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Socioeconomic Implications in Pancreatic Cancer

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Abstract

Pancreatic carcinoma is one of the most aggressive neoplasia with a poor long-term survival; less than 4% at 5-year with an increasing incidence in the last decade. Surgery remains the only curative option for treatment but unfortunately the survival rate remains low. Identifying the socioeconomic factors implicated in prognosis of pancreatic cancer is the aim this study. In this thesis we studied the patients diagnosticated with pancreatic cancer in one surgical unit. A total of 346 pancreatic cancer cases were identified between January 1, 2006 and December 31, 2017. Mean age 69.63 years, 81% cases were male and in 74.1 % of the pancreatic tumors were cephalic. The incidence of pancreatic cancer increased sharply with age and was 4.1 times more frequent in those aged 70–79 and 4.88 times more common in those aged 80-89, compared to those aged 40-49. There was no significant difference between the incidence or overall survival and socioeconomic status in the group. In conclusion, the complex relationship between pancreatic cancer and different risk factors requires more clinical research in order to developed new diagnostic and therapeutic strategies.

Keywords: pancreatic cancer, socioeconomic status, risk factor, prognostic.

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Introduction

Pancreatic carcinoma is one of the most aggressive neoplasia with a poor long-term survival; less than 4% at 5-year (Coupland *et al*., 2012). In the last decade, the incidence has been increasing (Altekruse *et al*., 2010). The diagnosis is usually made in advanced stage of disease and only a minority of the patients with pancreatic cancer is eligible for surgical resection (Shapiro *et al*., 2015). Unfortunately, less than 20% of patients are candidates for surgery at the time of diagnosis and even in case of R0 resection the postoperative median survival is under 20 months with a 5-year survival of less than 20% (Dal Molin *et al*., 2015). The diagnostic in early stage has a good impact in survival rates (Ariyama *et al*., 1986). Most of pancreatic tumors occur sporadically and variation in incidence are encountered over time and between different populations due to the differences in life styles and exposure to environmental risk factors (Lichtenstein *et al*., 2000). The rate vary significantly worldwide with the highest incidence in Northern Europe and North America, about 3-4 times higher compared with tropical countries (Altekruse *et al*., 2010; Curado *et al*., 2007).

The cigarette smoking is the most consistent risk factor associated with pancreatic carcinoma (Hippisley-Cox & Coupland, 2012; Stapley *et al*., 2012). A recent meta-analysis of 82 studies concurs that the overall risk of pancreatic carcinoma for current smokers was 1.74 and after smoking cessation the frequency the neoplastic lesion gradually diminishes, without returning to baseline in a period of ten years (Iodice *et al*., 2008). Other medical conditions like diabetes mellitus, chronic pancreatitis and obesity, are considered risk factors for pancreatic cancer. Low socioeconomic, alcohol consumption status has proven to be an important risk factor for developing upper aerodigestive tract cancer (Conway *et al*., 2010; Damian *et al*., 2017). It is also a risk factor for poor survival in patients with cancer of stomach (Siemerink *et al*., 2011), lung (Yang *et al*., 2010), hepatocellular carcinoma (Artinyan *et al* 2010) and breast (Aziz *et al*., 2010).

Regardless of incidence, overall mortality is predicted to increase also in US and Europe over the next decade, despite the studies concerning risk factor reduction and the attempt in improving the early detection of these tumors (Malvezzi *et al*., 2014; Rahib *et al*., 2014). Identifying epidemiological factors that could potentially be used to define high-risk groups, which would be suitable for targeted screening or surveillance, is increasingly being seen as a important way to improve survival in PDAC (Klein *et al*., 2013). This study explores the influence of socioeconomic and geographic factors on the incidence of pancreatic carcinoma.

Methodology

We evaluated retrospectively the patients diagnosed with pancreatic cancer in our Surgical Unit between January 1, 2006 and December 31, 2017. We included in this study only the patients with clinic-imagistic and morphological diagnosis of the neoplastic disease and we collect data about risk factors, demographic characteristics, cancer pathology and treatment. All data were processed using IBM SPSS Statistics and the data were analysed with Anova, independent T-test, chi-square test and Fisher test in order to compare the differences between the collected data. The result were considered statistically significant if p was less then 0.05.

Results

346 patients with pancreatic cancer were included in this study and about 81% were male. The mean age was 69.63 years (range 44 to 92 years), this being a small degree higher in case of metastatic tumors (*Table 1*).

Tabel 1. Age analysis correlated disease stage

	Resectable tumor	Locally advanced tumor	Metastatic tumor	P
Age interval (years)	44-85	48-92	44-89	
Mean age (years)	67,2	69,7	71,1	p=0,0142

In the study group were identified different risk factors implicated in the development of pancreatic cancer such as cigarette smoking, alcohol, diabetes mellitus or chronic pancreatitis with a slightly predominance of diabetes but the correlations with tumor stage revealed no statistic difference between this variables *(Table 2)*.

Table 2. Pancreatic cancer risk factors in correlation with tumor stage .

