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Geriatric Assessment in Elderly Cancer Patients Receiving Chemotherapy in Ain Shams University Hospital: An Implementation Study

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ABSTRACT
Background: In contrast to chronological age, the comprehensive geriatric assessment (CGA) was created as a multidisciplinary framework to measure the influence of age-associated physiological parameters that may affect health and disease in older persons. **Aim and objectives:** The purpose of the study was to evaluate the benefits of using geriatric assessments (GA) for elderly cancer patients receiving chemotherapy in Ain Shams University Hospital.
Subjects and methods: This prospective cohort study was conducted in the department of clinical oncology and nuclear medicine, Ain Shams University Hospital from October 1, 2019, to March 31, 2020. The patients who were referred by the specialized oncology clinics with certain decisions for chemotherapy were assessed using the G8 questionnaire by the oncology residents, and based on the G8 score, the patient either received the scheduled regimen and dose (if the G8 score >14) or was referred to the geriatric clinic for CGA (if the G8 score ≤ 14). Following CGA, a discussion was held between the clinical oncologist and the geriatrician to see whether the treatment choice had changed. In this study, we compared the proportion of decisions that changed before and after CGA. The current study also identified the difficulties encountered in setting up the onco-geriatric clinic and provided strategies to address the majority of these difficulties.
Results: This study was conducted on 117 Elderly cancer patients (aged 60 years and older), referred for chemotherapy, for whom a G8 score questionnaire was done, accordingly 86 (73.5%) patients were candidates for CGA - as their G8 score was ≤ 14 - after a treatment decision was given by the conventional oncology clinics. Of those candidate patients, 38 individuals missed CGA due to different reasons.
In 79.1% (n = 38) of patients, the onco-geriatric clinic supported the treatment recommendation made by the conventional oncology clinics. However, in 20.8% (n = 10) of the patients, the treatment proposal was modified according to the recommendations of the onco-geriatric clinic.
Conclusion: Implementation of CGA as an integrated part of the decision-making in the oncology clinics gave better information about the physiological state of elderly cancer patients that led to optimum decision-making.
Keywords: geriatric assessment; GA-based approach; conventional oncology; chemotherapy; cancer, elderly patients.

Introduction

Cancer is a disease that almost affects older adults (≥65 years old). Although most cancer deaths also occur in older persons, the majority of clinical trials that establish the standards of care typically focus on younger patients with higher performance status. [1]

We urgently need to change our policies on the care of elderly cancer patients because of the ageing global population and the established link between ageing and cancer. Classic geriatric symptoms including falls, confusion, starvation, weakness, or urine incontinence may worsen with cancer treatment or cancer itself. Therefore, when cancer therapy is planned, it's critical to have improved means of detecting health issues that are "non-cancer" linked. [2]

The International Society of Geriatric Oncology (SIOG), the European Organization for the Research and Treatment of Cancer (EORTC), the U.S. National Comprehensive Cancer Network (NCCN), and the European Society of Breast Cancer Specialists have all recommended using a GA to assist in treatment decision-making. [3]

The purpose of the GA is to identify any health conditions that are "non-cancer" and to select an appropriate course of therapy and follow-up. So that a GA can assist in tailoring cancer treatment strategies in order to prevent both unnecessary overtreatment and undertreatment. A GA is a multidimensional evaluation of psychological, physical, functional, and social circumstances with the goal of finding unidentified problems as well as risk factors that put older adults at higher risk for cancer therapy side effects, such as severe toxicity or hospitalization. Physicians, nurses, nutritionists, physiotherapists, social workers, occupational therapists, and pharmacists are among the participants in GA. GA has been found to be viable in a variety of contexts and to be most beneficial when treating frail elderly people. [4]

As a considerable number of elderly patients receive their treatment in the oncology clinics in Ain shams university hospital, it was crucial to implement the GA at these clinics. The GA could be considered a source of clinical data that would otherwise go unnoticed. Finally, and perhaps most crucially, the use of a GA could help identify the elements that put older adults at higher risk for treatment toxicity. Incorporating treatments or treatment modalities to lower the likelihood of treatment toxicity would be made possible by using this knowledge as the foundation for the creation of a new generation of clinical trials for frail older persons. Practically speaking, a CGA might be implemented in five steps: (i) selecting patients who can benefit from a CGA; (ii) evaluating these patients; (iii) developing recommendations; (iv) putting these suggestions into practice;

and (v) monitoring and adjusting the care plan with recurrent CGA. [2]

The question of whether performing a GA is valuable has been replaced by how to incorporate this into normal practice practically and efficiently as a result of mounting evidence regarding the significance of the results of GA in older cancer patients. [5]

The need for additional hospital visits, the time-consuming aspect, and creating cooperation between the oncologists and the geriatric team regarding expectations of the population referred for GA and expected outcomes of the GA were significant obstacles to implementing GA in clinical practice. [6].

