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Original article

Long-term trends in the incidence and relative survival of pancreatic cancer in Canada: A population-based study

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ABSTRACT

Background/objective: The poor survival among pancreatic cancer patients accounts for a disproportionate number of cancer deaths, and there has been little or no improvement in the long-term survival of these patients. This study examines the long-term trends in incidence and relative survival of patients diagnosed with pancreatic cancer in Canada between 1992 and 2008.

Methods: We used pancreatic cancer data from the Canadian Cancer Registry. Incidence rate per age group was estimated over the aforementioned period. A flexible parametric model was used to estimate trends in one- and five-year relative survival for each age group and sex. Excess mortality rate was estimated to illustrate additional mortality due to a cancer diagnosis.

Results: In total, 34,577 patients with pancreatic cancer were identified, of which 49.3% were male. Mean age at diagnosis was 70.1 (SD = 12.3) years. Approximately 60.0% of patients were older than 70 years at diagnosis. There has been no change in the incidence rate of pancreatic cancer in Canada; however, it significantly decreased for men (80+) ($p = 0.011$). Although one-year relative survival increased over time for all patients, five-year relative survival increased only 5% for the youngest age group (<50 years).

Conclusions: Overall survival of patients with pancreatic cancer remains low, although advances in chemotherapy and palliative care may have provided some improvement. Excess mortality remains highest shortly after diagnosis, which is likely attributable to the late diagnosis of pancreatic cancer.

Introduction

Pancreatic cancer is the fourth leading cause of cancer death among Canadians [1]. Despite being less commonly diagnosed than other cancers, the poor survival rate associated with pancreatic cancer accounts for the disproportionate number of cancer deaths [1]. In 2014, it was estimated that approximately 4700 Canadians would be diagnosed with pancreatic cancer, with 4400 Canadians dying from their disease. Pancreatic cancer has the lowest five-year relative survival rate among all cancers, at a mere 8% [1]. This poor prognosis is partly attributable to late diagnosis of the disease and low resection rates (10–15%), as most patients are not surgical candidates due to advanced local or distant metastatic disease [2–4].

To study the survival among pancreatic cancer patients, it is important to distinguish between benign and malignant pancreatic neoplasms. Cystic neoplasms of the pancreas include serous cystadenomas, mucinous cystic neoplasms (MCN), and intraductal papillary mucinous neoplasms (IPMN) [5]. While these cystic lesions are themselves benign, MCNs and IPMNs have the potential for malignant transformation [5]. Malignant neoplasms of the pancreas can be further subclassified into exocrine and endocrine tumors, and tumor characteristics can impact survival time [2,6]. Exocrine pancreatic neoplasms include tumors arising from pancreatic ductal and acinar cells, and comprise approximately 95% of all pancreatic cancers [7]. Of these, the most common is pancreatic ductal adenocarcinoma [8]. Endocrine neoplasms of the pancreas account for the remaining 5%, with the most common type being pancreatic neuroendocrine tumors (or islet cell tumors) [7,9].

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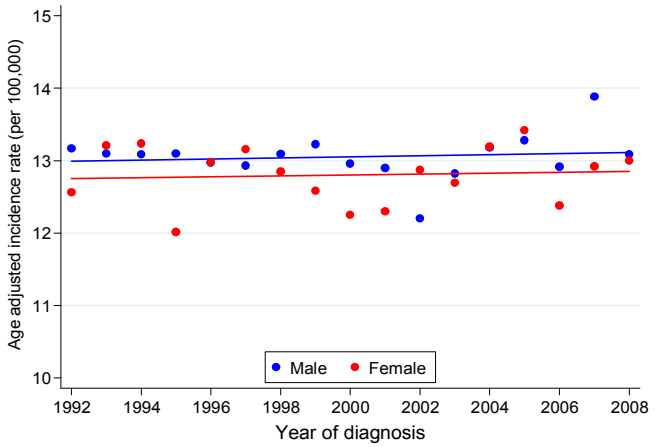

Fig. 1. Age adjusted trends in the incidence rate of pancreatic cancer in Canada, 1992–2008.

Most studies have described the median age of diagnosis of pancreatic cancer to be around 68 years, with the highest percentage within the 60–69 age group range [10,11]. Also, men are more likely to be diagnosed with pancreatic cancer [10,11]. For patients who are operative candidates, surgical resection may be potentially curative, leading to improved median survival (14–17 months), and a five-year survival rate of 10–26% [11].

In general, studies examining the survival trends of pancreatic cancer in Australia, Europe, and the United States have shown little or no improvement in the long-term survival of the disease [11–14]. However, the existing literature is lacking a report on the incidence and survival trends in Canada. Therefore, the present analysis aims to examine the long-term trends in incidence and relative survival of patients diagnosed with all types of pancreatic cancer in Canada over the period 1992–2008. Trends in relative survival will be explored along with associations with demographic variables such as sex, age at diagnosis, and year of diagnosis.

