

# “Elderly patients” in gynecologic oncology

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## Summary

The fact that about 60 % of all deaths in patients over the age of 65 are caused by malignancies, underlines the importance of geriatric oncology. For instance, about half of the patients that suffer from breast or ovarian cancer are over 65 years of age. Only limited data is available in the reference literature on elderly cancer patients as in the past, many past trials have excluded patients over the age of 65, and many physicians did not offer study participation to elderly patients. Several studies were able to show that elderly patients receive significantly less adequate surgical and adjuvant cancer treatment compared to younger patients. This observation could partly explain the less favorable prognosis of elderly patients with gynecologic malignancies. The aim of this review is to discuss the clinical management of elderly patients with gynecologic malignancies, under special consideration of the pharmacokinetic and pharmacodynamic aspects.

## Introduction

About 60 % of all deaths due to malignant diseases occur in the over-65 age group (Yancik and Ries 1994). This is particularly the case with the main gynecologic tumors, i. e. breast, endometrial and ovarian carcinomas. Geront oncology is therefore becoming an increasingly important field of gynecologic oncology.

According to current forecasts, the trend towards greater life expectancy is still increasing (Yancik and Ries 1994). In the year 2003, it is expected that the ratio of newborns to people over the age of 65 will be 1 : 5. In Germany, in the year 2000, the proportion of “old-aged” (80 years or older) was 3.6 %, i. e. 2.9 million people, but the figure estimated for the year 2020 is 6.3 %. (Source: Expert commission for the 4th German Aging Survey of the German Centre of Gerontology; [www.dza.de](http://www.dza.de)). However, this trend is not restricted to Germany or other industrialized countries but represents a global development (Fig. 1).

Various studies have shown that with increasing age the number of surgical operations undergone by patients clearly decreases and that adjuvant therapies are only carried out to a lesser extent (Newschaffer et al. 1996). Clinical studies form the basis of a physician’s work. However, this is a particular problem of elderly patients with oncological disease, as for most oncological studies carried out in recent years, being over the age 65 is an exclusion criterion. It was not until recently that this criterion was discarded. There is practically no data on patients over the age of 80. Furthermore, the dose or frequency of dosage was often primarily altered in the chemotherapy of older patients – without this being based on study data – thus making the interpretation of the results more difficult.

Various analyses have shown, however, that older, as well as younger patients benefit from chemotherapy and it is also generally well tolerated (Begg and Carbone 1983; Yancik and Ries 1994).

