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Functional impairment prior to major non-cardiac surgery is associated with mortality within one year in elderly patients with gastrointestinal, gynaecological and urogenital cancer: A prospective observational cohort study

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ABSTRACT

Objective: To investigate the prognostic value of elements of the Geriatric Assessment, in particular the Timed Up and Go (TUG) Test and the Barthel Index of Activities of Daily Living (ADL) for one-year post-operative mortality in elderly patients with cancer.

Materials and Methods: This prospective cohort study included patients 65 years of age or older undergoing elective major surgery for cancer between June 2008 and June 2010. Preoperative functional status was measured by the TUG Test and the Barthel Index of ADL. Cognitive state was assessed by the Mini Mental State Examination (MMSE). Complications were recorded prospectively. The degree of resection was noted.

Results: Data from 131 patients (56% women; median age, 71 years) were analysed at 1 year of follow-up. Mortality after 1 year was 28.2%. Twenty-nine patients (22.3%) were dependent in ADLs, and 43 (35.2%) impaired in TUG. Thirteen patients (10.7%) were both, dependent in ADLs and impaired in TUG. Short-term complications after surgery occurred in 66% of patients, and major complications occurred in 29%. Patients who were dependent in ADLs and impaired in TUG had significantly higher 1-year mortality (OR, 4.5; 95% CI, 1.21–18.25; $p = 0.034$). Lower scores on the MMSE (OR, 0.64; 95% CI, 0.43–0.95; $p = 0.048$) and incomplete surgical resection (OR, 3.25; 95% CI, 1.15–9.20; $p = 0.026$) were independently associated with higher 1-year mortality.

Conclusion: Functional assessments, such as ADL and TUG scores, as well as mild cognitive impairment, are predictors of long-term outcome in elderly cancer patients.

Trial Registration: German Clinical Trials Register (DRKS 00005150)

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1. Introduction

Cancer is a highly prevalent disease in the elderly. In North America and Europe, the majority of patients with solid cancer patients are 65 years or older [1,2]. Surgery alone or as part of a multimodality treatment regime is still the state of the art therapy for solid tumours [3]. Elective surgery is generally safe with low mortality rates, but perioperative mortality and morbidity in elderly patients are still higher than in

younger ones [4–6]. Furthermore, reported overall post-operative complications are high with rates over 60% [5,7]. Traditionally, the ASA (American Association of Anesthesiology) score and risk stratification for single organ systems were the perioperative risk assessments prior to surgery [5,8,9]. It has been shown that the ASA score is not sufficient to assess the particular risks in elderly patients with cancer [5,7–11]. Elements from the Geriatric Assessment (GA), in particular physical performance tests, were found to predict post-operative complications [4, 9,12]. The GA was developed from pre-existing geriatric assessments to evaluate functional status, co-morbidities, mental status and nutritive state activities of elderly patients with cancer, as well as to predict the individualized risks associated with cancer surgery [4,5].

Both the International Society of Geriatric Oncology (SIOG) and the National Comprehensive Cancer Network (NCCN) recommend that elderly patients with cancer undergo geriatric assessment [13,14]. The predictive value of the physical performance tests of the GA for long-term mortality has been shown in studies of elderly patients living in

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the community [15]. There have been few publications of long-term post-operative observations [9].

The objective of the present prospective observational cohort study, was to determine whether elements of a preoperative geriatric assessment could predict long-term mortality after major cancer surgery in elderly patients.

2. Materials and Methods

2.1. Study Design

The study was performed as a clinical prospective observational cohort study at the Charité-University Hospital in Berlin, Germany, a tertiary medical care centre with 3200 beds. The study was designed as a pilot study testing feasibility of conducting geriatric assessment preoperatively. The study was conducted in compliance with the Helsinki Declaration. The Institutional Review Board of Charité-Universitaetsmedizin Berlin approved the study (EA 2/103/07). The study is registered at the German Clinical Trials Register (DRKS 00005150). All participants gave their written informed consent.

2.2. Patients

From June 2008 to July 2010, all patients 65 years of age or older scheduled for surgery for gastrointestinal, urogenital or gynaecologic cancer were screened for eligibility. Follow-up was performed 12 months after surgery. The last follow-up visit for the last patient was completed in October 2011.