Subjects and Methods

Our study was a prospective cohort study. It was conducted in the oncology department at Ain Shams University Hospitals between October 1, 2019, to March 31, 2020. Patients aged 60 years or older, both males and females, referred to the department of clinical oncology and nuclear medicine for the treatment of a solid malignancy, using chemotherapy were included. Patients less than 60 years old, receiving concurrent chemo-radiotherapy & patients with hematological malignancies were excluded. Patients were invited to participate by oncology residents, who obtained informed consent and performed the G8 questionnaire. Patients with a G8 score ≤ 14 were referred to CGA.

In this study, a new track, the onco-geriatric care pathway, was developed to share with the existing tumor board in decision-making. The percentage of treatment decision changes before (care as usual) and after CGA was calculated. Care as usual was defined as the decision in the specialized oncology clinics or the chemotherapy clinic decision as dose adjustment. To measure the percentage of treatment decision changes before versus after CGA, all patients were first discussed in the regular oncology clinics and secondly in the onco-geriatric clinic, adding additional information on GA and patient preferences. (Fig: 1)

Inclusion of the patients took place in the chemotherapy clinic, and sampling was performed as a convenient sample using PASS 11 program for sample size calculation, based on the referral of elderly cancer patients to the chemotherapy clinic.
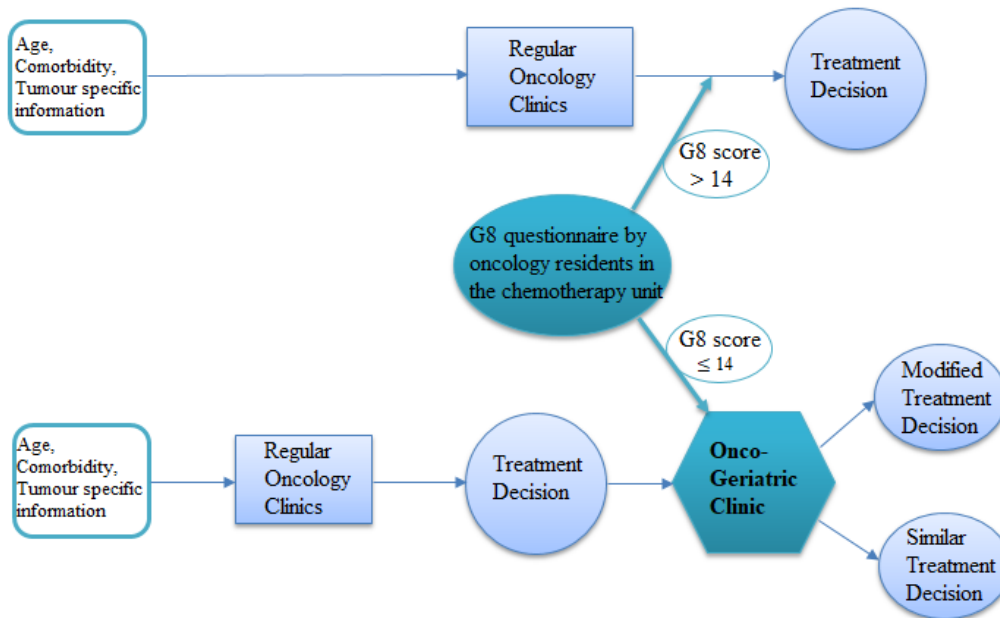
Figure 1: A: Conventional care in decision-making for older cancer patients, B: decision-making pathway in the implementation study.

Ethical Considerations: The protocol of this thesis was approved by the Research Ethics Committee of Ain Shams University. To ensure the confidentiality of collected data. All data obtained from patients were used for scientific purposes only. Written informed consent was taken from all participants.

Outcomes of CGA assessment:
After conducting CGA, patients were divided into 3 groups:
• Group 1: patients who were functionally independent for activities of daily living (ADL) and without serious comorbidity.
• Group 2: patients who were independent for ADL but had 1 or 2 comorbidities with no geriatric syndrome.
• Group 3: Age ≥ 85 years, patients who were dependent for at least 1 ADL and/or having 3 or more comorbidities and/or at least 1 geriatric syndrome.

