Failure to diagnose the presence of cancer or performing nephrectomy when cancer has been diagnosed incorrectly are all too frequent causes for litigation. Radical nephrectomy is the desirable treatment for renal cell carcinoma (RCC), and this places greater responsibility with the radiologist for accurate diagnosis. Also, diagnostic responsibility has increased with the knowledge that small renal cancers, less than 3 cms across, may be curable. Thus, it is important for radiologists to realise the sources of possible diagnostic error. As a basis it is essential to have strict CT and US criteria for RCC and simple cyst.

RCC: "A mass containing no fat but sometimes calcified. Precontrast the mass is, in part or wholly, less dense than renal parenchyme. Following contrast heterogeneous enhancement is demonstrated."

Simple Cyst: "A rounded unilocular mass with an imperceptible wall on CT or US. The cyst fluid is hypoechoic with density less than 25 Hounsfield units. Sonographic through transmission with posterior wall enhancement is clearly demonstrated."

False Negative Diagnosis i.e. cancer is present but misdiagnosed.

i. The normal urogram in hematuria. In patients with red cells in the urine consistent with direct bleeding into the urinary tract, the intravenous urogram is the time honoured and valuable first approach in diagnosis. However, the IVU is unreliable in excluding bladder tumours and also small space lesions in the kidney. Such patients should be further investigated with cystoscopy and CT of the kidneys, which is currently the most sensitive method for detecting small masses.

ii. Disregarding small space lesions displayed on CT or ultrasound. Often detected incidentally during studies directed elsewhere such lesions are frequently dismissed as small cysts on insufficient evidence. These so called incidentomas require detailed examination when first detected if there is any suggestion that the mass is solid. Thin section CT should be performed to provide accurate density measurement and to overcome the frequent problem with small lesions of volume averaging. Dynamic scanning may be required to detect enhancement. Any small solid lesions less than 3 cms requires monitoring to assess growth if not explored.

iii. Calling a cystic carcinoma a simple cyst. The demonstration of a wall to a cyst should be an indication for renal exploration. Simple cysts do not have a perceptible wall on CT or ultrasound. Renal puncture is of no help as cystic carcinomas frequently contain straw coloured fluid. Histology of the wall at the time of operation is required.

iv. Atypical density pattern causing misdiagnosis. Occasionally a carcinoma may be isodense with the renal tissue and enhance homogeneously suggesting a pseudotumour. In such cases a DMSA radionuclide study will show failure of uptake if a cancer. With indeterminate masses, not meeting the criteria of RCC or cyst, the radiologist should warn clinicians and surgeons. In some cases exploratory surgery may be indicated.

False Positive Diagnosis i.e. renal carcinoma diagnosed but not present.

i. Mass in adjacent tissue. Careful assessment should determine whether a lump is within the kidney or not. However, errors have been seen, particularly in respect to the adrenals and also a case in which an accessory splenic lobe was thought to be in the upper pole of the left kidney.

ii. Cancer mimicked by other solid lesions. The CT criteria for diagnosing RCC may be met by a
range of other mass lesions, some neoplastic. Angiomyolipomata may be disclosed by the presence of fat but this may be small in amount and can be confused with distorted fat within the renal sinus. A measurement of less than -70 Hounsfield units is required to differentiate fat from products of necrosis. Despite efforts to find specific features for oncocytoma the overlap with RCC is such that radical nephrectomy is sometimes performed for such lesions. Whilst the malignant potential of oncocytoma has not been fully determined such a happening may not constitute a serious error. These tumours are frequently quite large and may have a central scar and a peripherally disposed blood supply. The presence of a large renal mass with features of renal cancer, but without appropriate clinical symptoms should raise the suspicion of alternate diagnoses and favour exploration rather than radical nephrectomy. Xanthogranulomatous pyelonephritis may mimic cancer. Usually calculi are present and the extent of renal damage often warrants nephrectomy. Isolated renal metastases are uncommon. A second primary renal tumour is more common in those with previous extrarenal cancer. If a metastasis is suspected, percutaneous biopsy may prove helpful and the same can be said for lymphoma.

iv. Parapelvic lesions mimicking cancer. Parapelvic cysts are usually readily diagnosed. Occasionally a solid appearing focal lesion may be seen within the renal sinus fat suggesting the possibility of renal cell carcinoma or localised transitional cell tumour. Such a mass may appear hyperechoic on ultrasound and of soft tissue capacity on CT. It is important to realise that local fibrous changes within renal sinus fat may give this appearance of a focal mass lesion.

Conclusion

In order to minimise errors in renal carcinoma diagnosis a number of points can be made.

1. It is essential to have strict criteria on US and CT for diagnosing simple cyst and renal cell cancer.

2. A negative IVU in patients with true hematuria should be followed by cystoscopy and, if negative, renal CT.

3. It is essential to determine whether an abnormal mass lies within the kidney or closely adjacent.

4. With mass lesions less than 3 cm in diameter found incidentally, it is essential to determine the cystic or solid nature of the lesion and to explore or monitor for growth the solid lesions.

5. Radical nephrectomy should be reserved for those lesions meeting the CT criteria for RCC with appropriate clinical findings.

6. Indeterminate masses not fully meeting the criteria of RCC or simple cyst require further discussion with the clinician. Exploratory surgery may be indicated for further assessment.

References
