Renal cancer

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Abstract

Renal carcinoma is a reasonably common cancer in the UK. Fortunately, its diagnosis is nowadays much earlier due to the increased utilization of radiological imaging. Whilst surveillance is an option, particularly in older/comorbid patients, nephron sparing surgery remains the gold standard treatment for small renal masses. Laparoscopic, robotic or open partial nephrectomy have excellent cure rates. For larger tumours, radical nephrectomy may be required. This again can be performed laparoscopically, robotically or in an open manner. The classic presentation of renal mass, haematuria and loin pain is a late presentation – many of these patients will already have metastatic disease. Although non-curable, treatments are available for metastatic disease. Surgical options in the form of cytoreductive nephrectomy and metastasectomy can improve overall survival. Tyrosine kinase inhibitors and other targeted novel agents contribute the non-surgical treatments and have demonstrated increases in survival.

Keywords Ablation; cancer; carcinoma; kidney; nephrectomy; nephron sparing; partial; radical; renal

Renal cancer facts

Renal carcinoma (RC) is the seventh most common cancer in the UK, but the fifth most common in UK males.[1]

Over time, this cancer has become more prevalent (Figure 1), due largely to the increasing use of radiological imaging with a resulting increase in incidental renal masses. With detection of smaller, earlier stage tumours, a reduction has occurred in patients presenting at a late, incurable stage. Thus, the age-old pathognomonic presentation triad of loin pain, renal mass and haematuria has thankfully become far less common. It is important to note that despite the improvement in survival, renal cancer remains a significantly deadly disease; only 56% of UK adults are expected to survive 5 years.

The main risk factors are: male sex, smoking status, hypertension and obesity. There are several genetic predispositions including Von-Hippel Lindau syndrome, tuberous sclerosis and Birt–Hogg–Dube syndrome, amongst others.

Renal cancer types

Clear cell renal cell carcinoma (ccRCC) is the most common type of RC. It is characterized by abundant clear cytoplasm due to the abundance of glycogen, on microscopy. The other RCCs include papillary RCC, with type 1 boasting a more favourable prognosis than type 2. Chromophobe RCC has the most favourable prognosis, due to its relative slow growth.

A Fuhrman grade can be assigned – it is based on nuclear size, shape and frequency of mitoses. Grades 1 and 2 are designated low grade, with three and four as higher grade tumours. Table 1 shows the AJCC renal cancer staging system.

Complex renal cysts (Figure 2) can be malignant and often represent a diagnostic dilemma. The Bosniak score can stratify the likelihood of harbouring malignancy and is based on CT characteristics including whether the cyst contains solid enhancing components, enhancing wall or septae as well as degree of septation, nodularity and calcification. The following risk levels for malignancy apply: Bosniak 4, 90%; Bosniak 3, 50%; Bosniak 2, 0–5%; Bosniak 1 (simple cyst), 0%.[2]

Paraneoplastic effects

RCC can produce several paraneoplastic effects, including anaemia, weight loss, fever, thrombocytopenia, hypertension, hypercalcaemia (due to parathyroid-hormone-related peptide secretion)[3] and rarely an acute hepatitic picture known as Stauffer's syndrome. A worse prognosis is imparted by the presence of hypoalbuminemia, weight loss, anorexia and malaise.[4]

Renal cancer diagnosis

A history of macroscopic haematuria, loin pain, renal dysfunction, family history of RCC and prior surgery should be elicited. Medical comorbidities, medications, family history of renal tumours or genetic predispositions as well as ECOG (Eastern Cooperative Oncology Group) status should be assessed. Clinical examination can reveal an abdominal mass. Assessment for cervical and supra clavicular lymphadenopathy should be made.

Laboratory tests should include full blood examination, urea and electrolytes (to assess overall renal function), alkaline phosphatase (can be elevated with bone metastases). Calcium, lactate dehydrogenase and erythrocyte sedimentation rate are markers for prognostic stratification.

Ultrasound can reliably distinguish cysts from renal solid tumours. Heterogenous, vascular masses are typical, although no radiological investigation can reliably differentiate benign from malignant tumours. The presence of fat, however, infers a diagnosis of angiomyolipoma – a benign tumour characterized by abnormal proliferation of blood vessels, adipose tissue and smooth muscle.