Statistical Analysis: The collected data were organized, tabulated, and statistically analyzed using SPSS software statistical computer package for each variable, the range, mean and standard deviation were calculated.

Results:

Between October 2019 and March 2020, 117 patients were included, for whom a G8 score questionnaire was

done (with median score = 13), 86 (73.5%) patients were candidates for comprehensive geriatric assessment (CGA) - as their G8 score ≤ 14 - after a treatment decision was given by the conventional oncology clinics. Of those candidate patients, 38 individuals missed CGA due to different reasons. (Fig. 2) We faced high patient dropout rates. However, using PASS 11 program for sample size calculation, we estimated that this sample size was enough to measure the study objectives with a 95% confidence level as it was a pilot study of implementing a new medical service.
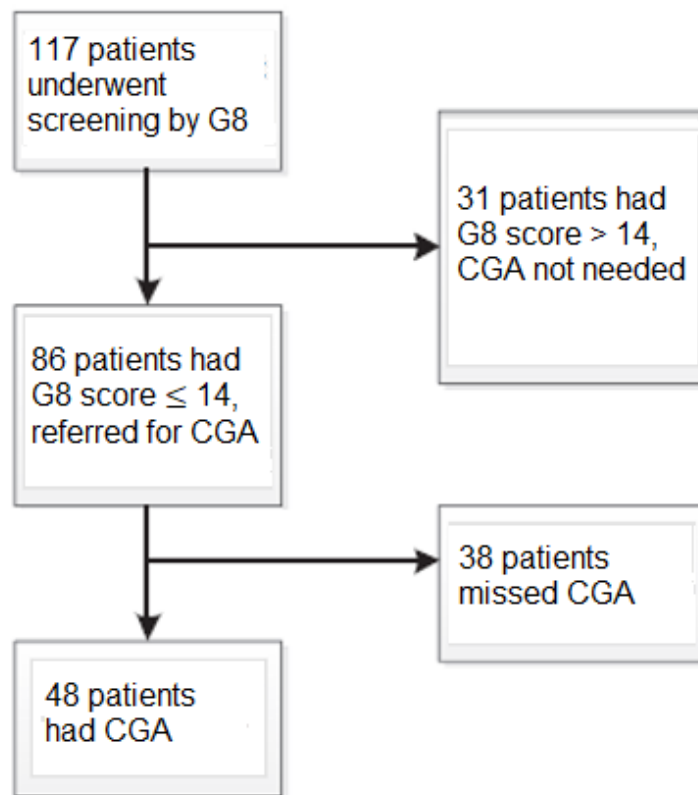

Figure 2: Inclusion of patients

According to the CGA outcome, treatment decision could be either changed with major deviation (for example, chemotherapy was omitted) or with minor deviation (for example, cisplatin fractionation into two days, using single agent chemotherapy instead of doublet or triplet, or starting chemotherapy after supportive treatment either at home or after admission in the geriatric hospital) or no change was made in the regular oncology clinic decision and

chemotherapy was received as prescribed.

In 79.1% (n = 38) of patients, the onco-geriatric clinic supported the treatment recommendation made by the conventional oncology clinics. However, in 20.8% (n = 10) of the patients, the treatment proposal was modified according to the recommendation of the onco-geriatric clinic. When a treatment decision change was suggested, this was mostly towards less intensive treatment (whether curative or palliative intent)., symptom relief or to hold chemotherapy and give supportive treatment at home or admission in the geriatric hospital till improvement of the general condition of the patient then to resume chemotherapy (Table 1).

Table 1: Decision change after Onco-Geriatric clinic consultation

Variable	Decision after CGA	
Chemotherapy omitted	6	12.5%
Chemotherapy received	38	79.1%
Chemotherapy received >> FEC instead of taxanes	1	2.1%
Chemotherapy received >> fractionated cisplatin	1	2.1%
Patients started chemotherapy (single agent) after geriatric follow up	1	2.1%
Patients started chemotherapy with supportive treatment	1	2.1%
Total	48	100.0%

FEC: 5 fluorouracil, epirubicin, and cyclophosphamide.

The CGA grouping results were found to be statistically significant when correlated with the decision change
(Table 2).

