Geriatric Assessment for Older Patients with Non-small Cell Lung Cancer

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Geriatric Assessment for Older Patients with Non-small Cell Lung Cancer: Daily Practice of Centers Participating in the NVALT25-ELDAPT Trial

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Abstract

Introduction Geriatric assessment (GA) for older patients with lung cancer could provide insight into vulnerability, cognitive impairment, and risk of toxicity. Discontinuation and complications of intensive treatment could potentially be prevented in vulnerable and frail patients. This study aimed to evaluate current clinical practice of GA for older patients with lung cancer in the Netherlands and identify potential hurdles for implementation.

Methods Pulmonologists and radiation oncologists participating in the NVALT25-ELDAPT trial completed an online questionnaire regarding current practice of GA, added value of GA for treatment decision-making and logistic barriers for patients with non-small cell lung cancer.

Results 15 out of 17 centers responded. Three performed GA as standard procedure, three on indication, eight considered a frailty screening step before GA, and one did not perform GA. Suspicion of cognitive problems was mentioned most often as indication for GA and of added value for treatment decision-making, followed by older age, curative-intent treatment, and stage I–III lung cancer. Administered instruments for screening and extensive GA were diverse. Main barriers to implement GA in clinical practice were logistic problems (timescales and availability of trained personnel).

Conclusion The use of GA in clinical practice for patients with lung cancer varied widely across centers regarding instruments and domains. Physicians are uniform in their opinion about indications for GA and the added value for treatment decision-making. Research should focus on manageable instruments and important domains to assess for this heterogeneous group of older patients with lung cancer to optimize treatment selection.

Trial registration The NVALT25-ELDAPT trial is registered under trial number NCT02284308. Details are available at http://www.eldapt.org (predominantly in Dutch).

Keywords Geriatric assessment · Non-small cell lung cancer · Frailty · Questionnaire · Elderly

Abbreviations

ADL	Activities of daily living
CHRT	Chemoradiotherapy

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ELDAPT	Elderly with locally advanced lung cancer: deciding through geriatric Assessment on the oPtimal Treatment strategy
GA	Geriatric assessment
GFI	Groningen frailty indicator
GP	General practitioner
ICF	International classification of functioning
IADL	Incremental activities of daily living
MMSE	Mini-mental state examination
MNA	Mini nutritional assessment
NSCLC	Non-small cell lung cancer
NVALT25	Dutch association of medical specialists for lung disease and tuberculosis (study number 25)
PS	Performance status
SPPB	Short physical performance battery

Introduction

For older patients with cancer, geriatric assessment (GA) is recommended prior to treatment [1, 2]. Although evidence is accumulating, GA is considered time-consuming and not yet part of standard care [1–3]. However, it provides important information on multiple domains regarding age-related deteriorations (comorbidity, dependency and mobility, cognitive and emotional status, malnutrition and social context), and gains insight into patients' vulnerability [4, 5]. Half of patients with lung cancer are aged 70 years or older at the time of diagnosis [6]. Previously undiagnosed impairments come to light in 58% of this population through GA [7]. As a result, patients can receive non-oncologic interventions additional to treatment or adaptations in the intensity of treatment [7], in order to avoid treatment-related toxicity [8].

For patients with locally advanced (stage III) non-small cell lung cancer (NSCLC), a meta-analysis showed significant superior survival of concurrent chemoradiotherapy (CHRT) compared to sequential CHRT. However, patients aged 70 years or older were underrepresented (only 13% received concurrent CHRT and 19% sequential CHRT) [9]. In the Netherlands, a retrospective study did not show superior survival for concurrent CHRT compared to sequential CHRT in patients aged ≥ 70 years in clinical practice [10], and a nationwide study did not find significant differences in survival for CHRT between patients aged 65–74 years and those aged ≥ 75 years [11]. Also, complications, hospitalization, and discontinuation of treatment are common during CHRT, especially among older patients [12–14]. While better quality of life and functional status [instrumental activities of daily living (IADL)] at diagnosis are associated with better prognosis among patients with advanced lung cancer undergoing chemotherapy [15], half of patients with (locally) advanced NSCLC show functional decline during (intensive) treatment [16]. Therefore, it may be important to incorporate domains, which can be clarified by GA, in the process of treatment decision-making to estimate potential effects on treatment tolerance and survival [17–19]. Although advances in geriatric oncology and evidence regarding GA for patients with lung cancer are stacking, it remains unknown to what extent GA is currently applied in daily clinical practice.

