Pancreatic Head Carcinoma-Implications and Correlations in a Romanian Population

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ABSTRACT: Introduction: Pancreatic cancers are often an aggressive type of malignancy, with a 5-year survival rate estimated at around 5%. The main purpose of our study was to determine whether or not tumor dimensions influence the presence of jaundice and the diameters of the CBD and Wirsung duct. Material and methods: The study group included 32 patients (19 males, 13 females) diagnosed with various histological types of pancreatic head cancers who were hospitalized in the Surgery Department of the County Clinical Emergency Hospital of Craiova during 2016-2018. All 32 patients underwent an initial abdominal ultrasonography (US), followed by an abdominal computed tomography (CT) scan and an abdominal magnetic resonance imaging (MRI) with magnetic resonance cholangiopancreatography (MRCP) sequences. Results: Based on tumor dimensions, 19 (59.38%) were equal to or larger than 30mm, while 13 (40.62%) were smaller than 30mm. The average age of male patients was 65.15 years, while the average age of female patients was 60.07 years. Tumor dimensions ranged between 22mm and 52mm (33.53mm on average). Furthermore, the diameter of the CBD ranged from 5mm to 20mm (13.40mm on average), while the diameter of the Wirsung duct ranged from 3mm to 12mm (5.75 mm on average). Conclusion: In conclusion, our study reached its’ initial purpose and revealed a significant association between the tumor dimensions and the diameter of the Wirsung duct and also between the diameter of the CBD and the presence of jaundice.

KEYWORDS: Common bile duct, adenocarcinoma, tumor dimensions, Wirsung duct

Introduction

The pancreas is one of the most important retroperitoneal organs and fulfills both endocrine and exocrine functions. Pancreatic cancers are often an aggressive type of malignancy, with a 5-year survival rate estimated at around 5%, thus being one of the leading causes of cancer mortality worldwide [1,2].

According to GLOBOCAN 2018, over 458,000 new cases of pancreatic cancer were reported worldwide in 2018, out of which approximately 132,000 were reported in Europe and around 3,100 in Romania alone.

For example, in Asia, 214,499 new cases of pancreatic cancers were reported in 2018, compared to Africa where only 16,059 new cases were declared.

In 2018, the incidence rate of pancreatic cancer in Romania for all ages and both sexes was 7.4 per 100,000, while the mortality rate was 6.9 per 100,000.

Pancreatic cancer is associated with multiple risk factors: smoking, family history of pancreatic cancer, diabetes, obesity, chronic pancreatitis and alcohol consumption. Furthermore, pancreatic neoplasms usually target elderly men [3].

Pancreatic neoplasms can develop in the head (65%), body (15%) or tail (15%) of the pancreas. The remaining 5% is represented by malignant tumors that diffusely affect the pancreas [4].

Regarding histology, the most common type of pancreatic head cancer affecting the exocrine component is adenocarcinoma (around 80-90% of all cases).

Other less frequently encountered histological types developing in the exocrine pancreatic tissue include acinar cell carcinomas (5%), cystadenocarcinomas (1%), pancreatoblastomas and pancreatic mucinous cystic neoplasms [5,6].

Patients with cancers affecting the head region of the pancreas are usually diagnosed in late stages with cholestatic jaundice, a dilated common bile duct (CBD) and/or a dilated Wirsung duct. The main purpose of our study was to determine whether or not tumor dimensions influence the presence of jaundice and the diameters of the CBD and Wirsung duct.
Material and methods

The study group included 32 patients (19 males, 13 females) diagnosed with various histological types of pancreatic head cancers who were hospitalized in the Surgery Department of the County Clinical Emergency Hospital of Craiova during 2016-2018.

The resection pieces were analyzed in the Pathology Department of the County Clinical Emergency Hospital of Craiova.

All patients expressed their agreement to be a part of this study.

All 32 patients underwent an initial abdominal ultrasonography (US), followed by an abdominal computed tomography (CT) scan and an abdominal magnetic resonance imaging (MRI) with magnetic resonance cholangiopancreatography (MRCP) sequences as suggested by Fumihiko Miura et al [7].

The tumor dimensions and the diameters of the CBD and Wirsung duct were measured on the MRI examinations.

We considered the normal diameter of the CBD to be 6mm, while the normal diameter of the Wirsung duct <4mm [8].

We performed a statistical analysis of the data we collected using One-way ANOVA test and Chi-square. Regarding software, we used IBM SPSS Statistics 20. Values less than 0.05 for p were considered statistically significant.