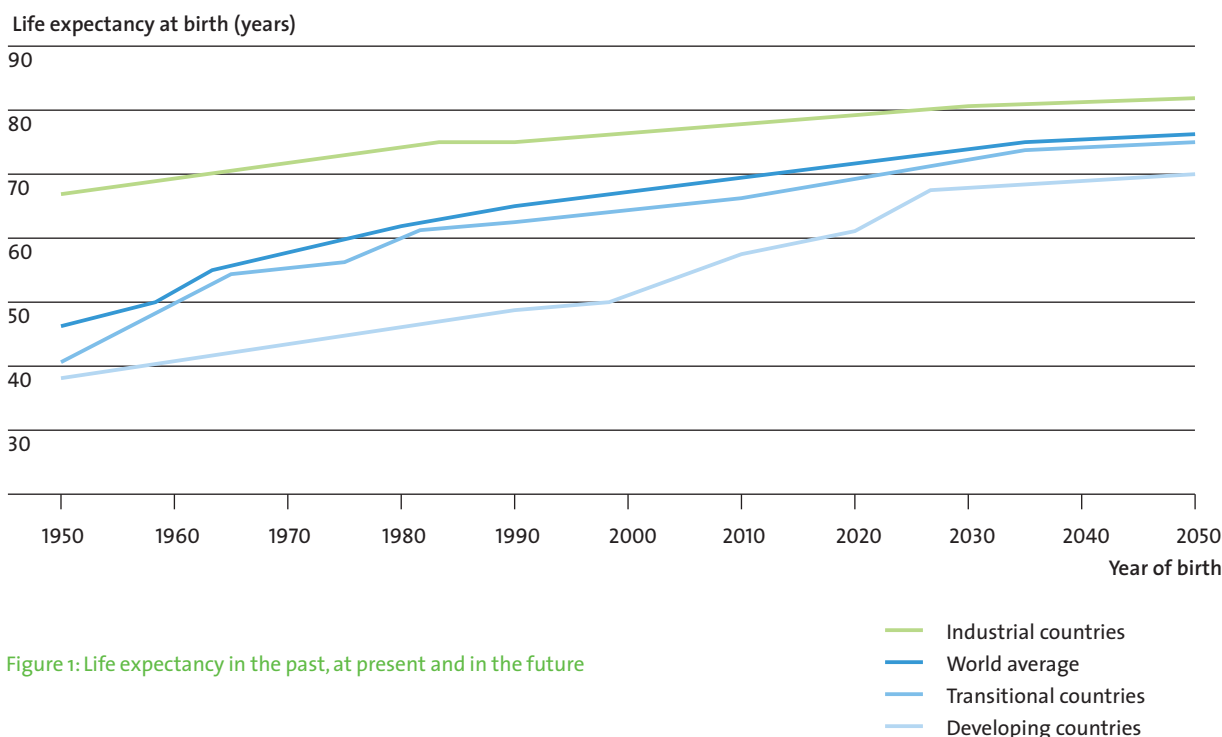


Figure 1: Life expectancy in the past, at present and in the future

### The ageing process and carcinogenesis

Various factors are thought to be responsible for increased occurrence of malignant disease in old age:

- Vulnerability to carcinogens in old age (exhausted repair mechanisms, summation effect of carcinogenic influences)
- cell biological processes: DNA adducts, methylation reactions, chromosomal translocations
- a weakened cellular immune system
- better conditions for the metastasation process

Different parallels have been identified between the biological ageing process and tumor genesis on a molecular-biological level. These include, inter alia, the significant increase in methylation reactions, which are, amongst other things, responsible for the activation and deactivation of various growth genes and the increased evidence of chromosomal translocations, which cause the immune system to become increasingly vulnerable to malignant disease (Yancik 1997).

### When is a patient “old” – how can age be measured?

In the reference literature, the definitions of the numerical age of “the elderly patient” are inconsistent. Some authors define the age of 65 as the beginning of old-age; others consider it not to begin until the age of 70 or 85 years (Balducci et al. 1998; Yancik and Ries 1994). More recent studies suggest that age should not be defined numerically, but by using biological parameters. The threshold age of 65 years is based on the socio-political definition that

concur with retirement from working life (recently, new age limits have been considered in this respect) and has no medical rationale. A threshold age of 75 years is becoming widely accepted as there is evidence of an objective reduction in various organ functions above this age.

Functional laboratory values can be consulted to estimate biological age; for instance, creatinine (parameter of the glomerular filtration rate), interleukin 6, cysteine in serum or thiol groups and D-dimers, and also questionnaires (e. g. CGA – Comprehensive Geriatric Assessment, IADL – Instrumental Activities of Daily Living), which evaluate mobility, cognitive and physical ability, and the capability of the older person to care for themselves. Various work-groups have developed instruments for comprehensive geriatric assessment that have already been integrated into clinical routine.

Assessment criteria for individual areas of everyday behavior:

- type and extent of care required
- personal hygiene, respectively activities of daily living (ADL)
- instrumental activities of daily living (IADL)
- memory capacity (e. g. measurement of dementia using the Mini Mental State examination)
- moods (e. g. measurement of depression using the “Geriatric Depression Scale”)
- social behavior
- other behavioral patterns, e. g. psychiatric symptoms

Examples of questions on individual activities of daily life are:

- Can the patient wash herself?
- Is she continent?
- Can she use the toilet by herself?
- Can she nourish herself (eat, drink)?
- Can she reliably take her medicine by herself?
- How mobile is she (shopping, visiting her doctor)?

One particular problem among elderly people is the complex pattern of “weakness”, which may be accompanied not only by varying physical (dyspnea, tachycardia) but also by psychological symptoms (e.g. irritability, depression) and which may have many causes. The existence of weakness is indicated, amongst other things, by impediment in carrying out at least one daily activity, at least three serious co-morbidities, the presence of a geriatric syndrome (e.g. dementia), and the inability to perform simple tests to measure strength (Tab. 1).