The objective of this study was to evaluate the current practice of GA in the process of treatment decision-making in daily clinical practice and barriers for GA in standard care for older patients with lung cancer.

Methods

Pulmonologists and radiation oncologists of 17 treatment centers were approached to report on the use of GA in daily clinical practice in their hospitals by completing an online questionnaire. These physicians were principal investigators in the NVALT25-ELDAPT trial[1](Elderly with locally advanced Lung cancer: Deciding through GA on the oPtimal Treatment strategy, study 25 of the Dutch association of medical specialists for lung disease and tuberculosis).

The online questionnaire was designed by consensus of the (co-)authors of this study (Appendix). SurveyMonkey (SurveyMonkey Inc., San Mateo, California USA, http://www.surveymonkey.com) was used for distribution and collection of answers between May and August 2016. The questionnaire addressed the assessment of older patients with (non-small cell) lung cancer in general clinical practice before initiation of the NVALT25-ELDAPT trial. Indications for GA, expected added value for treatment decision-making, instruments used to perform GA, potential barriers for the execution of GA in the context of the NVALT25-ELDAPT trial, and other relevant factors apart from GA (i.e., involvement of general practitioner (GP)) were included. The use of a GA was categorized as use of a screening step (to select a frail subpopulation in which GA is performed), an extensive multidomain assessment, or no assessment. Furthermore, the consultation of a geriatrician was assessed. A reminder was sent by email 2 weeks after non-response. The second reminder was sent 2 weeks thereafter, and the third reminder 2 weeks after the second. No further actions were issued in case of non-response after three reminders. IBM SPSS Statistics 22.0 was used for analysis. Results were displayed by frequencies, percentages, and expert opinion.

[1] The NVALT25-ELDAPT trial is registered under trial number NCT02284308. Details are available at http://www.eldapt.org (predominantly in Dutch).

Table 1 Applied information sources for standard evaluation of geriatric characteristics according to fifteen centers in current clinical practice

	A	B	C	D	E	F	G	H†	I†	J	K	L	M	N†	O
Pulmonologist	x	x	x	x		x	x	x	x	x			x	x	
General practitioner	x	x		x		x	x	x	x	x	x	x			
Geriatrician*	x	●	x	x	x						x	x			
Short screening	x	x	x		x	x									
Extensive screening	x	●		x	x			●						●	
No geriatric screening															x

*Consultation or presence at tumor board

†Answered by radiation oncologist

x represents applied in current practice

● represents on indication

In the NVALT25-ELDAPT trial, all patients with stage III NSCLC aged 75 years or older will undergo extensive GA. Patients classified as vulnerable through GA are re-evaluated by a geriatrician and re-classified as fit (if applicable after geriatric intervention) or frail. Fit patients providing additional informed consent are randomized to concurrent CHRT or sequential CHRT, and frail patients receive treatment at the discretion of the pulmonologist. The aim of the NVALT25-ELDAPT trial is to generate evidence for predictive factors for quality-adjusted survival, GA instruments, and personalized treatment decision-making in this heterogeneous and under-investigated patient population. The results of the questionnaire stand apart from patient-related outcomes in the NVALT25-ELDAPT trial.

Results

Twelve pulmonologists and three radiation oncologists of 15 centers filled out the questionnaire with a total response rate of 88% (15/17). Sixty percent had ≥ 10 years of experience regarding treatment of lung cancer as a medical specialist. Extensive GA was standard procedure in three centers (20%, Table 1), while GA was performed on indication in three additional centers.

Of all physicians, 72% indicated that the clinical view of the pulmonologist was used to estimate geriatric factors. Also, 67% incorporated information from GPs, and only half of respondents included the view of a geriatrician (46%). Information provided by relatives was mentioned as well (13%). Most often, the view of the pulmonologist and GP were combined. In one center, no GA, screening instrument, or geriatric consultation was used in daily standard care. Reasons to perform geriatric screening in clinical practice were suspicion of cognitive problems (Fig. 1), followed by consideration of curative-intent treatment, age ≥ 70 years, stage I, II, or III disease, and comorbidity. In two centers, age ≥ 70 years, and age ≥ 65 years were explicit and decisive indications to administer (extensive) GA as part of standard care. Predefined instruments contributing to GA were used in eight centers and ranged from one to seven domains, including instruments for performance status, comorbidity, mobility, and/or social environment (Table 2).

