnaire.[13] Impairment was defined as needing assistance/unable to do at least one out of 7 items
Any grade 3-5 treatment toxicity including laboratory toxicity	Abstracted from medical chart by nurses, geriatricians, and/or oncologists, and defined by the CTCAE[44]
Unscheduled health care utilization (hospitalizations and emergency department visits)	Abstracted from patient diary and medical charts
Patient satisfaction	Assessed with 1 item on a 5-point Likert scale ranging from completely satisfied to completely dissatisfied[31]
Cancer treatment plan modification	The summary of GA results was provided to the oncologists, and oncologists were asked if they had adjusted the cancer treatment plan on the basis of receipt of the results. Answer categories included no, yes (modification of dose, modification of agents, modification of schedule), and an option where the oncologist could identify any other change
Overall survival at 12 months from entering the study	The date of death was abstracted from the medical record
Adherence to GA recommendations provided to the participant	Adherence to the GA recommendations provided to the participant was assessed by the RN at the first monthly follow-up phone call after the GA was completed (yes/no)

Abbreviations: CTCAE, Common Terminology Criteria for Adverse Events v5.03; EORTC QLQ C30, European Organisation of Research and Treatment of Cancer Quality of Life Questionnaire core version 30 items; GA, geriatric assessment; IADL, instrumental activities of daily living; RN, registered nurse.

and functional status outcomes for the participants receiving chemotherapy only.

RESULTS

Recruitment began in March 2018 and was completed in March 2020. A total of 4,792 patients were screened for eligibility; 565 were deemed eligible and invited to participate and 378 provided informed consent (66.9%). However, 28 patients had to be excluded as ultimately, they were not eligible (Fig 2).

A total of 350 participants were included in the analysis: 173 in the intervention arm and 177 in the control arm. Patient characteristics were balanced between arms (Table 2). The mean age was 76 years, and 40% were female. The most common cancer sites were gastrointestinal, thoracic, and genitourinary. The majority (68%) were recruited from a single cancer center. More than 54% were treated with curative intent. Two thirds had a G8 score < 15 indicating frailty. The median Charlson Comorbidity Index score was 1 (interquartile range, 0-2) in each arm. In the intervention group, the GA domains commonly impaired included the potential for medication optimization (65%), nutritional status (39%), risk of falls (29%), vulnerable social supports (16%), cognitive impairment (14%), and depressive symptoms (10%). Twenty participants (13%) had a high risk of toxicity according to the Cancer and Aging Research Group treatment toxicity risk score, 95 (62%) were at medium risk, and 32 (21%) at low risk.

A total of 76 patients were lost to follow-up at 6 months (21.7% attrition) due to death (n = 47; intervention: n = 22, control: n = 25), and withdrawal of consent (n = 29; intervention: n = 11, control: n = 18). At 12 months, an additional 48 patients dropped out, resulting in a total attrition rate of 35% (124/350). There was no imbalance in missing data by trial arm (data not shown).

Forty-four percent completed data collection before the COVID-19 pandemic, and the other 56% completed data collection during the pandemic.

Primary Outcome

Raw EORTC Global QOL subscale scores at baseline were 67.6 (95% CI, 64.2 to 71.1) in the control arm and 65.0 (95% CI, 61.5 to 68.5) in the intervention arm. Model estimated adjusted difference in global QOL at baseline was 4.3 points (95% CI, 1.3 to 7.2), favoring the control arm. This difference was maintained over time, with groups differing by 4.4 (95% CI, 0.9 to 8.0) points at 6 months. The effect of the intervention on the slope was nonsignificant in both models tested (Fig 3; intervention effect pattern mixture model, −0.03; 95% CI, −0.52 to 0.47; $P = .93$; latent curve modeling, 0.01; 95% CI, −0.46 to 0.48; $P = .98$). A nonlinear model specified by allowing time scores to be estimated freely was selected as the best fitting model for time, as the slope changed direction multiples times across the 6 months. Dropout was shown to significantly affect the estimate of the intercept, indicating that those who left the study had lower initial levels of global QOL. See the Data Supplement for the details of the models. The trajectories were plotted and provided in Figure 3, stratified by treatment intent.