Table 1: Assessment suggestion developed by the work-group on geriatric oncology of the DGG/DGHO (Friedrich et al. 2003)

**Age ≥ 70 years**

- Comorbidity\*: Charlson comorbidity index
- Cognition\*: MMST
- IADL\*: ADL (Barthel Index) IADL (Lawton and Brody)
- Mobility\*\*: Tinetti I/II
- Depression\*: depression scale according to Yesavage
- Nutritional status: BMI\*, Mini Nutritional assessment\*\*

- \* Obligatory for each patient
  - \*\* Not in the case of obvious independence and full mobility; only to answer certain questions, in studies
- ADL: Activities of Daily Living; IADL: Instrumental Activities of Daily Living; BMI: Body Mass Index; MMST: Mini Mental State examination

Table 2 shows an example of geriatric assessment (Barthel Index).

Table 2: Activities of daily living (ADL) – Barthel Index

ADL	Barthel Index	Description
Eating	10	Independent, uses tableware and cutlery
	5	Requires assistance, e.g. with cutting food
	0	Is dependent in all aspects
Bathing	5	Bathes or showers without assistance
	0	Bathes or showers with assistance
Washing	5	Washes face, combs hair him/herself Cleans teeth, shaves or puts on make-up
	0	Requires assistance
Dressing	10	Independent, including putting on shoes
	5	Requires assistance – can partially dress her-/himself
	0	Is dependent in all aspects
Control of bowel movement	10	Continent
	5	Partially incontinent (e.g. at night)
	0	Incontinent
Urinary continence	10	Continent
	5	Partially incontinent (e.g. at night)
	0	Incontinent
Grooming	10	Can use the toilet/commode independently
	5	Requires assistance, for example, with balance, dressing and undressing, toilet paper
	0	Cannot use the toilet/use the commode
Bed/ chair transfer	15	Independent (also applies to wheelchair users)
	10	Minimal assistance or supervision
	5	Can sit, but requires assistance for the transfer
	0	Bed-ridden
Movement	15	Walks independently (also with a walking aid) for at least 50 m
	10	Can walk at least 50 m, but requires help
	5	For wheelchair users, independently for at least 50 m
	0	Cannot move without assistance (at least 50 m)
Climbing stairs	10	Independent (also with a walking aid)
	5	Requires assistance or supervision
	0	Cannot climb stairs
<b>Total points</b>		

The patient's functional reserves are very often already exhausted due to the malignoma or to treatment (operation, radiation therapy, chemotherapy). With increasing age, patients frequently suffer from other accompanying chronic illnesses such as diabetes mellitus and hypertension. The "seriousness" and prognosis of the individual "secondary diagnoses" must therefore be characterized.

According to the so-called Berlin Aging Study the 10 most common illnesses are:

1. cardiac insufficiency
2. hypertension
3. coronary heart disease
4. osteoarthritis
5. visual impairment
6. hearing impairment
7. arterial occlusive disease
8. arrhythmia
9. diabetes mellitus
10. osteoporosis

In comparison, women suffer more frequently from cardiac insufficiency, osteoarthritis and osteoporosis than men, and men suffer more frequently from lung disease and kidney insufficiency than women (Baltes et al. 1996). Older patients often have lowered stress tolerance (resources) compared to younger patients, if nothing else, due to their chronic internal illnesses, and this lowered threshold must be taken into account when choosing a therapy.

### Pharmacokinetics and pharmacodynamics in the elderly patient

A special clinical problem, which has so far been given little attention, is the interaction of cytostatics with other medication. Research into this relevant subject has also hitherto attracted too little interest.

As is to be expected, with increasing age the prevalence of classical diseases of civilization, such as hypertension and diabetes mellitus, grows; this often makes medication necessary. According to one study, in which 11 059 women participated, the proportion of elderly persons who took approximately at least one kind of drug per day in the 30 to 49-year-old age group was 22 %; however, in the over-60 age-group it was 60 % (Pharmadaten 1995 of the Bundesverband der Pharmazeutischen Industrie). The average 80-year-old even took an average of 1200 single doses per year. The number of undesired side effects increases with the number of pharmaceutical products taken. If side effects are registered in 3.4 % of the older patients who take up to five different drugs, in patients who take six or more drugs the percentage is as high as 25 %. The interactions between oncological and non-oncological drugs that are often used for elderly patients have, however, been inadequately studied so far, if at all.

