

Abstract

The Pilsen region suffers the highest incidence of kidney tumours worldwide. Approximately 240 new cases diagnosed as C64 (malignant renal tumours outside the pelvis) were recorded in this region of about 580,000 inhabitants in 2015. Clear renal cell carcinoma has long held first place as the most common tumour, with papillary renal cell carcinoma (pRCC) being the second most frequently operated kidney tumour at the Urology Department of the University Hospital in Pilsen. The 2016 WHO classification of kidney tumours recognizes officially only the stratification of pRCC to type 1 (pRCC1) and type 2 (pRCC2). Unfortunately, the current division does not correspond with knowledge derived from everyday practice. Most clinical trials involving pRCC do not differentiate between the subtypes, adhering only to the official type 1 and 2 divisions and the atypical papillary forms being excluded from their studies. We therefore have to face the question of whether the histological pRCC subtype affects the risk of recurrence, or death, in surgically treated patients.

The aim of this dissertation work is to take into consideration also all other papillary types which differ from characterization of pRCC1 and pRCC2. The analyses of a group of patients with surgically treated and histologically verified pRCC at the Urology Department of the University Hospital in Pilsen in the last nine years.

Since pRCC1 seems to be the most homogenous of this varied group of papillary renal cell carcinomas, it is the type to have received the greatest amount of attention in our work and the other papillary types - pRCC2, oncocytic pRCC (opRCC), no otherwise specified pRCC (pRCC NOS) are compared to this type of tumour. Comparison of these tumours in preoperative imaging is focused on the size of the tumour, its cT category, the proportion of regular spherical shape, exophytic tumour growth, and the proportion of cystic appearance (BIIF-BIV) between pRCC. Our work details a comparison of surgical solutions between the different pRCC groups. We also compare the histopathological results of these subtypes, mainly with a focus on the pT category, the nuclear grade of the tumour and presence of cystic morphology or necrosis. The most important point of this study is prognosis of surgically treated patients with pRCC.

The results of our first study including 131 patients show that the most cases of pRCC1 have regular spherical shape (98.9%) and exophytic growth (82.1%). More than $\frac{3}{4}$ (80.7%) of pRCC1 is possible to treat with resection. The most cases of pRCC1 indicate histopathologically low nuclear grade (89.2% - G1 or G2 according to ISUP/WHO) and low stage (pT1 category - 81.9% of cases). The results of our second study including 138 patients

show that 30% of pRCC have a cystic appearance on imaging methods. There is statistically significant difference between the proportion of cystic appearance of pRCC1 (42.3%) and the other papillary types (13.3%) on CT imaging ($p=0.0002$). There is also association between histologically verified necrotic form of pRCC and cystic appearance of pRCC described using CT ($p=0.0002$). Cystic appearance demonstrate lower frequency of recurrence and metastases (4.9%) than solid appearance of pRCC (16.5%). 3-year PFS (Kaplan-Meier analysis) was: pRCC1 89.2 %, pRCC2 72.7 %, opRCC 88.1 %, pRCC NOS 79.5 % - $p=0.2234$; with statistically significant difference in comparison of pRCC1 and other pRCC ($p=0.0025$).

The conclusion of our study demonstrate that pRCC1 differs significantly from other papillary types in its appearance on preoperative imaging (typical spherical shape and exophytic growth), histologically (typical low nuclear grade) and also prognostically (favourable 3-PFS). The majority of pRCC1s can be resolved using nephron sparing surgery, with excellent prognostic results. Its typical clinical and radiological properties, predetermined by its characteristic microstructure, can be explained using basic physical and chemical laws. Cystic appearance on imaging methods is mainly characteristic of pRCC1. Since cystic morphology in imaging methods seems to predict the indolent behaviour of papillary renal carcinoma, we believe it is necessary to develop a preoperative scoring system that will also take into account the appearance of the tumour (cystic vs. solid) on the preoperative examination.