Although GA was not part of standard care in most centers, several indications were recognized to be important for treatment decision-making (Fig. 2): Suspicion of cognitive problems, consideration of treatment with curative intent, multiple comorbidities, stage III disease, and performance status (score ≥ 2 according to 47% of respondents). One respondent explicitly mentioned that any physical performance score could lead to additional GA, as it is a subjective measurement. Another respondent designated that performance score is only a limited estimation and should not influence the application of GA. Additionally, the following results of the GA were broadly recognized to adjust treatment regimen: dementia, ADL-dependency, vulnerability, no caretakers, and malnutrition (Fig. 3). One respondent explicitly indicated that only a complete GA would be important to deviate from standard treatment and not individual deviant domains.

Barriers that were considered to hinder the execution of GA in current clinical practice were logistic planning

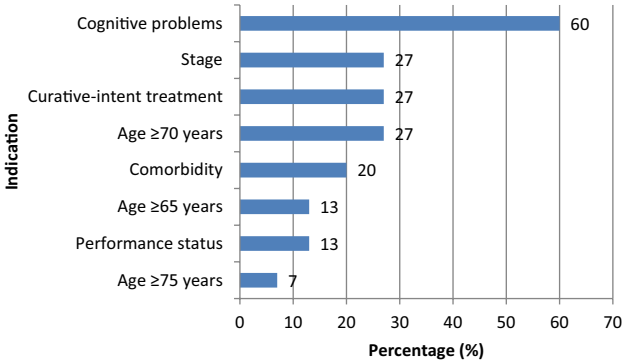

Fig. 1 Indications for geriatric assessment (GA) according to fifteen centers. Percentages are calculated for each indication individually (total count > 100%)

Table 2 Components of short and extensive geriatric assessment (GA) indicated by six centers

Center	Screening instrument or tool	Geriatric assessment (GA) and its predefined components
A	G8	PS, comorbidities, mobility, social environment
B	Components unknown	Geriatric navigator, MMSE, MNA, PS, comorbidity, mobility, social environment
C	SPPB	Geriatric navigator
D	Extensive screening only	ADL, IADL, MNA, PS, comorbidities, mobility, social environment
E	GFI	On indication, components unknown
F	ICF	On indication, components unknown

PS performance status, *SPPB* short physical performance battery, *GFI* Groningen frailty indicator, *ICF* international classification of functioning, *MMSE* mini-mental state examination, *MNA* mini nutritional assessment, *ADL* activities of daily living, *IADL* incremental activities of daily living

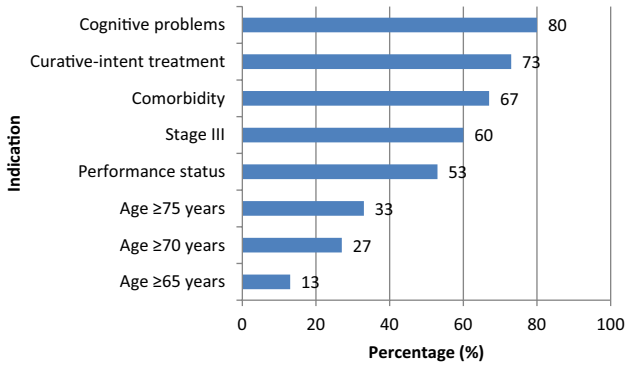

Fig. 2 Indications for which geriatric assessment (GA) could provide added value according to fifteen centers. Percentages are calculated for each indication individually (total count > 100%)

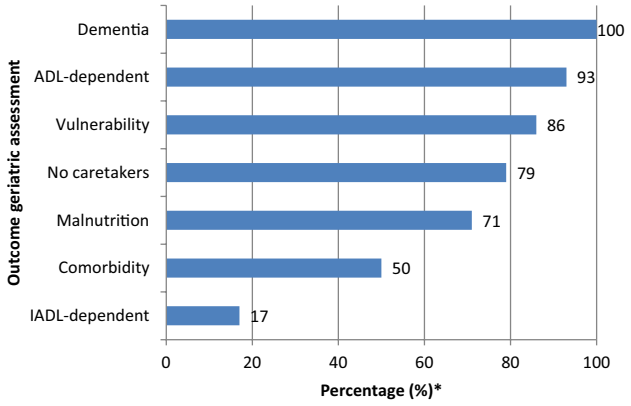

Fig. 3 Important outcomes of geriatric assessment (GA) to deviate from standard treatment according to fourteen centers. *ADL* activities of daily living, *IADL* instrumental activities of daily living. Percentages are calculated for each indication individually (total count > 100%)

within hospital timescales (53%), availability of a geriatrician (40%), staff planning and budget (33%), and patient motivation (27%). Only three centers did not mention barriers (20%): Two of these three centers already incorporated GA as part of standard care and the third performed GA on indication. All participants acknowledged the need for scientific evidence in this field.