The alterations in pharmacokinetics and -dynamics in "elderly" patients compared to those of younger patients generally affect the following factors:

- Volume of distribution: decrease in plasma volume, extracellular fluid and total body water; reduction in plasma albumin with the increasing toxicity of cytostatics with a high degree of plasma protein binding (e.g. taxane, epidophyllo toxins); increased prevalence of anemia, augmented toxicity of drugs with a high potential to bind to red blood cells (e.g. anthracyclines, taxane and epidophyllo toxins); increase in fatty tissue
- Resorption: reduction of the resorption surface of the gastrointestinal tract, circulation, motility, stomach and enzyme secretion; examples: oral cytostatics (e.g. alkylating agents, capecitabine)
- Liver metabolism: decrease of circulation in the liver, in the liver parenchyma, and the activity of the cytochrome-P-450 enzyme system; examples: cyclophosphamide, ifosfamide, anthracyclines
- Kidney function: decrease in the glomerular filtration rate (GFR), erythropoietin; examples: cis- and carboplatin, methotrexate, bleomycine
- DNA repair processes

Due to the relative augmentation of fatty tissue, the volume distribution of lipophile substances increases, resulting in a lengthened half-life period. In contrast, the volume distribution of water-soluble substances (e.g. anthracyclines) decreases, thereby resulting in a significant increase in plasma concentrations.

With age, various alterations can be observed in the gastrointestinal tract that may hinder the resorption of different drugs. These alterations include, amongst others, a decrease in acid secretion, a decrease in the peristaltics of the stomach and intestines as well as in the cell-separation rate of stomach and intestinal cells. The prevalence of diarrhoea in elderly patients can be explained by the delayed regeneration of the mucous membranes of the intestinal tract. Diarrhoea must be acutely treated as it may lead to a life-threatening loss of fluids and electrolytes – especially when combined with a reduced amount of fluid intake.

**! Cave: ensure that patients are sufficiently hydrated. !**

Physiological regressive alterations also take place in the kidneys. Apart from the reduction of the weight of the kidneys and in the number of glomerules and nephrones, a decrease in renal blood circulation is also found. Over the age of 70 the glomerular filtration rate (GFR) is only about 50 %. As the muscle mass, and thus the endogenous release of creatinine and elimination of creatinine in the urine, decrease almost parallel to one-another, the creatinine levels in serum remain in the normal range, although the GFR is significantly reduced in old age. The GFR is therefore the most important functional parameter for the

kidneys, and it should be closely monitored during treatments with cytostatics where renal elimination takes place (e. g. cisplatin, carboplatin, ifosfamide, topotecane). Side effects can particularly be expected when the dose has not been adapted to creatinine clearance (AUC) but has been calculated according to the body surface. Adequate hydration can further decrease nephrotoxicity. If kidney function is seriously restricted, the use of non-nephrotoxic chemotherapeutic drugs, such as taxane, should be considered.

The risk of cardiac damage and failure grow with increasing age (due to pre-existing arteriosclerosis, for example), which, particularly when cardiotoxic cytostatics are administered, may predispose patients to the development of cardiomyopathic side effects. However, a retrospective study by Ibrahim et al. (1996) showed that during chemotherapy with doxorubicin in patients over the age of 65 who had no previous history of cardiac illness, lethality due to cardiopulmonary causes is no higher than that in younger patients. The threshold dose of around 450 mg/m<sup>2</sup> should, however, be avoided in patients over the age of 70, especially when administered in combination with percutaneous radiation in which the heart and lungs are situated in the area to be irradiated. Close-meshed apparatus monitoring of the heart function using an ECG, echocardiography, and/or MUGA (“multiple gated acquisition scan”) is required, particularly in older high-risk patients with cardiac comorbidity or in patients that have been treated previously with medication containing anthracycline. The avoidance of high concentrations, such as occur after an i.v. bolus injection of doxorubicin, reduces cardiotoxicity. The simultaneous administration of other cardiotoxic drugs, such as the HER<sup>2</sup>/neu antibody trastuzumab, should be the subject of critical discussion.

The perfusion of the liver and the activity of cytochrome P450 enzyme system also decrease significantly with age (Sotaniemi et al. 1997). These metabolic changes influence the activation (e. g. cyclophosphamide, ifosfamide, capecitabine) as well as the elimination (e. g. anthracyclines, taxane, Vinca alkaloids, aromatase inhibitors) of various drugs. Care should be taken due to frequent co-medication, as various conventional (e. g. proton pump inhibitors) and unconventional therapeutic agents (e. g. St. John’s wort extract) influence the CYP11A enzyme and may considerably influence the metabolism of oncological drugs (Sparreboom et al. 2006).

