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CT and Anatomopathological Staging of Kidney Cancer

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Abstract

Renal tumors are becoming more common in our Moroccan environment. This trend can be explained by the generalization of the use of imaging, particularly abdominal ultrasound, among general practitioners, which has become almost systematic. Kidney cancer is distinguished by anatomopathological heterogeneity: histological type, nuclear grade, and tumor stage are the most important prognostic factors. Renal biopsy appears to be a safe and dependable solution with a low risk of tumor seeding and complications, but it cannot provide all of the necessary detailed histological information. As a result, the abdominal scanner has piqued the public's interest. The abdominal scanner is the standard examination for evaluating renal tumors; it diagnoses the tumor, specifies its characteristics, and evaluates its locoregional and venous extension.

Keywords: Kidney cancer • Anatomopathological • CT findings

Introduction

This is a descriptive and analytical retrospective study that was conducted at Casablanca University Hospital from 2015 to 2019. Patients with kidney cancer who had undergone an enlarged total nephrectomy or partial nephrectomy had 70 files collected. All of our patients underwent a thoraco-abdomino-pelvic CT scan. An experienced radiologist reviewed the CT acquisitions in relation to the histological type. We were able to collect the following information using an operating sheet: age, gender, history, risk factors, symptoms, paraclinical examinations, and anatomopathological results. The histological types were evaluated using the WHO classification from 2004, the histological grade using the Führman classification, and the TNM classification using the AJCC 2009 classification [1, 2].

The ultrasound was performed on all of our patients and revealed the kidney tumor in 100% of cases. It revealed the presence of liver metastases in two patients. Six patients had suspected vascular invasion. A CT scan was performed in all our patients; two patients did not receive an injection of contrast product because of renal failure. The CT scan confirmed the diagnosis in 100% of cases. Clear cell carcinoma was the most common histological type (63%). The most represented nuclear grades are Führman grade 3 and 4 with 42.3% and 48.9% of cases, respectively [3].

Linear regression analysis of tumor size on CT versus pathology reveals that CT predicts tumor size significantly (r^2=0.984, p 0.0001).

Restaging after surgical excision revealed over-staging on CT in two cases and under-staging in two others. That equates to 11.42% of all cases. Tumor size as a predictor of pathological characteristics: The comparison of mean CT size and histological type revealed that clear cell carcinoma is larger (average height 11.02 cm) than the other histological types (average height 6.4 cm). Similarly, 86.36% of tumors larger than 7 cm are clear cell carcinomas compared to 23.07% of tumors less than 7 cm. The comparison between the size of the tumor on CT imaging and the pathology showed a non-significant difference p=0.368

However, our study found no link between tumor size and distance extension. In fact, distance extension was observed in 45.45% of cases with tumors less than 7 cm and 20.8% with tumors greater than 7 cm without being statistically significant (p=0.621). Various studies have revealed a male predominance. In the various series, the average age ranges from 49 years to 62 years. Smoking, professional exposure, hemodialysis, and being a carrier of multicystic dysplasia are the most frequently mentioned risk factors. The most common symptomatology encountered is a triad: lumbalgia+tumor mass+hematuria. Imaging in kidney cancer is used to distinguish between malignant and benign tumors and to establish an extension imaging. Because of the tumor's size, CT.

The increased use of modern imaging has resulted in an increase in kidney tumors. We are seeing an increasing number of asymptomatic or small tumors. On the other hand, histological orientation can influence therapeutic choice; for example, a patient with a histological type with poor metastatic capacity and recurrence may not require an in-depth search for metastases, and a large resection can be avoided, reducing morbidity and mortality. Our study's goal was to clearly define the role of CT in the preoperative evaluation of kidney cancer.

For any suspicion of a kidney tumor, ultrasound is the first-line examination. It helps to assess the vascular pedicle and a possible atypical image in addition to detecting the kidney tumor. The ultrasound has a sensitivity of 70% for tumors under 3 cm and 92% for tumors larger than 3 cm. In our series, ultrasound revealed the tumor in 100% of the cases; in this regard, Mucksavage et al. published a series comparing ultrasound with CT and MRI and discovered no difference in mean height between the three imaging modalities. For detecting a kidney mass, a CT scan is the gold standard. Although no type of imaging can currently predict the histological type, certain CT characteristics may point to a specific diagnosis. In this regard, the Z.SHEIR study found a link between the degree of contrast enhancement and the histological type. In fact, clear cell carcinomas were enhanced in 48.6% of cases compared to 15.4% of papillary carcinomas and 4.2% of chromophobic carcinomas (p=0.0001) [4].

Despite this, the average size of the tumors remains larger than the results of the literature, which can be explained by the delay in treatment. Other studies have found the same results, in particular the study by Zhang et al., which also showed that certain tumor characteristics revealed by CT could point to a histological type, for example, the presence of hemorrhage or necrosis is in favor of a chromophobic carcinoma (p 0.05), or the absence of Cystic degenera is in favor of a chromophobic carcinoma. The nuclear Führman grade is used to assess the prognosis of cancer. Our study found a significant relationship between tumor size and nuclear grade, with larger tumors having a higher nuclear grade and potentially being more aggressive, which is consistent with the findings of Western publications. Tumor restadification was observed in 8 cases (11.42% of cases) following anatomopathology. In comparison, this situation occurred 7.8% of the time in the Mucksavage study. The over-staging of these tumors can be explained by inflammatory phenomena and neoplasic process rearrangements. Lymphatic invasion is sought in the renal hilum and lumboaortic chains, and it is elicited in

front of lymph nodes larger than 10 mm in size. The only criterion used by the radiologist to confirm or deny lymph node invasion is size. Above 10 mm, we talk about adenomegaly and the possibility of lymph node invasion in the renal hilum and median retroperitoneum [5, 6]. However, false positives range from 5% to 43% when using this type of criterion. The false-negative rate, on the other hand, is lower (4%-5%). showed that all patients with synchronous lymphadenopathy at the time of nephrectomy were identified by CT scan in its study on the role of the multibarette scanner in the preoperative evaluation of kidney cancer.

According to the literature, the CT scan's reliability in differentiating between N0, N1, and N2 stages of kidney cancer is only 83%-89% [7]. It has recently been demonstrated that lymph node dissection is unnecessary when there is no suspicion of lymph node involvement on CT. The diagnosis of renal vein and inferior vena cava invasion is critical in developing a treatment strategy. Because of its multiphasic exploration and high spatial resolution, the multibarette scanner is now the first-line imaging tool for assessing cellar invasion. The CT scan has a sensitivity of 78%-79% in detecting renal vein involvement. These findings show that normal adrenal appearance on CT scan correlates well with pathologic findings. Positive CT results, on the other hand, are less reliable, with a positive predictive value of 91%.

There were several limitations to this study that should be mentioned. It should be noted that our data are a retrospective review of the results of a single center. As a result, our findings are susceptible to the inherent biases of a retrospective study [8]. A prospective randomized study should be considered to confirm the findings. More importantly, our data represent a group of surgically treated patients; thus, many patients, namely those with generalized metastases and inoperable tumors, were excluded from the study.

Conclusion

The current study confirms the benefit of CT in renal tumors; it allows for the prediction of tumor size as measured by anatomopathology. It demonstrates the existence of a relationship between stage and histological type on one hand and CT size on the other. The scanner's performance in detecting capsular breaches, locoregional and lymphatic extension has been clearly demonstrated.

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