Large Renal Tumor with Benign Evolution in a CKD Patient – Could It Be an Oncocytoma?

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Abstract

Introduction and Objectives. Renal oncocytomas are benign tumors consisting of oncocytes with a peak incidence at 55 years of age, often asymptomatic, found accidentally on ultrasound (US) examination. They appear as solid, solitary, well-bordered, capsule-less, fairly homogeneous renal cortical masses, with regular shape, relatively isoechoic or slightly hyperechoic than the adjacent renal parenchyma. Our aim was to depict the difficulties of imaging investigations in chronic kidney disease (CKD) patients by characterizing the clinical and US patterns in a patient with a renal mass suspected to be malignant, but with benign evolution.

Materials and Methods. A 61-year-old woman was examined in the Department of Nephrology of the Mures County Hospital in a period of six years, starting from 2012. She was followed-up for CKD stage IV. We performed complete abdominal US examination and we described the US characteristics of the left kidney mass. US examinations were performed with Esaote MyLab50 X-Vision and with Philips HD11 devices using a 3.5 MHz abdominal transducer.

Results. US grey-scale features were not enough to differentiate this lesion from renal carcinoma. Color Doppler US revealed an intense vascularization and surgical treatment was indicated. Because of the lack of compliance and severe comorbidities, surgery was postponed and the patient was followed up every six months in order to assess the progression of CKD and the renal mass. There was no significant increase in the size of the tumor and the patient remained asymptomatic. In 2018 chronic hemodialysis was initiated. After that, a contrast enhanced CT scan could be performed. The tumour measured aproximately the same size as in 2012 and 2016 and had a central scar that was suggestive for benignity.

Conclusions. In CKD patients in which contrast agents are contraindicated, the complete description of grey-scale and Doppler US characteristics of renal masses are mandatory in order to assess the best prognosis and the evolution. We strongly recommend US examination as the most reliable imaging modality for the diagnosis and monitoring of this category of patients.

Key-words: benign, Doppler, oncocytoma, tumor, ultrasound

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Introduction and Objectives

Renal oncocytomas are benign tumors, often asymptomatic, found accidentally on US examination. Renal oncocytomas represent approximately 5% of removed primary adult epithelial renal tumors and are typically present in the 6th and 7th decades with a peak incidence at 55 years of age. There is 2:1 male predilection with demographics that are similar to renal cell carcinoma.[1] The tumor consists of oncocytes which are uniform, round or polygonal neoplastic cells that have a granular eosinophilic cytoplasm.[2] At ultrasound (US) examination, oncocytomas appears as solid, solitary, well-bordered, capsule-less, fairly homogeneous renal cortical masses, with regular shape, relatively isoechoic or slightly hyperechoic than the adjacent renal parenchyma, and an exophytic growth pattern can be exhibited in most cases. Larger masses demonstrate a central stellate scar and a characteristic spoke-wheel vascular pattern. The tumors with a low percentage of stroma (<20%) are associated with an echotexture isoechoic to renal parenchyma, whereas oncocytomas with a higher percentage of stroma (>20%) are slightly hyperechoic.[3]

We characterized the clinical and US patterns in a patient with a renal mass which has grown very slowly suspected to be a benign tumor (oncocytoma) and we depicted the importance of US in the investigation of CKD patients.

Materials and Methods

A 61-year-old woman was examined in the Department of Nephrology of the Mures County Hospital. In a period of six years, from 2012-2018, she was followed-up for CKD. The tumor could not be investigated using other imaging modalities because of the toxicity of the contrast agents. US examinations were conducted with Esaote MyLab50 X-Vision and with Philips HD11 devices using a 3.5 MHz abdominal transducer. We performed complete abdominal US examination and we described the US characteristics of the left kidney mass, firstly observed in 2012. (fig 1) The patient was followed-up every six months until 2018 when dialysis was initiated, therefore contrast enhanced CT could be performed.

Results

Our patient presented with left flank and low back pain. A large left renal mass was identified on the first US examination in 2012, suggestive for a malignant tumor, but because of CKD stage 4 she could not be further investigated with contrast agents.