DNA repair processes are physiologically reduced in old age, and this may influence the primary initiation of malignant processes as well as the repair of organ damage induced by cytostatics (e. g. to the bone-marrow or to the gastrointestinal tract). In view of the side effects, the restricted functioning of the organs (either due to age or to chronic concomitant diseases) also plays an important role. Reduced stem cell reserves increase the risk of serious hematological side effects such as neutropenic fever and

anemia in elderly patients. Usually, these problems can, to a great extent, be avoided by the administration of growth factors. Various authors recommend the primary prophylactic use of G-CSF (“granulocyte colony-stimulating factor”) in patients from the age of 70 onwards if several chemotherapy cycles are planned (Zagonel et al. 1996). The recommendations of the American Society of Clinical Oncology also support the prophylactic use of hematopoietic growth factors in such cases (Smith et al. 2006).

Table 3 shows an overview of the particularities in the cytotoxic therapy of “elderly” patients.

Table 3: Possible choices in the supportive therapy of “elderly” patients

<b>Bone marrow</b>	<ul style="list-style-type: none"> <li>• Early use of growth factors, e. g. G-CSF (ESF to be decided individually)</li> <li>• Transfusions</li> </ul>
<b>Heart</b>	<ul style="list-style-type: none"> <li>• Use of liposomal anthracyclines</li> <li>• Extension of the infusion period of anthracyclines</li> <li>• Avoidance of doxorubicin if there is a significant reduction in cardiac sufficiency</li> <li>• In the case of comorbidity, optimization of cardiac medication and regular apparatus monitoring of cardiac function</li> </ul>
<b>Kidneys</b>	<ul style="list-style-type: none"> <li>• Determination and close-meshed monitoring of the individual glomerular filtration rate</li> <li>• Ensure adequate diuresis by adjustment of hyperhydration and if necessary, appropriate treatment of diarrhoea and vomiting (fluid balance)</li> <li>• If there is already a significant reduction in primary renal function, the use of non-nephrotoxic substances should be considered (e. g. taxane and anthracycline)</li> </ul>

ESF: erythropoiesis stimulating factor; G-CSF: granulocyte colony-stimulating factor



### Old age – poor prognosis?

Studies on patients with breast cancer have produced evidence that some tumor biological characteristics are also found more frequently in older patients (Ershler 1994):

- positive hormone receptor status
- good differentiation (grading I/II)
- decrease in mitotic frequency
- decreased production of growth factors due to the tumor

Furthermore, elderly women show a significant physiological decrease in the endogenous production of estrogens, which particularly stimulate the growth of receptor-positive tumors. Despite this, it appears that even minimal “estrogen concentrations” in elderly patients are sufficient to effect a tumor proliferation.

In principle, the primarily “favorable” tumor biological characteristics would lead one to expect a better prognosis for elderly patients. However, most studies have found a significantly lower survival rate among elderly patients. The reason for this difference is unclear. The influence of heightened comorbidity and the frequency of inadequate therapy are discussed as possible causes.

Most studies on the optimization of the treatment of elderly patients in gynecologic oncology concern breast cancer. According to a study by Silliman and coworkers (1997), treatment was inadequate in 16 % of the patients with breast cancer (stadium I/II) in the 50 to 69-year-old age-group, and in patients over the age of 70 the figure was as high as 32 %. An analysis presented by Lucia and coworkers showed that when systemic chemotherapy was carried out in 157 patients over the age of 70, who were suffering from stage III breast cancer, it was also feasible in this age group. This underlines the fact that therapy regimes should be chosen according to functional (biological) parameters and not according to chronological age (Lucia et al. 2003).

An analysis by Muss et al. that included 6489 patients, who had been administered chemotherapy in various dose intensities in four studies carried out by the CALGB (Cancer and Leukaemia Group B), showed that, in principle, older patients are also able to tolerate high dose intensities (Muss et al. 2005).