Table 2: CGA decision & decision change

	CGA decision				
Decision change	Group 1	Group 2	Group 3	Total	p
Major deviation	0	0	6	6 (12.5%)	P < 0.0001
Minor deviation	0	2	2	4 (8.3%)	
No change	16	21	1	38 (79.2%)	
	16 (33.3%)	23 (47.9%)	9 (18.8%)	48 (100%)	

G8 score also was correlated considerably with the decision change (Table 3). Major deviation in decision changes was detected mainly in patients with low G8 score (median score: 8) while no change in the treatment decision after CGA was detected mainly in patients with high G8 score (P = 0.025).

Table 3: G8 score & Decision change

Factor	n	G8 Score (Minimum)	G8 Score (Median)	G8 Score (Maximum)	P
Major deviation	6	3.0000	8.000	12.500	
Minor deviation	4	11.0000	12.500	14.000	0.025
No change	38	4.0000	12.500	14.000	

Discussion

The majority of cancer diagnoses and cancer-related deaths occur in persons over the age of 65, making cancer primarily a disease of older adults. **[7]** Cancer therapy may be complicated by the presence of other age-related diseases in older cancer patients, such as geriatric syndromes or comorbidities. [8]

In our study, a new track, the onco-geriatric care pathway, was developed to share with the existing tumor board

in decision-making. The percentage of treatment decision changes before (care as usual) and after CGA was calculated. Care as usual was defined as the decision in the specialized oncology clinics or the chemotherapy clinic decision as dose adjustment. To measure the percentage of treatment decision changes before versus after CGA, all patients were first discussed in the regular oncology clinics and secondly in the onco-geriatric clinic, adding the additional information of the GA and patient preferences.

A non-randomized analysis of the effects of GA on changes in treatment plans and GA management interventions has been conducted in a few carefully chosen geriatric oncology studies. **[9]** Targeted management interventions can be utilized to assist the vulnerabilities in elderly cancer patients by identifying specific impairments using GA, such as cognitive impairment or a lack of social support. **[10]**

Experts in geriatric oncology undertook a Delphi analysis to come to a consensus on high-priority GA-based targeted management approaches for elderly cancer patients. **[11]** However, to date, no randomized, prospective studies have reported the feasibility and utility of GA in management interventions in older adults receiving cancer treatment.

The main aim of this study was to measure the percentage of treatment decision changes (including decisions from the specialized oncology clinics or decisions from the chemotherapy unit such as dose adjustment and reduction) before versus after CGA.

In our study, CGA was done on 48 patients. Ten patients (20.8%) of the 48 ones who underwent CGA, had treatment decision modifications.

Our results were similar to other studies using different frailty scoring systems also based on the same items. **Aliamus et al., [12]** included 49 elderly patients (aged 70 years and over) diagnosed with primary lung cancer who underwent a GA before a multidisciplinary meeting to decide on their course of treatment. The GA changed nearly half of the treatment decisions (44.9%). The fact that we included all eligible patients with solid tumors and patients 60 years of age and older while **Aliamus et al.** only included patients with lung cancer and patients in the higher age group may account for the difference in the percentage of treatment decision changes between our study and that of **Aliamus et al.**

The systematic review by Hamaker et al. [13], which included 36 publications from 35 research, provided additional support for our findings. A median of 28% of patients (range 8–54%) had their oncologic treatment plans changed following a geriatric evaluation, mostly to a less intensive course of therapy.

For patients with a G8 score ≤14, full CGA is recommended. **[14]** Previous

studies predicted that the G8 score should correlate with decision changes. **[15]** Our study discussed this assumption.

Another important question was the value of the G8 assessment in comparison to the CGA tool regarding treatment decisions. Eighty-six patients had a G8 score ≤ 14, referred to CGA. Thirty-eight patients failed to attend the onco-geriatric clinic and 48 (55.8%) patients underwent CGA, with a statistically significant correlation between the G8 score and the treatment decision changes (P = 0.025). This was an important indicator regarding the significant effect of the G8 score in changing the treatment protocol. To our knowledge, no studies in the literature directly assessed the correlation between the G8 score and the decision changes.

During the implementation of GA service for cancer patients, we met many challenges. Some of them were resolved while others remained an obstacle.
Those challenges included: Patient-related challenges, availability of resources, and collaboration issues between the oncology team and the geriatric team.