Discussion

The use of GA in standard daily care for older patients with lung cancer varied widely among treatment centers in the Netherlands. Everyday sources for (geriatric) information were dissimilar, as were instruments for a screening step, and for extensive GA covering different domains. Especially (suspicion of) cognitive problems were recognized to be of added value for treatment decision-making, followed by older age, intention to start curative treatment, and stage I-III NSCLC.

The added value of GA in older patients with cancer has been widely recognized in the research field of geriatric oncology [1]. Current evidence mainly focused on geriatric patients with breast or colorectal cancer, with less evidence for the heterogeneous and often vulnerable group of patients with lung cancer. Suspicion of cognitive problems, curative-intent treatment, and higher age are recognized as important indications for GA as they could impact treatment tolerance, survival, and quality of life [12, 17]. High age alone should not be decisive to withhold standard treatment. Although age-related deteriorations are warranted in this group, they are not visible or estimable without GA [7, 20]. Consequently, clinical judgments of PS or comorbidity by the treating physician could result in less intensive treatment, while specific advice of a geriatrician is lacking [16].

Specific indications for GA were acknowledged more often than the actual application of these indications in clinical practice, which may reduce the impact on treatment decision-making and treatment outcomes [21]. This discrepancy could be due to several barriers like lack of consensus on the gold standard of GA, lack of standards to classify patients into risk groups [21], lack of evidence regarding the effectiveness of GA for this specific patient group [4], or logistic issues withholding cooperation with a geriatrician. In this study, logistic issues were mentioned most often,

such as timescale for diagnostic procedures and decision-making, as well as the availability of a geriatrician. Over half of centers indicated that treatment decision-making for older patients with NSCLC was based on the clinical view of the treating physician, without interference of a geriatrician. It is known that the evaluation of geriatric characteristics by physicians other than geriatricians can lead to misclassification of frailty in older patients with cancer [22]. Although information of the GP may provide additional insights in overall health status of the patient, essential information may be overlooked, leading to an underestimation of pre-frailty and frailty [18, 20]. Numerous actual health problems can only be discovered by thorough assessment, which could alter treatment decisions in at least one in four patients [7, 20, 21]. Unrecognized deficits and strengths may influence treatment decisions and, consequently, may negatively impact treatment outcomes and quality of life [4, 15]. Therefore, implementation projects for uniform, reliable, and clinically applicable GA are necessary and should be facilitated on an (inter)national level [2].

Screening instruments are often used before applying more extensive GA as the use is less time-consuming, cumbersome, and resource-intensive [20, 23]. However, a large variety of screening instruments are used [17, 24]. Systematic evidence pointed out that the effectiveness of screening instruments remains equipoise and the superiority of a specific tool could not be affirmed due to diverse applications in trials and clinical practice [5, 21]. Nonetheless, at least some form of GA should be considered to personalize treatment decision-making [18]. Additional specific instruments, such as the CARG or CRASH toxicity tools, can be considered to gain insight in a specific outcome, i.e., predicting (treatment-related) toxicity [25, 26]. Nevertheless, the processing times within the hospital could delay the start of treatment, as well as the logistic planning, costs, and time consumption of planning and performing GA [20, 21]. Although these barriers for extensive GA are broadly recognized, these are not easy to overcome in clinical practice. Therefore, evidence regarding GA for patients with lung cancer specifically is highly needed. The recently started NVALT25-ELDAPT trial aims to generate evidence regarding screening instruments, extensive GA, cut-off points for vulnerability, and evidence regarding survival, toxicity, and quality of life for the heterogeneous and predominantly older group of patients with stage III NSCLC [4, 21]. As the available evidence is scarce for this understudied group, the results of the trial are awaited expectantly to improve treatment-decision-making by guidance of GA in the future and thereby optimizing patient-centered outcomes.

