SIOG consensus on geriatric assessment (GA) in older cancer patients


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Use of comprehensive geriatric assessment in older cancer patients: Recommendations from the task force on CGA of the International Society of Geriatric Oncology (SIOG)

Martine Extermann a,⁎, Matti Aapro b, Roberto Bernabei c, Harvey Jay Cohen d, Jean-Pierre Droz e, Stuart Lichtman f, Vincent Mor g, Silvio Monfardini h, Lazzaro Repetto i, Liv Sørbye j, Eva Topinkova k

CGA or GA??

Oncology
focus on the diagnostic assessment

Geriatrics
comprehensive assessment including integrated geriatric interventions and follow-up.
Aims of this SIOG task force:

1. What are the **reasons** to perform a GA?
2. What does a GA **detect** in oncological patients?
3. What is the **predictive value** of GA for treatment-related complications?
4. What is the **prognostic value** of GA?
5. What is the influence of GA on treatment decisions?
6. Which **geriatric domains** should be included in a GA and which **tools** should be used to assess these?
7. How can GA be **organized/implemented** in clinical care?
Methodology

• A review by Puts (JNCI 2012) et al., relevant to questions 2-5 (with data included until 11-2010) was considered as the starting point for the present paper.

• Systematic literature search by PH for later papers

• First draft by writing team

• Seven expert working groups (for the 7 questions)

• Consensus statements
Q1: What are the reasons to perform a GA?

**Literature search results**

GA can reveal/detect previously unknown and potentially reversible geriatric problems not found by routine oncology care.

GA can predict toxicity/side effects from cancer treatment or decrease in QoL enabling a more targeted use of preventive measures.

GA has important prognostic information that can be helpful in estimating life expectancy, which is of paramount importance when making treatment decisions.

GA can influence/improve treatment decisions.

GA allows targeted interventions, which can improve QoL and compliance to therapy.

GA is a systematic procedure to appraise objective health including multimorbidity and functional status, which interfere with the cancer prognosis and treatment choices in older patients.

GA = Geriatric assessment; QoL = Quality of life
Q1: What are the reasons to perform a GA?

1. Important reasons to perform a GA in older cancer pts

   (i) **detection** of **unidentified problems** and risks *(question 2)*
   (ii) **prediction** of **adverse outcomes** *(e.g. toxicity, but also other relevant items such as functional or cognitive decline, postoperative complications, …)* *(question 3)*
   (iii) **better estimation of residual life expectancy** and **lethality of the malignancy** in the context of competing comorbidities and general health problems *(question 4)*

2. The main goal of a GA is to

   (i) realize objective and comprehensive health appraisal
   (ii) improve care quality
      - targeted geriatric interventions *(discussed in another SIOG paper)*
      - appropriate cancer treatment selection *(question 5)*.

   GA allows thus to evaluate the balance of benefits and harms of performing or omitting specific oncological interventions.
3. Selection of patients for GA is an area of controversy

- Many oncological studies have used the **age of 70** as the minimal age for implementing GA
- Other age cutoffs have been proposed
- **Geriatric screening tests** can also help in the selection of patients in need of a full GA.
Q2: What does a GA detect in oncological patients?

| First author, year (reference) | Sample size, population | Percentage of patients in which GA detected a problem
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<tbody>
<tr>
<td></td>
<td></td>
<td>Demographic data and social status (%)</td>
</tr>
<tr>
<td>Kania, 2013 (1)</td>
<td>1967, 6 tumor types MaA = 76 y</td>
<td>NR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(51.2)§</td>
</tr>
<tr>
<td>Klepin, 2011 (11)</td>
<td>54, acute myelogenous leukemia MaA = 70.8 y</td>
<td>92.6</td>
</tr>
<tr>
<td>Hamaker, 2011 (13)</td>
<td>292, known and first diagnosed cancer patients admitted to general medicine or oncology ward MaA = 74.9 y</td>
<td>91.1</td>
</tr>
<tr>
<td>Gironsa, 2012 (30)</td>
<td>83, lung cancer patients MaA = 77 y</td>
<td>90.4</td>
</tr>
<tr>
<td>Horgan, 2015 (18)</td>
<td>30, lung or gastrointestinal cancer MaA = 78 y</td>
<td>NR</td>
</tr>
</tbody>
</table>

§ Data between brackets report on new detected problems (not routinely evaluated by the treating physician)
1. **Deficits** in GA domains are **frequent** in older cancer patients.