1. **Patient-related challenges:**
- **Extra hospital visits:**

Presented reasons from the patients for missed appointments involved that older adults usually depend on others such as family members, neighbors, and friends for transportation to cancer treatment hospitals and so could not come back for geriatric assessment when it needed more hospital visits. The importance of onco-geriatric clinic implementation was explained to the patient and the importance of being assessed by the geriatric team on the morbidity and mortality of these patients as proven by evidence-based data to justify the additional hospital visits. We booked the date of the visit for the chemotherapy clinic for many patients with the already scheduled onco-geriatric clinic date, aiming to decrease the number of hospital visits. Eighty-six patients (with a G8 score ≤ 14) were instructed to attend the onco-geriatric clinic for CGA. Of those patients, only 48 patients (55.8%) came to the clinic for CGA. We lost 38 patients (44.1 %) who refused to come to do the CGA due to the extra visits barrier. This obstacle cannot be solved as we could not at this stage increase the number of weekly appointments of the geriatric oncology clinic, especially as regards the COVID-19 situation. We expect that increasing the number of available appointments at the geriatric oncology clinic could solve this problem.

2. **Personnel-related challenges:**
- **Lack of awareness:**

Staff awareness of the process of the geriatric oncology clinic

implementation and its aims was important to ensure effective implementation. Misinterpretation of the importance of the intervention or its aims could cause unnecessary resistance against the implementation, which means that staff will not follow the procedure. Multiple visits to the units of the oncology department were performed for additional training and education of the staff members about the longer-term positive outcomes and reduction in overall burden that can be achieved if the implementation process of the onco-geriatric clinic succeeds.

• **Lack of personnel:**

As we don't have enough nurses in the chemotherapy unit and due to the language barrier for nurses, the G8 test was not time-consuming, was convenient, and could be administered quickly (it was generally completed within five minutes or less with no need for a geriatrician), it was decided that G8 could be routinely administered by the oncology residents in the chemotherapy clinic as a part of the assessment of any eligible elderly cancer patient. There was an agreement between the oncology team and the geriatricians on who should be contacted by the patients and their caregivers if needed and who was responsible for every part of the care (e.g., follow-up). A geriatric resident was responsible for the patients who needed follow-up with the geriatric

clinic or the patients who needed urgent geriatric hospital admission after CGA.

3. <u>**System-related challenges:**</u>
• **The onco-geriatric clinic location:**

Going for assessments at the geriatric hospital which was at a far distance from the oncology unit, makes it more difficult to refer elderly cancer patients to a geriatric clinic outside the oncology unit. We anticipated that the location where CGA will be done can be an obstacle that may increase the dropout of the patients who were instructed to go for the onco-geriatric clinic, this was solved by implementation of the onco-geriatric clinic in the oncology department.

• **Lack of time:**

In a busy department like the oncology department with overcrowding of oncology services, it was not easy to find available places for the onco-geriatric clinic. It was a limiting barrier against the inclusion of the GA into routine appointments.

• **Referral system:**

A specific referral template regarding elderly cancer patients was designed to facilitate communication between oncologists and geriatricians. The G8 questionnaire was included inside the referral template to facilitate for the oncologist the G8 assessment. Additionally, we added the aim of the treatment plan from the oncologist's perspective and the points that are needed from the geriatrician to help in

the management of these challenging cases. On the other hand, the geriatrician was able to put his assessment on the back of the referral sheet and his recommendations in terms of decision changes supporting the elderly cancer patients to be able to proceed with the oncologist decision or no further additional service needed. The geriatrician response was adjusted to predefined endpoints that the geriatric oncologist should respond to.

Conclusion

Implementation of CGA as an integrated part of the decision-making in the oncology clinics gave better information about the physiological state of elderly cancer patients that led to optimum decision-making. Our study suggested that GA can change oncologic treatment plans, leads to non-oncologic interventions, and improve communication about care planning and aging-related issues. It was found that the G8 score significantly affected the treatment decision with a statistically significant correlation detected between the G8 score and the decision change. Some challenges were met during the implementation process of the onco-geriatric clinic and solutions were given to overcome most of these challenges. More research is needed to confirm the effect of GA on our elderly cancer patients with a larger sample size, and to measure toxicity/side effects, treatment outcomes, and disease response after longer periods of follow-up of the elderly cancer patients who had treatment decision changes after CGA. Also, more research based on actual surveys provided to participants or physicians is needed to assess properly other possible challenges in the implementation process and how to deal with them.

Statements and Declarations:
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