The high response rate and results of this study confirm the importance and need for evidence of GA for older patients with NSCLC. As principal investigators of the centers participating in the NVALT25-ELDAPT trial were approached before initiation of the study, outcomes could be incorporated directly into logistic information and prevent possible barriers of the study program. An additional evaluation will be performed after implementation of the trial in the same centers, examining experiences and barriers of extensive geriatric screening. Other strengths are that abundant and specific information could be collected in a short period of time by distributing a questionnaire. A limitation of the study is that a validated questionnaire was not available. However, it was designed by consensus of the project leaders and face validity has been extensively evaluated. Also, the content and intention of questions were independently evaluated and thoroughly discussed afterwards by a radiation oncologist, pulmonologist, and two (clinical) epidemiologists. This leads to highly specific and relevant questions for the objective of this study, and effects of researcher imposition were minimal [27]. Another potential limitation is that the rather small sample size might have led to selection bias, as included centers could be more research-minded compared to other clinical facilities in the Netherlands and Belgium. However, principal investigators were selected before initiation of the trial and regarded as representatives for their multidisciplinary team of academic, teaching, and tertiary centers. Hereby, valuable insights could be gained regarding the current practice of GA for patients with lung cancer covering fifteen different centers.

Conclusion

The use of GA varied widely across centers treating older patients with lung cancer. Logistic barriers as timescales and availability of a geriatrician seem to be dominant for implementing GA in standard care. Although physicians recognize patient categories that could benefit from GA and factors which are of added value for treatment decision-making, specific evidence regarding tools and individual patients is highly needed in order to select the optimal treatment strategy in this older and heterogeneous patient group. The current results set priority for properly conducted research to determine the effectiveness of GA, specific domains, and tools to assess vulnerability correctly among older patients with NSCLC.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Extermann M, Aapro M, Bernabei R, Cohen HJ, Droz J-P, Lichtman S, Mor V, Monfardini S et al (2005) Use of comprehensive geriatric assessment in older cancer patients. Crit Rev Oncol Hematol 55(3):241–252
2. Wildiers H, Heeren P, Puts M, Topinkova E, Janssen-Heijnen MLG, Extermann M, Falandry C, Artz A et al (2014) International Society of Geriatric Oncology Consensus on geriatric assessment in older patients with cancer. J Clin Oncol 32(24):2595–2603
3. Hamaker ME, Wildes TM, Rostoft S (2017) Time to stop saying geriatric assessment is too time consuming. J Clin Oncol 35(25):2871–2874
4. Schulkes KJG, Hamaker ME, van den Bos F, van Elden LJR (2016) Relevance of a geriatric assessment for elderly patients with lung cancer—a systematic review. Clin Lung Cancer 17(5):341–349.e3
5. Gosney MA (2005) Clinical assessment of elderly people with cancer. Lancet Oncol 6(10):790–797
6. Driessen EJ, Aarts MJ, Bootsma GP, van Loon JG, Janssen-Heijnen ML (2017) Trends in treatment and relative survival among non-small cell lung cancer patients in the Netherlands (1990–2014): disparities between younger and older patients. Lung Cancer 108:198–204
7. Schulkes KJG, Souwer ETD, Hamaker ME, Codrington H, van der Sar-van der Brugge S, Lammers JWJ, Portielje JEA, van Elden LJR et al (2017) The effect of a geriatric assessment on treatment decisions for patients with lung cancer. Lung 195(2):225–231
8. Corre R, Greillier L, Caër HL, Audigier-Valette C, Baize N, Bérard H, Falchero L, Monnet I et al (2016) Use of a comprehensive geriatric assessment for the management of elderly patients with advanced non–small-cell lung cancer: the phase III randomized ESOGIA-GFPC-GECP 08–02 Study. J Clin Oncol 34(13):1476–1483