Patients were eligible if they were able to understand or read the German language, had a Mini Mental State Examination (MMSE) score of 24 points or higher and were able to provide written informed consent.

The exclusion criteria were age under 65 years, two or more concurrent carcinomas, emergency surgery, participation in another trial and insufficient knowledge of the German language. Patients unable to give informed consent were also excluded (Fig. 1).

2.3. Data Collection

2.3.1. Activities of Daily Living

The ADL score was assessed by the Barthel Index [16]. The questionnaire includes 10 items measuring basic self-care abilities, such as mobility, stair climbing, transferring from bed to chair, feeding, bathing or showering and urinary and faecal continence. Scores range from 0 to 100, with 100 indicating complete independence. A score below 100 indicates the need for daily assistance in one or more activities and was defined as dependence in ADLs in the present study. The Instrumental Activities of Daily Living (IADL) test by Lawton and Brody [17] assesses independent living skills. The IADL measures eight domains of functioning in daily life, including mobility, housekeeping, domestic and leisure activities. Historically, women were scored in all eight domains, whereas men were not scored in the domains of food preparation, housekeeping and laundering. However, current recommendations are to assess all domains for both sexes [18]. Scores range from 0 (low function, dependent) to 8 (high function, independent).

2.3.2. Timed Up and Go Test

For objective measurement of physical functioning, the TUG described by Podsiadlo and Richardson [19] was used. The study staff, trained by a gerontologist, demonstrated how to perform the TUG and then instructed the patient to stand up, walk 3 m at his or her usual speed, turn around, walk back and sit down again. The patients could use their walking aids. The times needed for these activities were measured with a stop watch and noted to the nearest 0.1 s. Freely independent patients are able to complete the test in 10 s, whereas a time

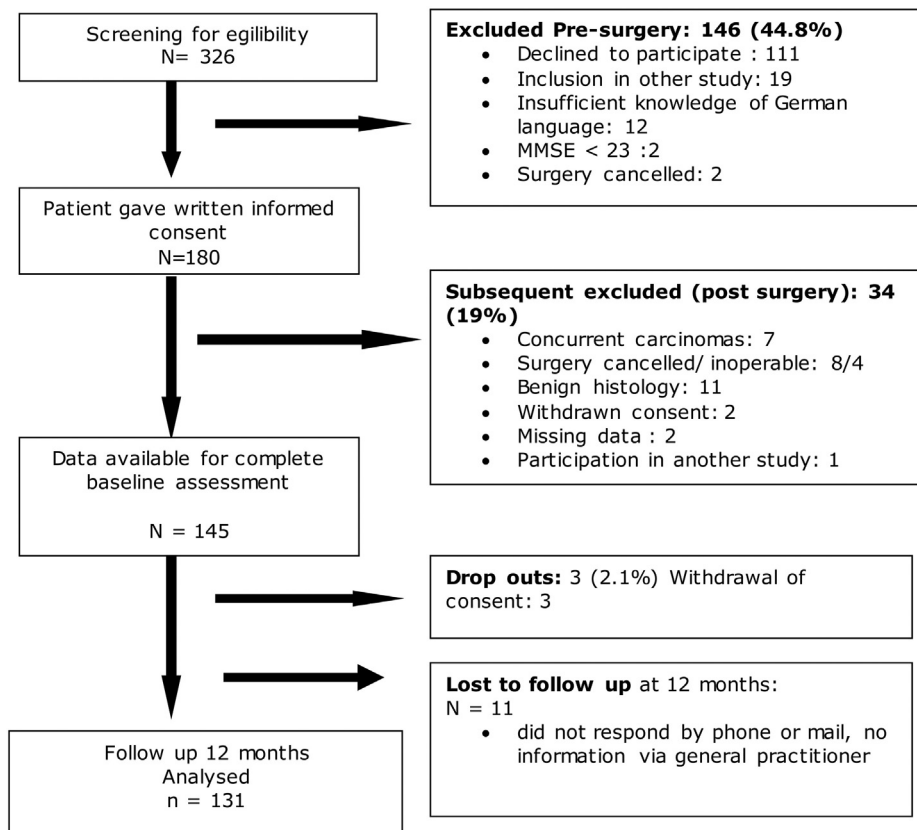


Fig. 1. CONSORT flow chart. Enrolment of patients.

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