UROLOGICAL MALIGNANCY—III: RENAL AND TESTICULAR CARCINOMA

Chris Dawson, Hugh Whitfield

Renal cell carcinoma

Presentation of renal cell carcinoma

- "Classic triad" (uncommon)
- Pain or haematuria
- Paraneoplastic syndromes
- Symptoms of metastatic disease
- Incidental finding

Ultrasound scan showing lower pole tumour of right kidney (arrow).

Cavagram showing extension of tumour thrombus into inferior vena cava (arrow).

Carcinoma of the renal parenchyma accounts for 3% of all cancers in adults and is seen twice as often in men as in women. Most cases occur in patients aged 50-70 years. No specific causative agents have yet been identified.

Presentation

Renal cell carcinoma notoriously presents in several ways. Although this tumour is believed to present typically with the "classic triad" (pain, haematuria, and a mass in the loin), this presentation occurs in only 10% of cases. Three quarters of patients present with either pain or haematuria.

Paraneoplastic syndromes are also common presentations—substances normally produced by the kidney (for example, prostaglandins, renin, and erythropoietin) may be produced in excess quantities, and other substances that the kidney does not usually secrete (such as parathyroid hormone-like chemicals, glucagon, and insulin) may be produced.

Other presentations include the development of symptoms due to metastases (cachexia, fever, and night sweats). With the increased use of ultrasound scanning, more tumours are being discovered incidentally during investigations for non-urological complaints.

Diagnosis

When a renal mass is present clinically the initial investigation should be an ultrasound examination to determine whether the mass is renal in origin and whether it is cystic or solid. If the lesion is clearly seen in the ultrasound scan as a simple renal cyst then the patient usually needs no further follow up. Any cyst that cannot clearly be identified as a simple renal cyst should be further investigated with computed tomography.

Solid renal masses should be investigated with computed tomography to gain information about the tumour, to see whether the tumour has extended into either the renal vein or the inferior vena cava (although many radiologists can now gain this information from ultrasound scanning), and to ensure that the contralateral kidney is both present and functioning.

Intravenous urography is not needed if the above criteria can be met. Angiography is no longer routinely performed but is useful either when partial nephrectomy is considered or when tumour embolisation may be needed for palliation in advanced renal cancers.

Management

Role of partial nephrectomy

- In bilateral tumours
- Tumour in a solitary kidney

Renal cell carcinoma is usually treated by radical nephrectomy, in which the whole of the kidney, the surrounding fat, and the adrenal gland are all removed along with Gerota's fascia. Whether extensive lymph node dissection is beneficial in addition to radical nephrectomy is unknown, although the results of a recent prospective trial seem to suggest not.

Role of immunotherapy

- About 75% of patients with renal cell carcinoma will develop metastases, of which one third are present at the time of diagnosis
- Renal cell carcinoma is resistant to chemotherapy, and hormonal therapy has also been rejected because of poor success rates
- Immunotherapy—with interferon, interleukin 2, or lymphokine activated killer cells—has been tried with some success
- With immunotherapy, responses of up to 30% have been achieved but seem to be short lived. It is not yet clear whether survival can be enhanced by such therapies

The increasing number of renal tumours that are discovered incidentally has prompted the suggestion that partial nephrectomy may be adequate in patients with a single tumour and a normal kidney on the other side. Incidental tumours are usually small, and peripheral in the kidney, and normally asymptomatic. Partial nephrectomy is technically simple, leaving the unaffected part of the kidney intact. However, the procedure is associated with a local recurrence rate of approximately 10%. In addition, when specimens taken during radical nephrectomy are examined histologically, tumours are often found to be multifocal. Thus radical nephrectomy remains the treatment of choice for a unilateral renal tumour in patients with a normal contralateral kidney.

Testicular tumours

Examination

- The scrotum should be examined to confirm that the lump originates from within the testicle
- The spermatic cord should be palpated for possible involvement with tumour
- The abdomen and neck should be examined for evidence of metastatic spread

Symptoms and signs

Most patients present with a painless lump in the testicle, although some patients may complain of scrotal ache. The practice of testicular self examination has recently become more popular, and many men now present at an earlier stage of the disease. This has had a noticeable impact on the potential for cure in this disease.

Investigations

Any lump palpated within the tunica vaginalis should be considered to be a testicular tumour until proved otherwise, and urgent referral to a urologist is mandatory. If doubt exists about the nature of a scrotal lump then scrotal ultrasonography should be requested. Common problems that may mimic testicular tumour include testicular torsion and epididymo-orchitis. If the ultrasound scan shows a testicular tumour and surgery is planned then serum concentrations of the markers α fetoprotein and β human chorionic gonadotrophin should be requested and abdominal computed tomography and chest x ray examination obtained to look for metastatic spread.