2. Assessment of **all domains** is relevant as GA can potentially identify deficits across domains.

3. GA seems to reveal several **deficits** that were **not** **routinely evaluated** by the treating physician.
Q3: What is the predictive value of GA for treatment-related complications?

<table>
<thead>
<tr>
<th>First Author, year (reference) design</th>
<th>Type of statistical analysis used</th>
<th>Was multivariable analysis conducted? What adjustments were used?</th>
<th>Sample size, number of events</th>
<th>Complications of treatment (expressed as HR with CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurria, 2011 (15) observational</td>
<td>multivariate logistic regression model</td>
<td>Multivariable analyses were conducted. Variables with $P &lt; 0.1$ in univariate analyses and clinically relevant variables (chemotherapy dosing [standard or dose reduced], number of drugs [mono- or polychemotherapy], chemotherapy duration, and receipt of primary prophylaxis with white blood cell growth factor) were examined in multivariable analysis.</td>
<td>500 various cancer cases. 53% of patients experienced at least one grade 3 to 5 toxicity (39% grade 3, 12% grade 4, and 2% grade 5).</td>
<td>Predictors of severe chemotherapy complications: Age (OR=1.85; 95%CI = 1.22-2.82), Cancer type (GI or GU) (OR=2.13; 95% CI=1.39-3.24), Chemotherapy dosing (OR=2.13; 95% CI=1.29-3.52), Poly-chemotherapy (OR=1.69; 95% CI=1.08-2.65), Hemoglobin (OR=2.31; 95% CI=1.15-4.64), Creatinine Clearance (OR=2.46; 95% CI=1.11-5.44), Hearing (OR=1.67; 95% CI=1.04-2.69), Falls (one or more past 6 months) (OR=2.47; 95% CI=1.43-4.27), MOS (limited in walking 1 block) (OR=1.71; 95% CI=1.02-2.86)</td>
</tr>
<tr>
<td>Extermann, 2012 (40) observational</td>
<td>multivariate logistic regression model</td>
<td>Multivariable analyses were conducted. Forward-selection approach with predictors being selected based on $p&lt;0.1$ was used. Adjustments were made for toxicity of the regimen.</td>
<td>518 various cancer cases. 64% of patients experienced severe toxicity, 32% had grade 4 H toxicity and 56% had grade 3 or 4 NH toxicity.</td>
<td>In univariate analysis, diastolic blood pressure, IADL, aspartate aminotransferase, lymphocytes, and LDH were associated with grade 4 H toxicity. ECOG PS, hemoglobin, creatinine clearance, albumin, MMS,</td>
</tr>
</tbody>
</table>
Q3: What is the predictive value of GA for treatment-related complications?

2 SIOG consensus statements

1. Geriatric parameters, measured by GA, have **predictive value** (independent from classic oncologic predictors) for the occurrence of **severe** treatment-related **toxicity** in a variety of diseases and treatment settings.

2. The **optimal geriatric parameters** (including cut-off points) to predict severe treatment toxicity or modify the therapeutic approach have **not** yet been **established** for the different cancer types or treatment options.
Q4: What is the prognostic value of GA on overall survival (OS)?

<table>
<thead>
<tr>
<th>First author, year (reference)</th>
<th>Type of statistical analysis used</th>
<th>Was multivariable analysis conducted? What adjustments were used?</th>
<th>Age, sample size, number of events</th>
<th>Mortality (expressed as HR with CI)</th>
</tr>
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<tbody>
<tr>
<td>Aaldrjiks, 2013 (3)</td>
<td>Cox regression analysis, Log-rank test, Kaplan-Meier method</td>
<td>Multivariable analysis was conducted with adjustment for age and comorbidities.</td>
<td>Age ≥70 25 only advanced breast cancer cases, 41 of 55 (75%) patients died after a mean follow-up of 16 months.</td>
<td>Inferior MNA 3.05 (95% CI: 1.44-6.43; p = 0.004) and GFI scores 3.40 (95% CI: 1.62-7.10; p = 0.001) were associated with increased HR for mortality.</td>
</tr>
<tr>
<td>Soubeiran, 2012 (4)</td>
<td>Logistic regression</td>
<td>Multivariable analysis was conducted. Variables significant in univariate analysis at the 5% level were selected for inclusion in the multivariable model. Forward ascending stepwise selection procedure was used. Model was adjusted for treatment site.</td>
<td>Age ≥70 348 various cancer cases, within 6 months 56 patients (16.1%) had died</td>
<td>Advanced disease 3.9 (95% CI: 1.58-9.73), a low MNA score 2.77 (95% CI 1.24-6.18), male sex 2.40 (95% CI 1.2-4.82), and long GUG 2.55 (95% CI 1.32-4.94) were associated with higher risk of early death (&lt; 6 months)</td>
</tr>
<tr>
<td>Spina, 2012 (7)</td>
<td>Cox regression analysis, Log-rank test, Kaplan-Meier method</td>
<td>Multivariable analysis was conducted. Variables significant in univariate analysis at the 5% level were selected for inclusion in the multivariable model. Additional adjustments were not conducted</td>
<td>Age ≥70 100 only DLBCL cases, The 5-year OS rate was 60% (95% CI, 50%-69%). At the time of writing, 63% of fit patients, 34% of unfit patients, and 31% of frail patients were alive (p = .006), with 3-year OS rates of 76%, 53%, and 29% (p = .001) respectively.</td>
<td>Geriatric group (unit 1.96 (95% CI 1.64 - 3.70), frail 2.55 (1.14 - 5.73) and IPI score (2 or 3) 1.95 (95% CI 1.04 - 3.66), 4 or 5 4.93 (1.53 - 15.64) were independent predictors of death.</td>
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</table>
Q4: What is the prognostic value of GA on overall survival (OS)?