	T1 n (%)	T2 n (%)	T3 n (%)	T4 n (%)	P value
Smoking	16 (4.58)	18 (5.15)	23 (6.59)	21 (6.01)	0.23
Alchool	15 (4.29)	16 (4.58)	19 (5.4)	17 (4.87)	0.75
Diabetes mellitus	26 (7.73)	21 (6.01)	25 (7.16)	26 (7.44)	0.59
Chronic pancreatitis	3 (0.89)	5 (1.43)	6 (1.71)	4 (1.14)	0.98

The incidence of pancreatic cancer increased sharply with age and was 4.1 times more frequent in those aged 70–79 and 4.88 times more common in those aged 80–89, compared to those aged 40–49. The surgical resection with curative intention was possible in 23.42% of patients (*Figure 1*). 2 cases with locally advanced disease required resection of a totally replaced common hepatic and reconstruction using a reversed splenic artery in order to maintain the negative resection margins.

The other cases with locally advanced or metastatic disease demanded palliative procedures in order to treat the jaundice, duodenal obstruction, exploration of peritoneal cavity with biopsy or pain relief surgical procedure due to celiac trunk invasion. In the selected group, the patients had in 23.5% localized disease, 19.1% had locally advanced disease, and 57.8% had metastatic disease. The median survival times were 23 months for patients with localized, 13 months for those with locally advanced and 7 months for those with metastatic disease. By the end of the follow-up 91% of patients had died. There was no significant difference between the incidence or overall survival and socioeconomic status in the group (*Table 3*). The low socioeconomic group was characterized by slightly older age and less frequent resection of the tumor without statistical significance.

Table 3. Characteristics of patients with pancreatic cancer

Patient characteristic		
Gender, %	male	81
	female	19
Mean age (SD), years		69.63
Urban vs rural area		188/ 158
ASA classification (%) I II III-IV		 26 49 25
Co-morbidity (%)		
Cardiac		28
Hypertension		46
Pulmonary		4
Diabetes mellitus		28
Glucose intolerance		4.7
Body index mass (mean)		25.7
Tumor location (%) Head Body Tail		 74.1 9.45 16.45

Cancer stage (%) Localized Locally advanced Metastatic		 23.1 19.1 57.8
Resection (%)	Yes	23.42
	No	76.58
Median survival, months Localized Locally advanced Metastatic		 23 13 7
Overall survival Low socioeconomic status High socioeconomic statuc		10.9 9.1 p-value 0.59 10.6

Discussion

Pancreatic cancer is a life-threatening neoplasia with an 5-year overall survival rate about 6% and a median survival rate that varies from approximately 2 years in resectable disease to few month in case of locally advanced or metastatic disease (Vincent *et al*., 2011, Amalinei *et al.*, 2014). Due to the diagnosis in advance stage less than 20% of patients are candidates for surgery (Dal Molin *et al*., 2015). The key to reduce the mortality associated with pancreatic carcinoma is identifying the risk factors that are modifiable, possibilities of an early diagnostic, the treatment of precursor disease (Hruban *et al*., 2007). One goal is to identify the high-grade precursor lesions and/or early invasive pancreatic cancer in order to increase the rate and the benefits from curative surgical resection (Kanda *et al*., 2013).

This study explored pancreatic carcinoma between 2006 and 2017 in among the patient from one surgical unit. Pancreatic cancer was more common in men and the incidence increased with age, which is similar with data reported in previously studies (Coupland *et al*., 2012; Shahib *et al*., NCIN, 2008). Several risk factors have been studied and associated with pancreatic cancer including diabetes, cigarette smoking (Hippisley-Cox & Coupland, 2012; Stapley *et al*., 2012, Bonelli *et al*., 2002) and chronic pancreatitis (Hassan *et al*., 2007; Iodice *et al*., 2008).

An association between low social status and pancreatic cancer was not proved to be significantly statistic in the population from in this study and no impact in the overall survival was revealed. This result was slightly unexpected, due to the influence of different risk factors which are more prevalent in groups with lower socioeconomic status in the development of pancreatic cancer such as smoking, diabetes and obesity. There were other studies have also not found a consistently association between pancreatic neoplastic lesions and poverty (Basstrup *et al*., 2008; van Boeckel *et al*., 2010).

In term of survival in pancreatic carcinoma are few major determinants such as tumor characteristics, disseminated disease at the time of the diagnosed (van Roest *et al*., 2008; Effenberger *et al*., 2012). Also other factors may have a part in cancer pathogenesis like bio-behavioral, environmental and psycho-social influences, environmental influences and income-related lifestyle (Antoni *et al*., 2006; McCormack & Boffetta, 2011; Nilsen & Vatten, 2000). Patients of lower social status are more likely to have comorbidities and may lack an understanding of th complexity of their diagnosis, the therapeutic possibilities in different medical centers (Louwman *et al*., 2010; Cheung *et al*., 2010)

Conclusion

Our study being perform in one medical center can be a factor of the obtained results regarding the socioeconomic status compared with nationwide-studies performed on large cohorts of pancreatic cancer patients. A study performed in United States revealed that patients diagnosed with pancreatic cancer with low socioeconomic status were treated more frequently in a low volume hospitals, compared with patients with those with high socioeconomic status and when patients from lower socioeconomic environment were treated in a high volume or teaching hospital, they maintained an increased perioperative mortality and a shorter overall survival (Cheung *et al*., 2010). Pancreatic carcinoma is an aggressive neoplasia with an incidence that increases with age and is usually diagnosed in advanced stages. Socioeconomic status may be a prognostic factor due to the comorbidities and the risk factors associated. Pancreatic resection remains the only therapeutic option and is not being influenced by the socioeconomic standards.

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