**Why are some renal cancers hard to spot?**

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The following cases we share with you have been identified by retrospective review of urology specialist MDT records, or have come to light through our learning from discrepancies process over the past 6 years.

Nine factors affecting renal cancer conspicuity are noted. Often multiple factors can be attributed to each case. These cases are a mix of misses and good spots!

1. **Location within the kidney**
   Interpolar lesions are more difficult to spot than polar lesions. Small transitional cell tumours within the collecting systems are particularly easy to miss unless excretory phase imaging has been performed.

2. **Attenuation.**
   Many small clear cell carcinomas are similar in attenuation to adjacent renal tissue, particularly in the portal venous phase of CT imaging. Lesions <2 cm are particularly difficult to spot on US as they are often isoechogenic to normal kidney.

3. **Phase of contrast enhancement.**
   The majority of abdominal CT is undertaken in portal venous phase (60 seconds delay), in which the renal cortex is opacified but the medulla is not. This may lead to reduced conspicuity of small renal masses, particularly those located more centrally. Renal parenchymal phase imaging at 120 seconds delay produces uniform renal enhancement, thus allowing better contrast between normal parenchyma and renal masses.

4. **Endophytic**
   Endophytic lesions located completely within the kidney are more challenging to spot than exophytic lesions which deform the renal contour.

5. **Relatively homogeneous**
   Homogeneous lesions with relatively low attenuation (<40 Hounsfield units) can resemble simple cysts relative to avidly enhancing adjacent renal parenchyma, and need ROI measurement to establish their nature.

6. **Satisfaction of search**
   With increased imaging of elderly patients, often with multiple co-morbidities, it can be easy to overlook a small renal mass, particularly when there are other significant findings elsewhere in the abdomen. Routine review of coronal MPR in addition to axial sections improves lesion detection.

7. **Incompletely imaged on studies performed for another purpose.**
   Scout views of spiral, pelvic and cardiac MRI will often include the kidneys; these are easy to overlook yet make for a regular theme at our learning from discrepancies meetings.

8. **Suboptimal study**
   Reasons for suboptimal study include artefact from movement, extremes of body habitus, poor contrast opacification etc; these become more common with increasing age and co-morbidity.

9. **Not compared with previous**
   Sometimes previous studies are not available, are either not displayed appropriately by the PACS system or we simply forget to compare to priors! It is a particular factor when the patient has had multiple previous studies.

Conclusion

Features have been identified which make some renal masses more difficult to detect on cross-sectional imaging. As illustrated by the cases above, there are frequently multiple factors working in combination.