Triphasic renal CT (Figure 3) is useful for characterization of a renal mass, as well as assessing function of the ipsi- and contralateral kidneys. Local and nodal staging can also be based on CT of the retroperitoneum, whilst a CT of the chest is useful for excluding lung metastases. Renal vein or caval thrombus can be visualized on CT or MRI. Unfortunately, imaging cannot reliably distinguish benign from malignant tumour, nor assess cancer grade.

Whole body bone scan can identify metastatic deposits if suspected, whilst a brain CT may be required if focal neurological symptoms are present. PET is not currently recommended in the workup of RCC.

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Increasing incidence of renal carcinoma in the UK (1)

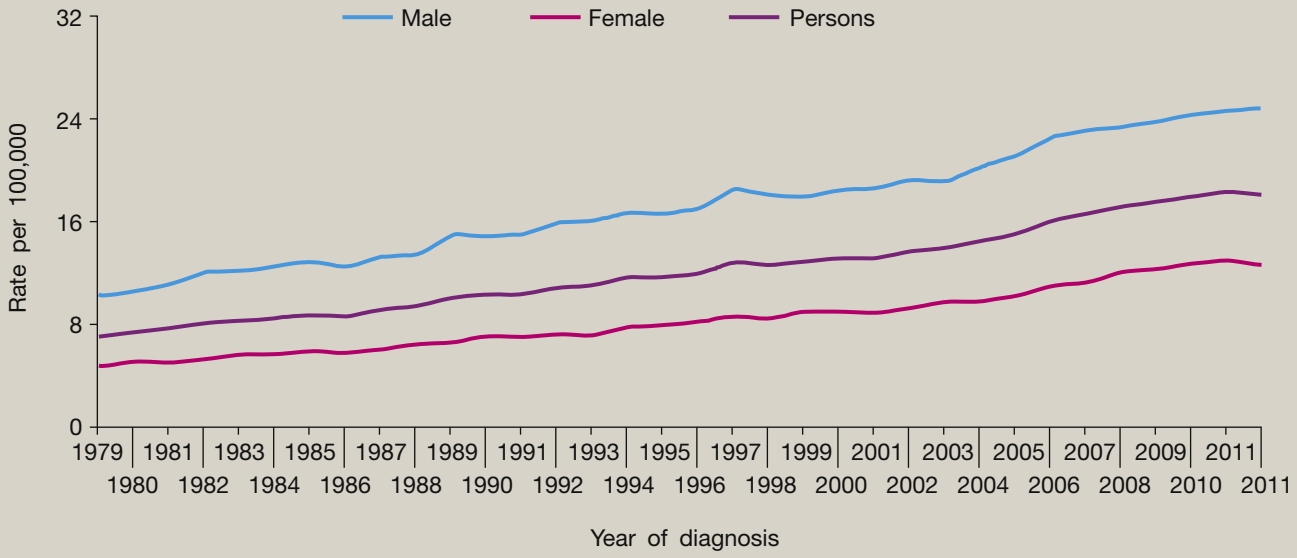

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Figure 1

Renal cancer staging system (American Joint Committee on Cancer)

Primary tumour (T)	
TX	Primary tumour cannot be assessed
T0	No evidence of primary tumour
T1	Tumour $\leq$7 cm in greatest dimension, limited to the kidney
T1a	Tumour $\leq$4 cm in greatest dimension, limited to the kidney
T1b	Tumour >4 cm but $\leq$7 cm in greatest dimension, limited to the kidney
T2	Tumour >7 cm in greatest dimension, limited to the kidney
T2a	Tumour >7 cm but $\leq$10 cm in greatest dimension, limited to the kidney
T2b	Tumour >10 cm, limited to the kidney
T3	Tumour extends into major veins or perinephric tissues but not into the ipsilateral adrenal gland and not beyond the Gerota fascia
T3a	Tumour grossly extends into the renal vein or its segmental (muscle-containing) branches, or tumour invades perirenal and/or renal sinus fat but not beyond the Gerota fascia
T3b	Tumour grossly extends into the vena cava below the diaphragm
T3c	Tumour grossly extends into the vena cava above the diaphragm or invades the wall of the vena cava
T4	Tumour invades beyond the Gerota fascia (including contiguous extension into the ipsilateral adrenal gland)
Regional lymph node (N)	
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in regional lymph node(s)
Distant metastasis (M)	
M0	No distant metastasis
M1	Distant metastasis

Table 1

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