Using the same model as described above but extending the data to 12 months, the effect of the intervention on the slope was found to be nonsignificant in both models tested (Table 3). Sensitivity analyses with participants receiving chemotherapy only were similar (Data Supplement).

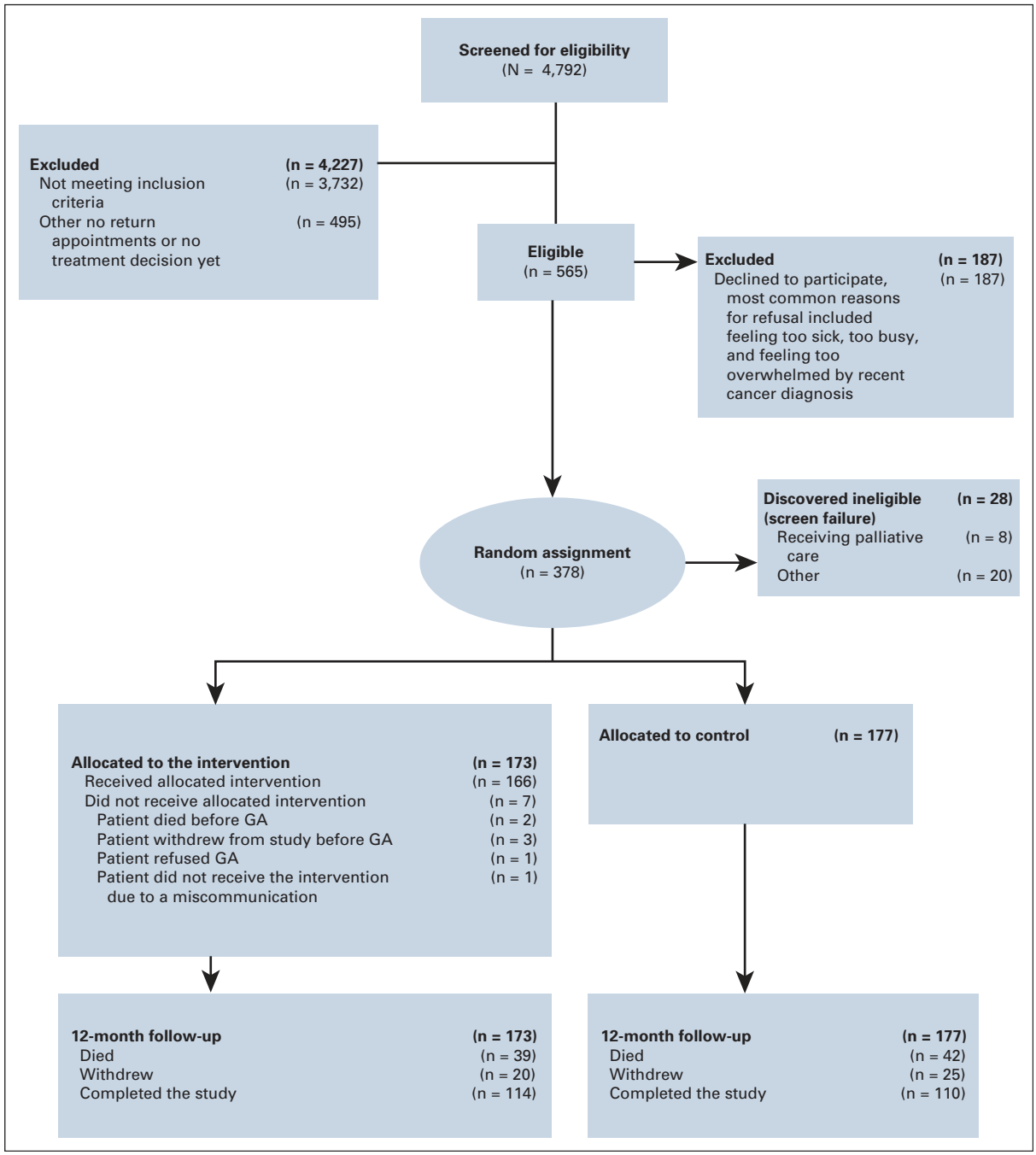

FIG 2. CONSORT diagram. GA, geriatric assessment.

