Original Research

Determinants and prognostic value of quality of life in patients with pancreatic ductal adenocarcinoma

Yang Deng [a,b], Huakang Tu [a], Jeanne A. Pierzynski [a], Ethan D. Miller [c],
Xiangjun Gu [d], Maosheng Huang [a], David W. Chang [a], Yuanqing Ye [a],
Michelle A.T. Hildebrandt [a], Alison P. Klein [e,f], Ren Zhao [b],
Scott M. Lippman [g,1], Xifeng Wu [a,*,1]

[a] Department of Epidemiology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA
[b] Department of Surgery, Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China
[c] Department of Gastroenterology Hepatology & Nutrition, The University of Texas MD Anderson Cancer Center, Houston, TX, USA
[d] Department of Oncology, Department of Medicine, Baylor College of Medicine Dan L Duncan Comprehensive Cancer Center, Houston, TX, USA
[e] Department of Pathology, The Sol Goldman Pancreatic Cancer Research Center, The Sidney Kimmel Comprehensive Cancer Center, The Johns Hopkins Medical Institutions, Baltimore, MD, USA
[f] Department of Oncology, The Sol Goldman Pancreatic Cancer Research Center, The Sidney Kimmel Comprehensive Cancer Center, The Johns Hopkins Medical Institutions, Baltimore, MD, USA
[g] Department of Medicine, University of California San Diego Moores Cancer Center, University of California San Diego, La Jolla, CA, USA

Abstract *Background:* Quality of life (QOL) is impaired in pancreatic cancer patients. Our aim was to investigate the determinants and prognostic value of QOL after diagnosis in a hospital-based cohort of racially/ethnically diverse patients with pancreatic ductal adenocarcinoma (PDAC).
Patients and methods: QOL was prospectively assessed using the Short Form-12 in 2478 PDAC patients. The Physical Component Summary (PCS) and Mental Component Summary (MCS) were categorised into tertiles based on their distribution. Ordered logistic regression was adopted to compare the risk of having lower PCS and MCS by patient sociodemographic and clinical characteristics. The association of PCS and MCS with mortality was assessed by Cox regression.
Results: Compared with non-Hispanic whites, Hispanics were at significantly higher risk of having lower PCS (odds ratio [95% CI], 1.69 [1.26—2.26]; $P < 0.001$) and lower MCS (1.66 [1.24—2.23];

* *Corresponding author*: Department of Epidemiology, The University of Texas MD Anderson Cancer Center, 1515 Holcombe Blvd., Unit 1340, Houston, TX, 77030, USA. Fax: +1 713 792 4657.
E-mail address: xwu@mdanderson.org (X. Wu).
[1] These authors jointly supervised this work.

$P < 0.001$). Patients diagnosed with stage III (1.80 [1.10−2.94]; $P = 0.02$) and stage IV (2.32 [1.50 −3.59]; $P < 0.001$) PDAC were more likely to have lower PCS than stage I patients. Other determinants of QOL included sex, age, drinking, smoking, education level, comorbidities and time since diagnosis. The low tertile of PCS (hazard ratio [95% CI], 1.94 [1.72−2.18]; $P < 0.001$) and MCS (1.42 [1.26−1.59]; $P < 0.001$) were each related to poor prognosis. Similar results were found for non-Hispanic whites as compared with African-Americans/Hispanics/others.

Conclusion: QOL after diagnosis is a significant prognostic indicator for patients with PDAC. Multiple factors determine QOL, suggesting possible means of intervention to improve QOL and outcomes of PDAC patients.

© 2017 Published by Elsevier Ltd.

1. Introduction

Pancreatic cancer (PC) is the third leading cause of cancer mortality in the United States [1] and the seventh globally [2]. In the United States, projections estimate that there will be 53,670 new cases of PC and 43,090 PC deaths in 2017 [1]. Pancreatic ductal adenocarcinoma (PDAC) accounts for 90% of all pancreatic cancers. The prognosis for patients with PDAC remains poor. The 5-year relative survival rate is 8% for all stages combined, 29% for local disease, and 3% for distant stage, respectively [3].

PDAC is known for its debilitating symptom burden and has a profound negative effect on patient quality of life (QOL) [4]. Consequently, QOL has become a subject of paramount importance for PDAC patients. Several studies of patients with PC have shown that higher baseline/pretreatment QOL is associated with longer overall survival [5−13], whereas another study showed no association [14]. However, these studies were limited by small sample sizes (ranging from 50 to 569), and most studies focused on metastatic or advanced-stage cancer without considering early-stage patients.

Identifying the determinants of QOL in PC patients could be important for clinicians to identify patients with poor QOL who need enhanced monitoring or improved care management. Previous studies have found some demographic (age) and clinical (clinical stage, operation type, and weight stabilisation) factors affect QOL in PC patients [15−17]. However, the sample sizes of these studies were also small and did not investigate the difference in determinants of QOL by race/ethnicity. Therefore, we assessed the prognostic value and the determinants of QOL after diagnosis in a large prospective cohort of racially/ethnically diverse patients with PDAC which encompassed all stages.

2. Methods

2.1. Patients

Participants were patients with histologically confirmed PDAC between August 1999 and October 2012 as part of The MD Anderson Cancer Patients and Survivors Cohort Study (MDA-CPSC) [18], a prospective hospital-based cohort study in the United States. At their initial visit, all participants completed a patient history form that collected epidemiologic, sociodemographic, and risk factor information. The patient history form also assessed QOL employing the generic, validated Short Form-12 vision 1 (SF-12v1) questionnaire [19]. Clinical information was abstracted from the institutional Tumour Registry. This study was approved by the institutional review board.

2.2. Eligibility and exclusion criteria

A total of 3725 PC patients completed the patient history form and SF-12v1 questionnaire within 1 year of diagnosis. We excluded patients who were younger than 18 years (N = 12), those who had been diagnosed with nonductal adenocarcinoma (N = 789), those who had been diagnosed with multiple primary tumours (N = 442), and those who did not give the consents (N = 4). The final number of patients included in this study was 2478.

2.3. SF-12v1 questionnaire

The SF-12v1 questionnaire is a multipurpose generic QOL questionnaire evolved from the Short Form-36 questionnaire. The SF-12v1 questionnaire consists of 12 questions that measure 4 domains (physical, functional, emotional and social) and 8 subscales (physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health). The 8 subscales of this tool can be summarised into 2 indices: the Physical Component Summary (PCS) and the Mental Component Summary (MCS), which describe the patient's physical and mental well-being respectively [19]. Higher PCS and MCS scores indicated better QOL.

2.4. Statistical analysis

The PCS (high: ≥ 45.7, medium: 32.7−45.7, low: <32.7) and MCS (high: ≥ 52.3, medium: 40.3−52.3, low: <40.3)