Results

Based on tumor dimensions, 19 (59.38%) were equal to or larger than 30mm, while 13 (40.62%) were smaller than 30mm (Fig.1).

Based on the tumor histological type, 26 (81.25%) were classified as adenocarcinomas (ADK), 3 (9.375%) were considered acinar cell carcinomas (ACC), 2 (6.25%) were described as cystadenocarcinomas (C-ADK) and 1 (3.125%) was classified as intraductal papillary mucinous neoplasm (IPMN) (Fig.2).
The patients included in the study group were aged between 51 and 78, with an average age of 63.46 years. Furthermore, 10 patients (31.25%) were younger than 60 years, while 22 patients (68.75%) were aged 60 or above. The study group included 19 males (59.375%) and 13 females (40.625%). Out of 19 males, 5 (26.31%) were younger than 60 years and 14 (73.69%) were aged 60 or above.

Out of 13 females, 4 (30.76%) were younger than 60 years and 9 (69.24%) were aged 60 or above (Fig.3).

The average age of male patients was 65.15 years, while the average age of female patients was 60.07 years. Also, 21 patients (65.62%) were smokers, while the rest (34.38%) denied smoking (Table 1). Twenty patients (62.5%) presented with jaundice.

Tumor dimensions ranged between 22mm and 52mm (33.53mm on average). Furthermore, the diameter of the CBD ranged from 5mm to 20mm (13.40mm on average), while the diameter of the Wirsung duct ranged from 3mm to 12mm (5.75mm on average).

The highest CBD diameter was encountered in a 29mm tumor, while the lowest CBD diameter was recorded in a 39mm tumor. Tumor dimensions were not significantly associated with either the diameter of the CBD (p=0.102) or the presence of jaundice (p=0.621). However, tumor dimensions were significantly associated with the diameter of the Wirsung duct (p=0.018<0.05) (Fig.4).

Also, the diameter of the CBD was significantly associated with the presence of jaundice (p=0.0001).

Table 1. The structure of the study group based on the tumor dimension, histological type, patient age, sex and smoking status

| Characteristics | Parameters       | Number of patients | Percent of patients (%) |
|-----------------|------------------|--------------------|-------------------------|
| Tumor dimension | <30mm            | 13                 | 40.62%                  |
|                 | ≥30mm            | 19                 | 59.38%                  |
| Tumor histological type | Adenocarcinoma | 26                 | 81.25%                  |
|                 | Acinar cell carcinoma | 3         | 9.375%                  |
|                 | Cystadenocarcinoma | 2                 | 6.25%                   |
|                 | IPMN             | 1                  | 3.125%                  |
| Age             | <60Y             | 10                 | 31.25%                  |
|                 | ≥60Y             | 22                 | 68.75%                  |
| Sex             | Male             | 19                 | 59.375%                 |
|                 | Female           | 13                 | 40.625%                 |
| Smoking         | Yes              | 21                 | 65.62%                  |
|                 | No               | 11                 | 34.38%                  |

Fig.2. Tumor histological types distributed on sexes

Fig.3. Patients’ age distributed on sexes

Fig.4. Significant association between the tumor dimensions and the diameter of the Wirsung duct
Discussion
Pancreatic head cancer is one of the leading causes of cancer mortality worldwide and is associated with several risk factors like smoking, family history of pancreatic cancer, diabetes, obesity, chronic pancreatitis and alcohol consumption [1,2,9].

According to Olson SH et al., men in their 6th or 7th decade are usually targeted by this disease [3].

The findings of our study suggested that pancreatic head carcinoma had a strong predilection for male patients, especially for those aged 60 or above. Furthermore, the average age of the male patients was somewhat higher than the average age of the female patients included in our study (65.15 years vs. 60.07 years), suggesting that women are affected at a younger age compared to men.

In accordance with the data provided by the literature, our findings indicated that the most frequently encountered histological type of pancreatic head cancer was adenocarcinoma (81.25% of all cases included in our study), followed by acinar cell carcinoma (9.375% of all cases included in our study).

Given that the tumor dimensions were not significantly associated with the diameter of the CBD and that the highest diameter of the CBD was encountered in a tumor with below average dimensions, we considered the location of the tumor within the pancreatic head to be significantly more important than the tumor dimensions [10,11].

Conclusion
In conclusion, our study reached its initial purpose and revealed a significant association between the tumor dimensions and the diameter of the Wirsung duct and also between the diameter of the CBD and the presence of jaundice.

Conflict of interests
The authors declare that they have no conflict of interests.

Author contribution
Lucian Mihai Florescu and Mirela Marinela Florescu equally contributed to the manuscript.

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