Methods

Data source

This analysis used pancreatic cancer data from the Canadian Cancer Registry (CCR) database. The CCR is a dynamic database which includes all Canadian residents diagnosed with cancer from all 13 provinces and territories since 1992. It is a collaborative work between the 13 Canadian provincial and territorial cancer registries (PTCRs) and the Health Statistics Division of Statistics Canada, where data are maintained. The CCR is a patient-based system that records the type and number of primary cancers diagnosed for each person until death. The patient level data is regularly linked to mortality data to optimize the accuracy of date, cause, and place of death, and to identify potential primary cancers not currently registered in the CCR. For each patient, the CCR describes both the individual and the tumor characteristics [15]. Information on the stage and size of tumors has been collected from 2004.

The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10), was used to identify patients with primary invasive pancreatic cancer with the codes C25.x (malignant neoplasm of pancreas) in the CCR dataset.

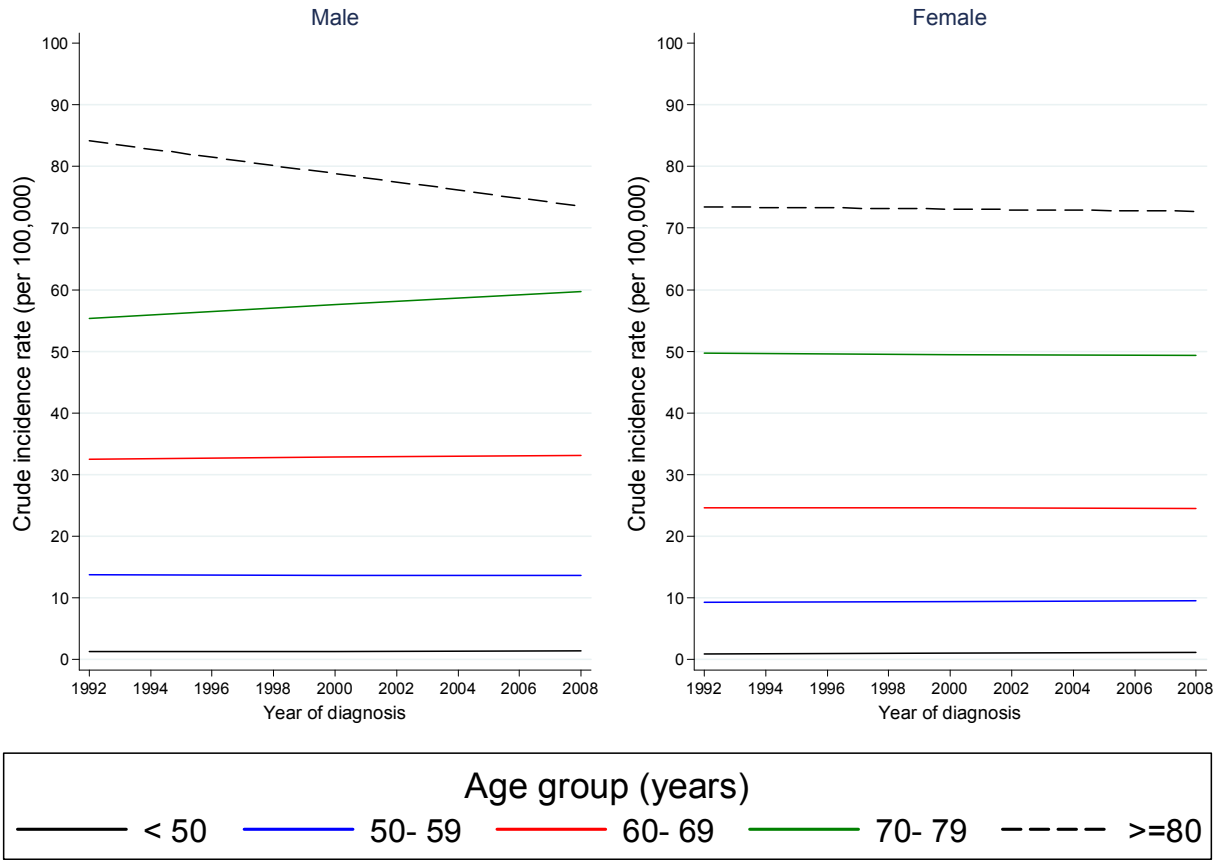

Fig. 2. Trends in the incidence rate of pancreatic cancer based on sex and age group in Canada, 1992–2008.

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