Secondary Outcomes

EORTC QLQ C30 summary score at 6 months (Table 3). The QLQ C30 summary score at baseline was 81.7 (95% CI, 79.4 to 84.0) in the control arm and 80.4 (95% CI, 78.2 to 82.6) in the intervention arm. The effect of trial arm on the slope was found to be nonsignificant in both models tested.

Functional limitations at 6 and 12 months (Table 3). In total, 82 in the control arm had any impairment in functioning at baseline (46.3%) compared with 85 (49.1%) in the intervention arm. The effect of trial arm on the slope was nonsignificant in both models tested.

Number of ED visits and unplanned hospitalizations (Table 4). The intervention arm had a lower, but nonsignificantly different, rate of ED use than the control arm. The rate of unplanned hospitalizations was similar.

Any grade 3-5 treatment toxicity and discontinuation (Table 4). A total of 107 (72.3%) patients continued receiving treatment at 3 months in the intervention arm, compared with 135 (82.8%) in the control arm.

TABLE 2. Description of the Participants

Baseline Characteristic	Control Group (N = 177) % (unless otherwise indicated)	Intervention Group (N = 173) % (unless otherwise indicated)
Mean age, years (SD)	76.0 (5.1)	75.7 (4.7)
Female	39.8	41.0
Married/partnered	59.9	61.3
Living at home	97.2	97.1
Living alone	33.1	28.9
< 13 years of education	34.1	33.7
Cancer site		
Gastrointestinal	21.5	24.3
Breast	9.6	10.4
Genitourinary	23.2	19.1
Thoracic	24.3	23.7
Gynecologic	7.9	7.5
Lymphoma	9.6	9.3
Other	4	5.8
Curative/adjuvant intent	53.9	54.9
Treatment planned		
Cytotoxic	80.2	79.8
Immunotherapy	9.0	6.4
Targeted	7.9	11.0
None	2.8	2.9
G8 ≤ 14 (= frailty)	65.5	66.9
One or more other chronic health problems	67.8	66.3
Upfront dose reduced/undecided treatment	35.6	32.0
EORTC QLQ C30 global QOL mean score (SD)	67.7 (23.1)	65.0 (23.3)
1 or more IADL impairments	46.3	49.1
GA baseline[a]		
Comorbidity (N = 163)	NA	
High ≥ 4 points		17 (10.4)
Moderate 2-3 points		50 (30.7)
Falls risk (n = 163)	NA	48 (29.4)
Vulnerable social supports (n = 161)	NA	27 (16.8)
Nutrition malnourished or at risk (n = 162)	NA	64 (39.5)
Depressive symptoms (n = 162)	NA	17 (10.5)
Cognitive impairment (n = 158)	NA	23 (14.6)
Medication optimization (n = 164)	NA	107 (65.2%)
Median No. of prescription medications at baseline (n = 164)	NA	5 (Range 0-22)
CARG toxicity risk (n = 152)	NA	
Low		32 (21.1)
Medium		95 (62.5)
High		20 (13.2)
NA		5 (3.2)

Abbreviations: CARG toxicity risk, Cancer and Aging Research Group treatment toxicity risk score; EORTC QLQ C30, European Organisation of Research and Treatment of Cancer Quality of Life Questionnaire core version 30 items; GA, geriatric assessment; IADL, instrumental activities of daily living; QOL, quality of life; SD, standard deviation.