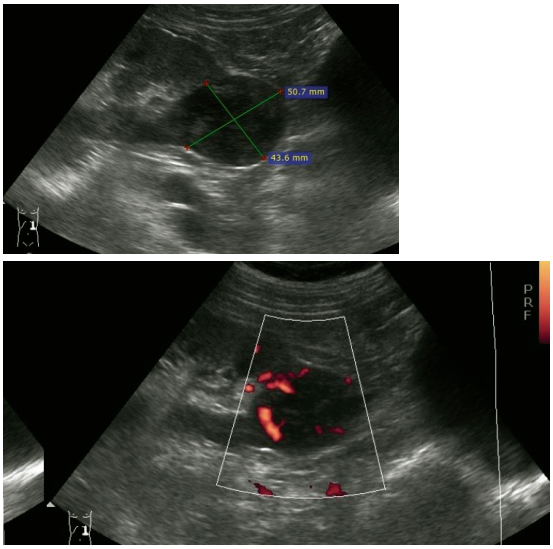

Figure 1. Grey-scale and Doppler US at the initial presentation. Well-delimitated tumor with exophytic pattern and spoke-wheel distribution of the vascularization

Although surgery was indicated, the patient's clinical condition and poor compliance postponed the intervention. During the period of follow-up, grey-scale characteristics of the renal mass were: oval regular shape, well-delimitated, slightly inhomogeneous with a vascular spoke-wheel pattern in color Doppler and a very slow growth. (fig 2) Moreover, we decided not to perform a biopsy of this renal mass due to the high risk of bleeding as the tumor appeared to have an intense vascularization and the high tendency of bleeding in CKD patients.

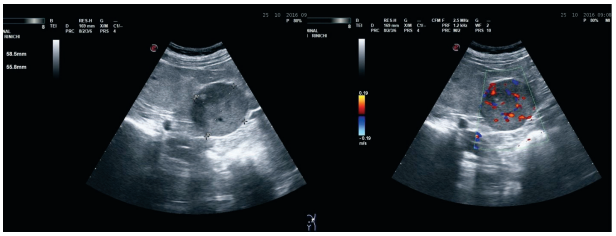

Figure 2. Renal mass after four years of evolution showing a slow growth, a peripheric scar and the same vascular pattern.

US examinations were not enough to differentiate this lesion from renal carcinoma, but the six years of evolution revealed a benign behaviour of the tumor. Because of end-stage renal disease (ESRD) due to diabetic nephropathy, in 2018 chronic hemodialysis was initiated and a contrast enhanced CT scan was performed. (fig 3) The tumour measured approximately the same size as in 2012 and 2016 and had an intratumoral scar: these were suggestive for benignity.

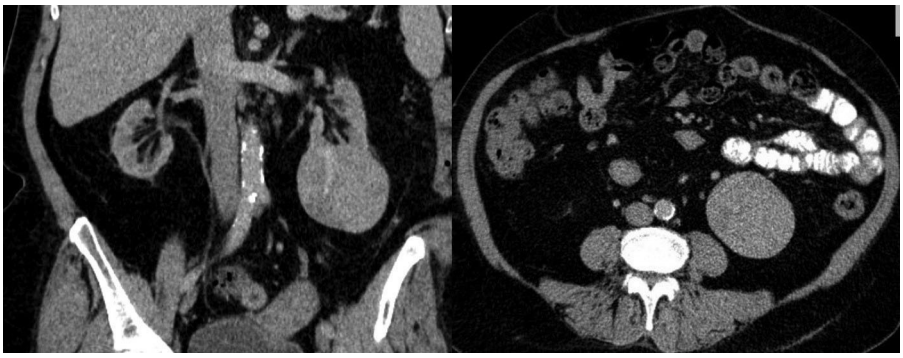

Figure 3. Contrast enhanced CT: 70x59 mm lesion with the same enhancement and wash-out as the renal parenchyma, proving a benign pattern.