Ultrasound scan showing tumour occupying most of testis.

Staging of testicular tumour

- Stage I Tumour confined to testis
Stage II Involvement of subdiaphragmatic lymph nodes
Stage III Involvement of supradiaphragmatic lymph nodes
Stage IV Tumour spread to lungs and liver
Stages II and III may be subdivided according to the number and size of lymph nodes involved with the tumour

Classification of testicular tumours

Differing testicular tumours result according to the abnormal developmental pathway taken by the embryonic totipotent germ cells, which normally develop to produce spermatocytes. Initially, abnormal differentiation will lead to the formation of a seminoma (which may be of the classic, spermatocytic, or anaplastic type) or embryonal carcinoma. Embryonal cells may further differentiate along two different pathways: production of abnormal embryonic tissue leads to teratoma, while production of extra-embryonic tissue leads to yolk sac tumours or choriocarcinoma. The recent trend has been to label testicular tumours as either seminomas or non-seminomatous germ cell tumours. Several staging systems exist, but one of the more useful is shown here.

Incidence of different testicular tumours.

Initial treatment

- Immediate local control is with radical orchidectomy
- This should be performed with an inguinal approach and the cord clamped before manipulation of the testicle to prevent dissemination of tumour
- A prosthetic testicle may be inserted into the empty scrotum during the same operation for cosmetic reasons
- Once the histological results and the results of computed tomography are known, further treatment can be decided on

Treatment of advanced non-seminomatous germ cell tumours

- More advanced disease is best treated with chemotherapy
- If the concentrations of tumour markers fall after chemotherapy and residual retroperitoneal masses are seen on computed tomography then lymph node dissection is appropriate as 20% of such nodes will harbour residual tumour
- When the tumour markers do not fall to normal concentrations after chemotherapy, opinion on treatment is divided between lymph node dissection and further chemotherapy

The ultrasound scans were provided by Mr H N Blackford, Edith Cavell Hospital, Peterborough.

Markers

Testicular tumours are one of the few malignancies to produce specific tumour markers, which may be used in deciding the course of the disease. α Fetoprotein is present in serum at birth but quickly declines to negligible concentrations, becoming undetectable after the first year of life in the normal male. This marker is produced in varying amounts by all non-seminomatous germ cell tumours (except choriocarcinoma) but is never found in pure seminoma. β Human chorionic gonadotrophin is not present in the serum of the normal male but is produced by non-seminomatous germ cell tumours and in many cases of seminoma.

Treatment

Seminoma is exquisitely radiosensitive, and radiotherapy for stage I disease results in cure rates in excess of 95%. Survival rates for stage IIa disease (tumour in regional nodes <2 cm size) after radiotherapy alone are not appreciably less than for stage I disease. For more advanced disease the initial treatment of choice is usually chemotherapy with platinum based agents. After chemotherapy computed tomography may show residual retroperitoneal masses. Residual tumour has been shown in half of such masses that are more than 3 cm in diameter, but surgery is difficult because intense fibrosis is a common finding.

Traditionally the treatment for stage I non-seminomatous germ cell tumours has been orchidectomy followed by retroperitoneal lymph node dissection to eradicate the disease while confined to the local lymph nodes. It is now believed, however, that most patients with such tumours do not benefit from this dissection. In addition, the procedure is not without complications—most notably, failure to ejaculate and infertility. Newer nerve sparing techniques have done much to reduce the incidence of these complications.

More recently, stage I non-seminomatous germ cell tumours have been managed by surveillance. Serum tumour markers should be estimated on days 5, 10, 20, and 30 after orchidectomy and monthly thereafter. Computed tomography should be performed two monthly for the first year and every three months thereafter.

Key references

- DeKernion JB, Belledgrun A. Renal tumours. In: Walsh PC, Retik AB, Stamey AB, Vaughan ED, eds. *Campbell's urology*. Philadelphia: W B Saunders, 1992
- Gore ME. Advances in the management of renal cell carcinoma. In: Hendry WF, Kirby RS, eds. *Advances in urology/andrology* 6. Edinburgh: Churchill Livingstone, 1993
- Richie JP. Neoplasms of the testis. In: Walsh PC, Retik AB, Stamey AB, Vaughan ED (eds). *Campbell's urology*. Philadelphia: W B Saunders, 1992
- Jenkins BJ. The treatment of advanced testicular cancer. *Cancer Topics* 1995;10:10-1

The ABC of Urology is edited by Chris Dawson, a senior registrar in urology at the Edith Cavell Hospital, Peterborough, and Hugh Whitfield, a consultant urologist at the Central Middlesex Hospital and the Institute of Urology and Nephrology, London.