[a]The number of participants with a GA domain varies due to missing scores on certain tools because of location of the assessment, refusal, or other logistical reasons.

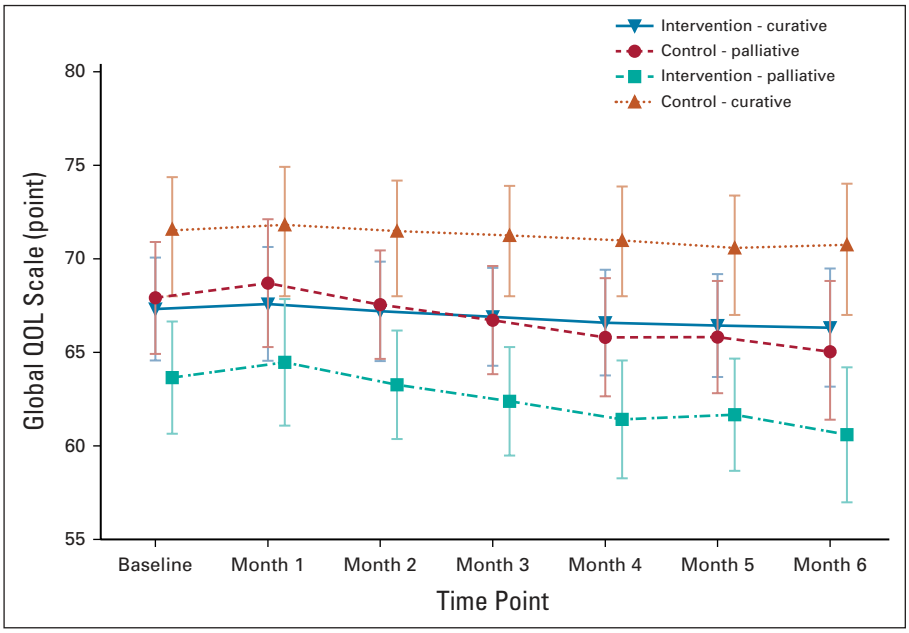

FIG 3. EORTC QLQ C30 global health subscale QOL over time. Model predicted QOL stratified by curative versus palliative on the basis of our latent growth curve modeling, no difference by treatment arm ($P > .05$). EORTC QLQ C30, European Organisation of Research and Treatment of Cancer Quality of Life Questionnaire core version 30 items; QOL, quality of life.

At 6 months, 52 patients in the intervention were still receiving treatment (38.5%) compared with 72 (50.4%) in the control arm. Similar proportions received a dose reduction (intervention: 36.7% *v* control: 35.8%) or a dose delay (intervention: 43.3% *v* control: 46.3%). A total of 54 (35.3%) patients had a grade 3-5 toxicity in the intervention arm versus 65 (40.1%) in the control arm ($P = .21$). No statistical difference in the odds of premature treatment discontinuation was found.

Survival up to 12 months (Table 4). A total of 38 (22%) died in the intervention arm compared with 41 in the control arm (23.2%). There was no difference in time to death.

Patient satisfaction. The percentage completely satisfied or satisfied with their care received at 6 months was 94.2% in the intervention group compared with 97.6% of the control group ($P = .21$).

Cancer treatment plan modification. A total of 3/173 patients (1.7%) in the intervention arm had their treatment plan modified on the basis of the GA.

Adherence to the intervention. The intervention group participants received 585 recommendations after the GA and on average, the older adults adhered to 72% recommendations made with the highest adherence for laboratory tests (98%) and the lowest for psychiatry referrals (17%). Our process evaluation will be reported separately.

Sensitivity analysis of the impact of the COVID-19 pandemic on our outcomes showed the most exposed group reported significantly higher QOL than the unexposed group over time and had a higher risk of death during follow-up (hazard ratio, 1.79; 95% CI, 1.05 to 3.07; Data Supplement). There was no difference in health care use (Data Supplement).