9. Aupérin A, Le CP, Rolland E, Curran WJ, Furuse K, Fournel P, Belderbos J, Clamon G et al (2010) Meta-analysis of concomitant versus sequential radiochemotherapy in locally advanced non-small-cell lung cancer. J Clin Oncol 28(13):2181–2190
10. Driessen EJ, Bootsma GP, Hendriks LE, van den Berkmortel FW, Bogaarts BA, van Loon JG, Dingemans AC, Janssen-Heijnen ML (2016) Stage III non-small cell lung cancer in the elderly: patient characteristics predictive for tolerance and survival of chemoradiation in daily clinical practice. Radiother Oncol 121(1):26–31
11. Driessen EJM, Schulkes KJG, Dingemans A-MC, van Loon JGM, Hamaker ME, Aarts MJ, Janssen-Heijnen MLG (2018) Patterns of treatment and survival among older patients with stage III non-small cell lung cancer. Lung Cancer 116:55–61
12. Cardenal F, Nadal E, Jové M, Faivre-Finn C (2015) Concurrent systemic therapy with radiotherapy for the treatment of poor-risk patients with unresectable stage III non-small-cell lung cancer: a review of the literature. Ann Oncol 26(2):278–288
13. Gridelli C, Langer C, Maione P, Rossi A, Schild SE (2007) Lung cancer in the elderly. J Clin Oncol 25(14):1898–1907
14. Semrau S, Zettl H, Hildebrandt G, Klautke G, Fietkau R (2014) Older patients with inoperable non-small cell lung cancer. Strahlenther Onkol 190(12):1125–1132
15. Maione P, Perrone F, Gallo C, Manzione L, Piantedosi F, Barbera S, Cigolari S, Rosetti F et al (2005) Pretreatment quality of life and functional status assessment significantly predict survival of elderly patients with advanced non—small-cell lung cancer receiving chemotherapy: a prognostic analysis of the multicenter Italian lung cancer in the elderly study. J Clin Oncol 23(28):6865–6872
16. Decoster L, Kenis C, Schallier D, Vansteenkiste J, Nackaerts K, Vanacker L, Vandewalle N, Flamaing J et al (2017) Geriatric assessment and functional decline in older patients with lung cancer. Lung 195(5):619–626
17. Blanco R, Maestu I, de la Torre MG, Cassinello A, Nunez I (2015) A review of the management of elderly patients with non-small-cell lung cancer. Ann Oncol 26(3):451–463
18. Handforth C, Clegg A, Young C, Simpkins S, Seymour MT, Selby PJ, Young J (2015) The prevalence and outcomes of frailty in older cancer patients: a systematic review. Ann Oncol 26(6):1091–1101
19. Kale MS, Mhango G, Gomez JE, Sigel K, Smith CB, Bonomi M, Wisnivesky JP (2017) Treatment toxicity in elderly patients with advanced non-small cell lung cancer. Am J Clin Oncol 40(5):470–476
20. Kenis C, Bron D, Libert Y, Decoster L, Van Puyvelde K, Scalliet P, Cornette P, Pepersack T et al (2013) Relevance of a systematic geriatric screening and assessment in older patients with cancer: results of a prospective multicentric study. Ann Oncol 24(5):1306–1312
21. Puts MTE, Santos B, Hardt J, Monette J, Girre V, Atenafu EG, Springall E, Alibhai SMH (2014) An update on a systematic review of the use of geriatric assessment for older adults in oncology. Ann Oncol 25(2):307–315
22. Wedding U, Ködding D, Pientka L, Steinmetz HT, Schmitz S (2007) Physicians' judgement and comprehensive geriatric assessment (CGA) select different patients as fit for chemotherapy. Crit Rev Oncol/Hematol 64(1):1–9
23. Decoster L, Van Puyvelde K, Mohile S, Wedding U, Basso U, Colloca G, Rostoft S, Overcash J et al (2015) Screening tools for multidimensional health problems warranting a geriatric assessment in older cancer patients: an update on SIOG recommendations†. Ann Oncol 26(2):288–300
24. Smets IH, Kempen GI, Janssen-Heijnen ML, Deckx L, Buntinx FJ, van den M, Akker (2014) Four screening instruments for frailty in older patients with and without cancer: a diagnostic study. BMC Geriatr 14:26
25. Nie X, Liu D, Li Q, Bai C. Predicting chemotherapy toxicity in older adults with lung cancer. Journal of Geriatric Oncology 2013 4(4):334–339
26. Extermann M, Boler I, Reich RR, Lyman GH, Brown RH, DeFelice J, Levine RM, Lubiner ET et al (2012) Predicting the risk of chemotherapy toxicity in older patients: the Chemotherapy Risk Assessment Scale for high-age patients (CRASH) score. Cancer 118(13):3377–3386
27. Ackroyd S, Hughes JA (1981) Data collection in context. In: Series aspects of modern sociology. Longman, London