Discussions

Renal oncocytomas are benign tumors, representing approximately 5% of the removed primary renal tumors. Oncocytomas appeared as solid, solitary, well-demarcated, capsule-less, fairly homogeneous renal cortical masses, with regular shape. Larger masses seem to have a characteristic central stellate scar and a spoke-wheel vascular pattern in 33% of cases.[4]

In our case, the renal mass had large dimensions with benign vascular pattern observed during US and contrast-enhanced CT. No local invasion (renal vein thrombosis) or distant metastasis were found during the years of follow-up. Due to the fact that the tumor did not increase in size from 2012 to 2018, had that central scar suggestive for benignity at US and was asymptomatic, we considered it to have a benign behavior. We could make the differential diagnosis between a renal angiomyolipoma and an oncocytoma, the two most frequent benign renal tumors, based on the US appearance. Angiomyolipomas are hyperechoic masses located in the renal cortex and with posterior acoustic shadow, while oncocytomas are hypoechogenic, inhomogeneous and with the characteristic spoke-wheel distribution of the vascularization seen in Doppler. The tumor that our patient had is most likely to be an oncocytoma.

At US, small sized oncocytomas usually appear as homogeneous renal masses that are isoechoic with the echogenicity of the renal parenchyma and are well defined.[5] Wu Y stated that the spoke wheel or stellate scar appearance on US, which is a well-known characteristic finding, is usually seen in larger masses and it may appear echogenic.[6] In our case, this scar was observed at the periphery of the lesion.

Furthermore, Meola M discovered that in oncocytomas color Doppler flow imaging showed rich blood flow signals in the periphery and strip-like blood flow signals within the masses characteristic to a spoke-wheel pattern of feeding arteries.[7]

Regarding the pathological aspect of oncocytoma, Wobker SE stated that although a central scar is quite characteristic of oncocytoma, it is not specific for oncocytoma and is not present in all tumors.[8]

On contrast-enhanced CT scans, the mass demonstrates smooth, well defined, relative homogeneous enhancement with central stellate scarring. Calcification, necrosis and hemorrhage are rare in oncocytomas and were completely absent in our patient. Moreover, there is no invasion or infiltration into the pararenal fat, collecting system, or vessels. Wu J et al. reported that CT imaging features such as stellate scar, spoken-wheel-like enhancement and segmental enhancement inversion were more common in renal oncoytomas.[9]

Clinical and laboratory findings in oncocytoma usually reveal no specific characteristics, consequently making the preoperative definitive diagnosis challenging.

A recent study of pathologically proven oncocytomas demonstrated that the mean growth rate of the tumor was 2.1 mm/year over a period of 36 months, which is equivalent to the growing rate of the renal cell carcinoma.[10]

Also recent studies discuss the use of segmental enhancement inversion (SEI) on contrast-enhanced CT. Furthermore, quantitative analysis of the enhancement pattern of small renal masses (below four cm) is believed to assist in identifying benign renal tumors such as oncocytomas.[11]

A renal oncocytoma grows slowly in asymptomatic patients in whom the treatment must be conservative. Initial management might be nonsurgical with close follow-up. Monitoring should not miss the time of conservative surgery. Initial tumor volume or fast tumor growth, are indications for surgery. Partial nephrectomy, if the tumor size and localization are reasonable, is currently the technique of choice.[12]

However, accurate preoperative diagnosis based only on imaging studies is difficult. Fan YH et al ana-

lyzed thirteen cases of oncocytomas and found a mean tumor size of 5.3 cm.[13]

Nowadays there is an increased enthusiasm for more conservative management of such renal masses in elderly and infirmed patients.[14]

Percutaneous biopsy could be an indication in these situations[15], but has not been done in our patient because of the high hemorrhage risk, as the dialysed patients have a higher risk of bleeding than the general population.[16]

Conclusions

In CKD patients in which contrast agents are contraindicated, the complete description of grey-scale and Doppler US characteristics of renal masses are mandatory in order to assess the best prognosis and the evolution. We have to perform an active surveillance of the tumor in order to correctly assess its evolution and the prognosis for such patients. In CKD patients, the imaging modalities are limited due to the toxicity of the contrast agents and in case of indication for surgery, ESRD patients have an increased intraoperative risk due to comorbidities and bleeding tendency. Our patient was continuously followed-up at six months interval for the assessment of the tumor evolution. In case of slow growth, no vein thrombosis or distant metastasis, combined with vascular pattern in an asymptomatic patient, one can take into consideration the benign character of the tumoral mass. We strongly recommend US examination as the most reliable imaging modality for the diagnosis and monitoring of this category of patients.

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