DISCUSSION

Although GAM was hypothesized to improve QOL, our study did not show its impact on QOL or any other end points. There was a numerical suggestion of reduced treatment toxicity and, although not statistically significant, this finding aligns with the GAIN[7] and GAP70[4] trials showing that GAM, particularly if implemented before treatment selection, can reduce oncology treatment–associated toxicity.

The EORTC QLQ C30 global subscale used in our trial was also studied in the GAM trial of Lund et al,[8] which also showed no significant change in this or in any other subscales. Soo et al[6] combined the EORTC QLQ subscales physical function, role, and social function with the EORTC elderly subscale mobility called the Elderly Functional Index and showed a significant improved function. However, we did not administer the EORTC elderly-14 item tool.

A number of reasons may account for the negative findings in our study. At the start of our trial, there was no evidence about the best timing to conduct the GA. Although we aimed to recruit participants before the oncologist finalizing the treatment plan, participants could indicate their preferred date for completing the GA, and most chose to complete it on the day of their first treatment. This may explain the low rate of GA-triggered changes to the oncologic plan. It is now clear that GAM completed before the final treatment decision is most effective in terms of

TABLE 3. Outcomes on the Basis of Repeated-Measures Analysis

Outcome	End Point, Months	Measure of Effect	Model[a]	Adjustment Variables	Point Estimate	95% CI Lower	95% CI Upper	*P*	Interpretation
EORTC QLQ C30 global QOL subscale scale	12	Regression coefficient for effect of intervention on the slope compared with the control	Latent curve model	Treatment intent and center	0.04	−0.25	0.34	.81	No evidence of difference in global QOL between arms
			Pattern mixture model		0.04	−0.42	0.49	.89	
EORTC QLQ C30 summary score	6	Regression coefficient for effect of intervention on the slope compared with the control	Latent curve model	Treatment intent and center	−0.33	0.01	−0.66	.15	No evidence of difference in C30 summary score QOL between arms
			Pattern mixture model		−0.33	0.01	−0.66	.16	
Functional limitations	6	Regression coefficient for effect of intervention on slope estimate in log odds	Latent curve model	Treatment intent and center	0.02	−0.06	0.11	.67	No evidence of difference in functional limitations between arms
			Pattern mixture model		0.05	−0.08	0.17	.53	
Functional limitations	12	Regression coefficient for effect of intervention on slope estimate in log odds	Latent curve model	Treatment intent and center	0.05	−0.06	0.16	.44	No evidence of difference in functional limitations between arms
			Pattern mixture model		0.07	−0.06	0.21	.36	

Abbreviations: EORTC QLQ C30, European Organisation of Research and Treatment of Cancer Quality of Life Questionnaire core version 30 items; QOL, quality of life.

[a]All models were nonlinear and used freely estimated time scores. Dropout was additionally modeled in the pattern mixture model.

reducing toxicity as the GAP-70 and GAIN trials showed that 15% and 10% increase in initial treatment plans with reduced intensity in the intervention groups led to 20% and 10% reduction in grade 3-5 toxicity, respectively.[4,7]

On the basis of available information at the time of the 5C study design,[12] we decided to use ≥ 70 years for accruing patients. Although GA is recommended on the basis of an age cutoff, conceivably those who are frail may benefit the most and those with advanced disease may be frailer. A third of our participants were not frail and may not have benefitted from the intervention. By contrast, the GAP-70 study, in which all participants had advanced disease and at least one impaired GA domain, showed a 20% reduction in treatment toxicity.[4] Lund et al[8] included only those with a score ≤ 14 on the G8 (indicating frailty) and found a significantly improved treatment completion rate owing to GAM. Thus, future studies could be more effective in improving outcomes by targeting a frail population. Additionally, further research needs to be done to improve the implementation of recommendations provided to patients after the GA; adherence was only 72% in our study compared with 76.8 reported by Li et al[7] and 1.4%-62% reported by Lund et al.[8]