Age had no significant influence on the risk of recurrence. The median total survival rate of patients over 65 years of age was lower in comparison to that of patients up to the age of 50 (9 months vs. 16 months); this was, however, mainly explained by the increased lethality that was not associated with breast cancer (11 % vs. 2 %). There was no significant difference in the lethality due to treatment in both groups (1.3 % vs. 0.2 %) (Muss et al. 2005). As early as 1986, data produced by the National Cancer Institute confirmed deficits in adequate staging in older patients with ovarian carcinoma. In women over the age of 75, the

number of cases in which the stage of the tumor was not known was almost double that in younger women (7.8 % vs. 4.3 %) (Yancik et al. 1986).

In a retrospective analysis, Rahaman and coworkers studied the influence of age at operation on the outcome in patients with ovarian carcinoma (Rahaman et al. 2001). The case histories of a total of 345 patients (230 stage III and 35 stage IV) who were operated on between January 1985 and December 1994 at the Mount Sinai Medical Center were analyzed. The multivariate analysis did confirm that, on the whole, older patients (> 65 years) showed a lower 3- and 5-year survival rate (53.0 % vs. 34.3 % and 64.5 % vs. 49.2 %). However, no significant difference was found in the group of patients who underwent optimal tumor resection.

Another study carried out at the Charité in Berlin also found no significant difference in the pattern of tumor growth, between elderly and younger patients with ovarian carcinomas.

One should thus distinguish between “fit” and “multimorbid” elderly patients with ovarian carcinoma. In the case of the “fit” patients, one should proceed according to the current guidelines for operative therapy as well as for treatment with drugs. The situation is different in the case of the multimorbid patient. Here, care should be taken that the operating time is short and all steps of the operation (e.g. systematic lymphonodectomy) must be critically assessed as to whether they are necessary. Special attention must be paid to strict volume management and scrupulous hemostasis. Particular attention should be paid to the need for intensive medical care, including intensive mobilization, provision of information and integration of the patient’s relatives.

A current study on older patients with recurrent ovarian carcinoma is examining the preference of oral and i.v. treatment with treosulfane (NOGGO preference study). On the one hand, the planned safety interim analysis showed that the treatment can be applied safely, and on the other, that a large proportion of the patients prefer the infusion to the tablet. The main reason given for this preference was the “great number of other tablets that must be taken for hypertension and diabetes” (Mahner et al. 2008).

These studies underline the need not to make the choice of operative and cytostatic procedures solely dependent on the patient’s age.

The following questions summarize the main problems in interdisciplinary decision-making processes regarding the choice of therapy:

- Is the patient likely to die from the malignoma?
- What is the most effective and best treatment?
- Which side effects will the patient develop?
- Can the patient tolerate the individual side effects?
- Which prophylactic and concomitant measures can be taken?
- Divergences from treatment standards must be justified in detail.

### Conclusions for the clinical routine

- The definition of the “elderly woman” should be based on biological parameters and not on the numerical age of the patient.
- Close interdisciplinary oncological treatment management is required.
- Valid measurement instruments should be used to objectify geriatric problems in clinical routine. These instruments serve to demask the risks and weaknesses in the care and compliance of elderly patients.
- The social environment of elderly patients should be involved in the planned therapy management at an early stage.
- The use of growth factors is recommended at an early stage to avoid hematological and non-hematological side effects (the hemoglobin benchmark is about 12 g/dl).
- The extent of the accompanying morbidity must be determined and effectively treated.
- The interaction of the various drugs must be taken into consideration.
- When administering renally eliminated and nephrotoxic cytostatics, the glomerular filtration rate and fluid intake must be carefully monitored.
- By identifying risk factors for the development of side effects and by the effective use of prophylactic measures, adequate chemotherapy can be carried out and a general dose reduction is not necessary.
- In order to optimize therapy management, clinical research should more often include the »elderly woman«.
- The observation that the quality and quantity of advice and consultation decreases with the age of the patient (Greene et al. 1996) should alarm all physicians involved in the treatment of elderly patients.
- Elderly patients do not necessarily reject systemic chemotherapy. In a study by Extermann and coworkers, 70 % of the US American and French cancer patients that took part, independent of their age, said they would be prepared to undergo intensive as well as moderate chemotherapy if it were necessary (Extermann 2000).
- Apart from the physical, cognitive and psychological capabilities, the social conditions of older women should be considered when choosing a therapy. This also includes broaching logistic problems such as the proximity of the next therapy center and the quality of the domestic care.