3 SIOG consensus statements (1)

1. **Geriatric parameters independently predict OS** in a variety of oncological diseases and treatment settings.
   - Control for cancer-specific parameters was often very general.

2. **Poorer OS** in older patients with deficits identified in geriatric domains might be explained by several factors:
   - shorter life expectancy based on the general condition of the patient
   - increased death of cancer due to less aggressive treatment
   - death due to complications from cancer treatment
   - ...

   *disease specific survival* and *overall survival* should both be reported in trials on outcome in older cancer populations.
Q4: What is the prognostic value of GA on overall survival (OS)?

3 SIOG consensus statements (2)

3. Several **prognostic models for OS** in the general geriatric population are **available**.

- Lack of validation in cancer patients
- Helpful to estimate the usefulness of specific cancer treatments.
- Prognostic models for geriatric oncology should also include cancer related prognostic factors
Q5: What is the influence of GA on treatment decisions?

<table>
<thead>
<tr>
<th>First author, year (reference)</th>
<th>Sample size</th>
<th>Impact of GA on cancer treatment decision making and/or predicting cancer treatment delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenis, 2013 (1)</td>
<td>1967</td>
<td>GA led to a geriatric intervention in 286 patients (25.7%). For 282 patients (25.3%), the treating physician stated that GA results influenced the treatment decision in some way. GA results didn’t always reach treating physicians before treatment decision was made.</td>
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<tr>
<td>Caillet, 2011 (17)</td>
<td>375</td>
<td>After the GA, the initial cancer treatment plan was modified for 20.8% of patients (95% CI, 16.8 to 25.3), usually to decrease treatment intensity (51.1% of 78 patients). By univariate analysis, cancer treatment changes were associated with Eastern Cooperative Oncology Group performance status ≥ 2 (73.3% in the group with changes vs 41.1% in the in the group without changes; ( P &lt; .001 )), dependency for one or more activities of daily living (ADL; 59.0% vs 24.2%; ( P &lt; .001 )), malnutrition (81.8% vs 51.2%; ( P &lt; .001 )), cognitive impairment (38.5% vs 24.9%; ( P = .023 )), depression (52.6% vs 21.7%; ( P &lt; .001 )), and greater number of comorbidities (mean, 4.8 [SD, 2.9] vs 4.0 [SD, 2.6]; ( P &lt; .02 )). By multivariate analysis, factors independently associated with cancer treatment changes were a lower ADL score (OR = 1.25 per 0.5-point decrease; CI, 1.04 to 1.49; ( P = .016 )) and malnutrition (OR = 2.99; CI, 1.36 to 6.58; ( P = .007 )).</td>
</tr>
<tr>
<td>Aliamus, 2011 (10)</td>
<td>49</td>
<td>GA led to changes in 44.9% of initial treatment plans. Only 16.7% of these modifications occurred in frail patients (Balducci classification), while 60% occurred in vulnerable patients. Treatments of vulnerable patients were significantly more frequent changed in comparison with fit or frail patients (( p=0.02 ), OR=4.9; 95% CI=1.3-18.6). Principal treatment modifications in vulnerable patients were: change of chemotherapy, one drug instead of two (27.3%), chemotherapy dose adaptation (13.6%), supportive care (13.6%), confirmation of standard treatment without modification (22.7%). By univariate analysis, cancer treatment changes in vulnerable patients were associated with lowered MMSE and IADL. Multivariate analysis indicated lowered MMSE score (&lt;26) as the only independent predictor for treatment modification in vulnerable patients.</td>
</tr>
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</table>
Q5: What is the influence of GA on R/ decisions?