Although recruitment finished on the day of the COVID-19 pandemic declaration, the pandemic restrictions could have influenced our primary end point in two ways: direct impact on QOL and impact on the intervention delivery.[36] For the final participants accrued, the GAs were conducted over telephone, limiting the GA to self-reported measures. For participants who were assessed before the COVID-19 pandemic but who were still in the intervention period, their care plan could not always be implemented as intended. Our sensitivity analyses showed contradictory findings in that those who completed the study during the COVID-19 pandemic reported the highest QOL while also being at higher risk for death. Other studies have reported negative impact of the COVID-19 pandemic on psychosocial QOL,[37-39] no impact on QOL,[40,41] or, similar to our study, a positive impact on QOL.[42,43] It can be hypothesized that the switch to virtual visits and reduced visits in hospital led to less treatment burden and higher QOL.

STRENGTHS AND LIMITATIONS

The 5C study was a large, randomized study recruiting in eight hospitals across three Canadian provinces. Although there are differences in cancer care organization across the provinces, Canada has a universal health care system and the organization of GAM care in this study resembles the interventions as provided in the RCTs of Lund et al[8] and

TABLE 4. Secondary Outcomes for Ratio Models

Outcome	End Point, Months	Measure of Effect	Model	Adjustment Variables	Point Estimate	95% CI		*P*	Interpretation
						Lower	Upper		
Survival at 12 months	12	Hazard ratio comparing intervention with control	Cox proportional hazards regression	Treatment intent and center	0.99	0.64	1.55	.97	No evidence of difference in survival between arms
ED visits	12	Risk ratio comparing intervention with control	Zero-inflated Poisson regression—primary: all data included	Treatment intent and center	0.89	0.72	1.09	.25	No evidence of difference in ED visits between arms
	12		Zero-inflated Poisson regression—secondary: self-reported data excluded		0.86	0.68	1.08	.19	
Unplanned hospitalizations	12	Risk ratio comparing intervention with control	Zero-inflated Poisson regression—primary: all data included	Treatment intent and center	0.99	0.73	1.33	.94	No evidence of difference in unplanned hospitalizations between arms; however, inconsistent findings between primary and sensitivity analysis suggest further evidence is needed
	12		Zero-inflated Poisson regression—secondary: self-reported data excluded		1.16	0.84	1.61	.36	
Toxicity in treatment arm	6	Odds ratio comparing intervention with control	Logistic regression	Treatment type	0.74	0.46	1.19	.21	No evidence of difference in toxicity between the arms

Abbreviation: ED, emergency department.

Soo et al.[6] The latter two studies documented the benefits of GAM in patients undergoing chemotherapy but were completed before the COVID-19 pandemic. We recruited a diverse population of older adults in terms of treatments using multiple clinically relevant end points. However, because of trial requirements for informed consent, the study population may have less cognitive impairment compared with clinic populations. Patients with Eastern Cooperative Oncology Group three and up were also not eligible as most would not receive systemic treatment at our centers. Both groups may benefit from receiving the intervention.

The attrition rate was considerably higher than anticipated (35% *v* 20%), mostly because of death due to the COVID-19 pandemic, which may have affected our power. However, our mortality rate is in line with the other GAM studies with older adults with cancer: Ørum et al[9] reported 20% mortality at 90 days, Li et al[7] reported 33% mortality at 12 months, and Mohile et al[4] reported 27% mortality rate at 6 months. However, because of increasing awareness of the ASCO geriatric oncology guideline and GAM, it is possible that oncologists increasingly paid more attention to age-related issues biasing toward the null.

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DISCLAIMER

E.P. is an older adult team member and S.M.H.A. is an editorial board member.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Impact of Geriatric Assessment and Management on Quality of Life, Unplanned Hospitalizations, Toxicity, and Survival for Older Adults With Cancer: The Randomized 5C Trial

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