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Original article

Age-related variation and predictors of long-term quality of life in germ cell tumor survivors

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Abstract

Purpose: To compare long-term health-related quality of life (QoL) in germ cell tumor survivors (GCTS) and age-adjusted men and to identify predictors of variation in long-term QoL in GCTS.

Methods: We used the Short-Form Health Survey to measure QoL in a cross-sectional sample of 164 survivors of germ cell tumors from Hamburg, Germany. QoL was compared with age-adjusted German norm data. Sociodemographic and medical data from questionnaires and medical records were used to find predictors of QoL.

Results: On average, patients were 44.4 years old (standard deviation = 9.6 y) and average time since first germ cell tumor diagnosis was 11.6 years (standard deviation = 7.3 y). We found significantly lower mental component scores in GCTS when compared with norm data (Hedges $g = -0.44$, $P < 0.001$). An exploratory analysis by age group showed the largest difference in mental QoL in survivors aged 31 to 40 years (Hedges $g = -0.67$). Linear regression analysis revealed age ($\beta = -0.46$, $P < 0.001$), marital status ($\beta = 0.20$, $P = 0.024$), advanced secondary qualifications ($\beta = -0.25$, $P = 0.001$), time since diagnosis ($\beta = 0.17$, $P = 0.031$), and tumor stage ($\beta = 0.17$, $P = 0.024$) as statistically significant predictors of the physical component score, accounting for 22% of the variance. Statistically significant predictors of the mental component score were higher secondary qualifications ($\beta = 0.17$, $P = 0.033$) and unemployment ($\beta = -0.21$, $P = 0.009$), accounting for 6% of the variance.

Conclusions: Survivors of germ cell tumors can expect an overall long-term QoL similar to that of other men of their age.

Keywords: Testicular cancer; Long-term quality of life; Germ cell tumor; Survivor; Psycho-oncology; Mental health

1. Introduction

Today, more than 95% of patients with germ cell tumor are cured because of advances in diagnosis and treatment such as cisplatin-based chemotherapy [1]. Patients having germ cell tumors are relatively young at first diagnosis (typically between 20 and 45 y) and can live on for decades after successful tumor treatment. Therefore, data on long-term impairment of quality of life (QoL) are of particular relevance. In germ cell tumor survivors (GCTS), the risk for premature metabolic syndrome and second malignancies as well as cardiovascular, renal, neurological, and pulmonary late toxicities has been well known for years [2,3].

It has repeatedly been found that GCTS' overall health-related QoL is comparable to that of age-adjusted men in the long term [4–6]. Significant decreases in QoL have been observed mainly within the first year after diagnosis [7].

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However, predictors of variation in long-term QoL remain to be identified. Most studies were not able to detect effects of treatment modalities on long-term QoL [6,8], but the results have been somewhat heterogeneous. Kim et al. [9] found that only patients treated with chemotherapy showed significantly lower QoL 5 years after first diagnosis. Contrary to that, Mykletun et al. [8] found that long-term side effects and cancer-related (posttraumatic) stress, but not treatment modality, partly accounted for variation in QoL.

Other identified risk factors of low QoL, such as physical symptoms, chronic fatigue, or unemployment combined with an additional chronic disease, tend to be part of the QoL construct or unspecific to GCTS [10,11].

This cross-sectional study therefore aimed to (1) compare the QoL of GCTS and age-adjusted men in the long term and (2) identify predictors of variation in long-term QoL in GCTS.

2. Methods

2.1. Patients and procedures

In this cross-sectional study, we enrolled adult male patients with germ cell cancer from the outpatient ward of the University Medical Center within the University Cancer Center Hamburg and a specialized private practice in Hamburg, Germany. All patients with a histologically confirmed diagnosis of GCT who were treated during the follow-up period at these 2 institutions in October 2012 were eligible for study participation if they had completed antitumor treatment at least 12 months prior without any further evidence of the disease. Further inclusion criteria were 18 years and older; proficiency in written and spoken German; and physical, cognitive, and verbal ability to give informed consent. The study received ethical approval by the ethics committee of the Medical Council in Hamburg, Germany, and all participants provided written informed consent.

All eligible patients were contacted by their treating germ cell cancer specialist either in a personal conversation or via mail and were asked to complete a set of questionnaires.

2.2. Measures

Sociodemographic data were assessed via a structured self-report questionnaire. Medical and treatment-related information was collected through medical records.

Health-related QoL was measured using the Short-Form Health Survey (SF-8) [12,13], a validated 8-item questionnaire assessing 8 dimensions of QoL—physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), mental health (MH), and role emotional (RE)—and 2 summary scores for physical component scores (PCS) and mental health (mental component score [MCS]). Each item score or summary measurement ranges from 0 to 100, higher scores indicating better QoL. Representative German population-based reference data for different age groups were published by Ellert et al. [13].

2.3. Statistical analysis

Descriptive statistics including means, standard deviations, and frequencies were determined. Group comparisons with QoL population-based data from age-adjusted men were calculated using t tests for independent samples; bias-corrected standardized mean differences (Hedges g) were used to determine effect sizes [14]. Bivariate associations were calculated by product-moment correlation. All significance tests were 2-tailed using a significance level of $\alpha < 0.05$.

We calculated linear regression models for predictors of the SF-8 PCS and MCS. The sample size before regression was $n = 164$. For each exploratory regression, missing values were deleted listwise, resulting in sample sizes of $n = 157$ for the PCS model and $n = 156$ for the MCS model.

Firstly, we chose variables from 2 sets: (1) social characteristics: age, marital status, children (yes/no), educational degree, and employment status (employed, retired, or unemployed) and (2) medical characteristics: time since diagnosis, tumor stage (localized vs. metastasized), effect of chemotherapy (complete remission, tumor marker–negative partial remission, tumor marker–positive partial remission, progressive disease, and stable disease), number of chemotherapy cycles, type of histology (seminoma vs. nonseminoma), secondary resection of residuals, additional radiotherapy, and germ cell tumor relapse. All categorical variables were dummy-coded.

Secondly, we screened all variables for multicollinearity. For strongly correlated variables (Pearson $r > 0.7$), we excluded the one that correlated less with the dependent variable.

The analysis was conducted with the "Regression" procedure in IBM SPSS Statistics (version 20, release 20.0.2), using backward elimination, where variables were excluded with $P_{out} = 0.05$.

3. Results

3.1. Patient characteristics

Of the 255 eligible patients approached, 164 (64.3%) completed the questionnaire. Participants and nonparticipants did not differ in age ($P = 0.18$), years since diagnosis ($P = 0.39$), and presence of metastases at first diagnosis ($P = 0.98$). Table 1 shows participating patients' demographic and medical characteristics.