4 SIOG consensus statements

1. **Age** by itself and **clinical impression** lead to **treatment adaptation** in a significant proportion of older cancer pts
   - Appropriate? Undertreatment?

2. **GA can additionally influence treatment choice** in patients, and this can be both **decreasing** and **increasing** of treatment intensity.

3. **GA can inform key parts of the decision making process** to tailor the treatment to the right one for a specific patient
   - Avoid overtreatment of vulnerable/frail patients
   - Avoid undertreatment of fit patients

4. **Oncology teams should integrate GA findings** in their treatment decisions
Q6: Which geriatric domains should be included in a GA and which tools are available to assess these?

Social status/support
Functional status
Fatigue
Comorbidity
Cognition
Mental health status
Nutrition
Presence of geriatric syndromes (dementia, delirium, falls, incontinence, osteoporosis or spontaneous fractures, neglect or abuse, failure to thrive, constipation, polypharmacy, pressure ulcus, sarcopenia)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Tool (References)</th>
</tr>
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</table>
| Demographic data and social status | Questions on living situation, marital status, educational level, safety of environment, financial resources. (1, 16, 17, 34)  
MOS Social Activity Survey (2, 15, 19)  
Caregiver burden (EDIZ) (13);  
MOS Social Support Survey: Emotional/Information and Tangible Subscales (2, 15, 16, 19)  
Summary of some criteria (e.g. availability of family support, appropriateness of social environment) (17, 18, 30, 34) |
| Comorbidity | Charlson Comorbidity Index (CCI) (10, 14, 16, 18, 29, 30)  
CIRS (31, 33)  
CIRS-G (7, 8, 17, 33, 34)  
NYAH (7)  
Number of comorbid conditions (2)  
Simplified Comorbidity Score (SCS) (30)  
Summary of comorbidities (17)  
Hematopoietic Cell Transplantation Comorbidity Index (11)  
Physical Health Section (subscale of the OARS) (20 (15, 19) |
| Functional status | ADL: Katz index (1, 4, 7, 8, 10, 11, 13, 14, 17, 18, 30, 34)  
IADL: Lawton scale (1, 4, 7, 10, 11, 13, 14, 18, 30, 34)  
Performance status index (10)  
Barthel Index (any version) (29, 31, 38)  
Lawton-Brody IADL Scale (29)  
Nottingham Extended Activities of Daily Living Scale (NEADL) (31, 38)  
Activities of Daily Living (subscale of MOS Physical Health; Medical Outcomes Study) (2, 15)  
Instrumental Activities of Daily Living (subscale of OARS; Older Americans Resources and Services) (2, 21, 19)  
The Peer Assessment Tool for Disability (PAT-D) (11)  
Visual and/or hearing impairment, regardless of use of glasses or hearing aids (13, 18, 34)  
MOS physical Health (any version) (16, 19)  
Mobility Problem (requiring help or the use of a walking aid) (13)  
Timed Get Up and Go (GUG) (4, 10, 14, 15, 17, 19)  
Hand grip strength (11)  
Short Physical Performance Battery (SPPB) (11)  
One-leg standing balance test (10, 17)  
Walking problems/gait assessment (17, 18, 34)/gait speed  
Eastern Cooperative Oncology Group (ECOG) performance status (14, 18, 29)  
Karnofsky Self-Reported Performance Rating Scale (2, 15, 19)  
Karnofsky Health Care Professional-Rated Performance Rating Scale (2, 15, 19) |
Q6: Which geriatric domains should be included in a GA and which tools are available to assess these?

2 SIOG consensus statements

1. Important domains in GA are social status/support, functional status, fatigue, comorbidity, cognition, mental health status, nutrition, and geriatric syndromes.

2. Various tools are available to investigate these domains, and superiority of one over other tools has not been proven.

- Choice of instrument might rely on local preference, aim of the tool and resources present.
- 20-30% of older cancer patients do not have relevant problems identified by GA.
Q7: How can GA be organized/implemented in clinical care?