- It is clear that the effective realization of an individually designed general oncological concept is only possible if all those involved in the care of the older patient are included. This primarily includes the general practitioner, the patient’s family, and the social services.
- Those responsible in the health services, such as hospital operators and health insurance funds, must also particularly address these concerns.
- Professional associations and work groups should become more involved in continuing education and training on the topic of “The elderly woman in gynecologic oncology”. In this connection we would like to mention the current training program of the Nord-Ostdeutschen Gesellschaft für Gynäkologische Onkologie (NOGGO) “The elderly patient in the focus of gynecologic oncology” ([www.NOGGO.de](http://www.NOGGO.de)), in which practical aspects of breast, ovarian, cervix endometrial and vulvar carcinoma are discussed, as well as current study results and geriatric assessment.

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### Keywords

Elderly patients, geriatric oncology, breast cancer, ovarian cancer

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# CME-Continuing Medical Education

## “Elderly patients” in gynecologic oncology

### Question 1

Which statement is correct with regard to elderly patients?

- Elderly patients categorically refuse to take part in clinical studies.
- Elderly patients are generally not suited to take part in clinical studies.
- The data available on the oncological treatment of elderly patients is totally adequate.
- It is imperative that elderly patients are involved in clinical studies.
- Elderly patients generally stop taking their medication during clinical studies.

### Question 2

Which of the following are *not* evaluation criteria of certain areas of the daily behavior of elderly patients?

- The type and extent of the dependency on care.
- Personal hygiene and activities of daily life (ADL).
- Instrumental activities of daily life (IADL).
- Memory capacity (e. g. measurement of dementia using the Mini-Mental state questionnaire).
- Numerical age.

### Question 3

According to the so-called Berlin Aging Study, which of the following diagnoses are *not* among the most common illnesses of “elderly” patients:

- cardiac insufficiency,
- hypertension,
- coronary heart disease,
- hearing disability,
- rheumatism.

### Question 4

On the whole, which of the following factors are *not* affected by the alterations in pharmacokinetics and pharmacodynamics of “elderly” patients in comparison to younger patients:

- distribution volumes,
- resorption,
- liver metabolism,
- urea-binding capacity,
- renal function.

### Question 5

According to recent studies, when is a patient classed as being “old”?

- From 55 years of age onwards.
- From 60 years of age onwards.
- From 65 years of age onwards.
- From 70-75 years of age onwards.
- From 100 years of age onwards.

### Question 6

Which statement is correct?

- When planning surgical procedures it is important to take the physical resources of the patient into consideration.
- Elderly patients do not run a higher surgical risk.
- Elderly patients do not run a higher risk of developing postoperative complications.
- Age is not a risk in the case of most gynecologic malignoma.
- When estimating a patient’s “age” the numerical age is of greater importance than the examination of functional parameters.

### Question 7

Which statement is correct?

- Elderly patients in particular must be hydrated beforehand, when cisplatin is administered.
- Topotecane may be administered to elderly patients with renal insufficiency without reduction of the dose.
- The cardiotoxicity of cytostatics may be ignored for elderly patients.
- Alopecia caused by chemotherapy does not occur in elderly patients.
- Hematological side effects are less common in elderly patients than in young patients.

### Question 8

Which statement is correct?

- In elderly patients, special attention should be paid to the possibility of anemia and leucopenia, and the indication of factors should be assessed.
- G-CSF is contraindicated for elderly patients.
- Erythropoietin is generally contraindicated for elderly patients.
- Chemotherapy should not be administered to elderly patients with breast cancer, even if the patient is at great risk.
- Chemotherapy is not necessary in elderly patients with advanced ovarian carcinomas.

**Question 9**

Which statement is correct?

- a. Ovarian carcinomas are never found in women over the age of 80.
- b. Ovarian carcinomas are never found in women under the age of 30.
- c. The median age at first diagnosis is about 60 years.
- d. The median age at first diagnosis is about 70 years.
- e. The median age of first diagnosis is about 75 years.

**Question 10**

Which statement is correct?

- a. Geriatric assessment should only be employed in women over the age of 75.
- b. Geriatric assessment may be used to evaluate the functional resources of the patient.
- c. Geriatric assessment should only be employed in studies.
- d. Geriatric assessment should only be performed by psychologists.
- e. Geriatric assessment can only be interpreted using complicated computer programs.