<table>
<thead>
<tr>
<th>CGA models</th>
<th>Definition</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General geriatrics</strong></td>
<td></td>
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<tr>
<td>GA ward models</td>
<td></td>
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<tr>
<td>- GEMU</td>
<td>A specific ward with a specialized geriatric care team that applies GA and ...</td>
<td>... delivers both acute and inpatient rehabilitation care. (GEMU) [38]</td>
</tr>
<tr>
<td>- ACE</td>
<td></td>
<td>... only delivers acute care. (ACE). Patients in ACE are transferred to long term care facilities for rehabilitation program [38]</td>
</tr>
<tr>
<td>IGCT</td>
<td>A specialized geriatric team that applies GA on non-GA wards on as consultative basis.</td>
<td>A recent meta-analysis could not show a consistent effect of IGCT interventions in non-GEMU on mortality, readmission, length of stay, or functional status [25]. Absence of effect is mainly due to a low adherence rate to the IGCT’s recommendation [25].</td>
</tr>
<tr>
<td>CMM</td>
<td>Joint geriatric and specialized care (e.g. orthogeriatric beds/units).</td>
<td>Individual studies of CMMs mainly operationalized as ortho-geriatric beds to date, show promising results and advantages [39].</td>
</tr>
</tbody>
</table>

(C)GA = (comprehensive) geriatric assessment; GEMU = geriatric evaluation and management unit; ACE = acute care for elders; IGCT = inpatient geriatric consultation team; CMM = co-management model
Q7: How can GA be organized/implemented in clinical care?

<table>
<thead>
<tr>
<th>GA models</th>
<th>Definition</th>
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<tr>
<td>Geriatric oncology</td>
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</table>

A specific ward with a team specialized in caring for older cancer patients that applies GA based on the GEMU or the ACE model.  
(+): centralization of geriatric expertise and treatment options  
(-): potential patient withdrawal from familiar treating oncologist  
(-): financial incentives might drive general oncologists not to refer patients  
(+): only a limited number of patients can be reached  
(-): General geriatric oncologists might miss the detailed rapidly evolving knowledge of the broad field of oncology  

| (I)GCT             | A specialized geriatric team that applies GA on non-GA wards or in other settings on a consultative basis.  

(+): patients remain under the supervision of their treating oncologist  
(+): this model can reach a large majority of older cancer patients  
(+): Interaction between oncologists and geriatric teams is feasible  
(+): decentralization of geriatric expertise has logistic and practical (e.g., staffing) challenges.  
(+): several factors may lead to low compliance of treating physicians to (I)GCT’s advice: GA results may be unknown at the time of decision making, treating physicians might not know what to do with GA results, onset of geriatric interventions or treatment adjustment depends on local possibilities.  
(+): patients who need referral to specific geriatric care programs might encounter waiting lists  

| Geriatric expertise Not nearby | GA in stand-alone comprehensive cancer centers without geriatric department or private practice oncology clinics  

(+): patients remain under the supervision of their treating oncologist  
(+): validated methods can easily be used to target high-risk patients and introduce geriatric care  
(+): a large majority of older cancer patients can be reached  
(+): realization of interaction between oncologists and geriatric teams is difficult  
(+): there is no gold standard to screen high-risk patients  
(+): interrater reliability and interpretation of results can be a problem  
(+): patients who need referral might encounter waiting lists  

GA = geriatric assessment; GEMU = geriatric evaluation and management unit; ACE = acute care for elders; (I)GCT = (inpatient) geriatric consultation team
Q7: How can GA be organized/implemented in clinical care?

3 SIOG consensus statements

1. There are several ways of implementing a GA.

2. All models have advantages and disadvantages

   Choice? ≈ local health care structure and setting

No comparison of outcomes from these various models in oncology is available.

3. Interaction with multidisciplinary geriatric teams (for selected patients) is highly recommended.
Discussion

- Low level of evidence: consensus guidelines
- Standardization of assessment tools
- Prediction of toxicity at the individual level is multifactorial
- Prognosis also heavily influenced by cancer and R/
- Other relevant questions than 7 described
- Few randomized trials on GA in oncology
- ...
Conclusions (1)

• **Important domains** in GA are social status/support, functional status, fatigue, comorbidity, cognition, mental health status, nutrition, and presence of geriatric syndromes, and **various tools** are available for assessing them.

• **Deficits** in GA domains are **frequent** in older cancer patients.

• GA parameters have **predictive value** for the occurrence of severe treatment-related **toxicity**.
Conclusions (2)

- GA parameters independently *predict overall survival* in a variety of diseases and treatment settings, but outcome is also heavily dependent on the oncological prognosis.

- GA can *influence treatment choice* in some patients, both downgrading and upgrading treatment intensity.

- There are *several ways for organizing GA implementation*: various models exist, each with advantages and disadvantages.
Thank you for your attention !!