

# KIDNEY AND URETER

## MAIN CATALOGUE

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### CASE 53

No clinical information is available.

**The specimen** consists of a kidney measuring 10cm in length. The medullary pyramids are well formed and the collecting tubules not obviously dilated except perhaps in the upper pyramid. The cortex is uniformly replaced by small cysts varying in size up to 3mm in diameter. Small irregular islands of relatively normal-appearing cortex can be seen from the external surface (on the back of the specimen) intervening between the cysts.

**Diagnosis:** Cystic disease of the kidney (? type)

### CASE 310

No clinical information is available.

**The specimen** is of 2 bisected kidneys measuring 25cm in length. Their substance is entirely replaced by large cysts varying in size up to 4cm in diameter. Some cysts contain blood clot. In a few places a little unaffected renal substance can be seen between the cysts.

**Diagnosis:** Polycystic kidneys, probably autosomal dominant (adult)

### CASE 700

No clinical information is available.

**The specimen** is a kidney measuring 9cm in length. The pelvis and upper ureter have been opened to disclose a large pale cauliflower-like tumour measuring 8cm in length by 5 in maximum diameter arising from the lower portion of the renal pelvis and filling and distending the upper end of the ureter. The kidney is small and shows large depressed cortical scars.

**Diagnosis:** Carcinoma of the renal pelvis and chronic pyelonephritis

**What type of tumour is this likely to be?** Transitional cell carcinoma

### CASE 2188

No clinical information is available.

**The specimen** is of a kidney measuring 10cm in length. Its substance has been largely replaced by cysts varying in size up to 6mm in diameter. Some cysts contain blood clot. The medullary pyramids are relatively unaffected.

**Diagnosis:** Cystic disease of the kidney (? type)

### CASE 2797

No clinical information is available.

**The specimen** is of a small kidney, possibly from a child. At its upper pole is an old encapsulated cyst 5cm in diameter that contains collapsed laminated membrane and remnants of daughter cysts.

**Diagnosis:** Hydatid cyst

**What is a hydatid cyst?** A hydatid cyst is a cyst caused by the tapeworm *Echinococcus granulosus* following the ingestion of its eggs, typically in dog faeces. Eggs hatch in the intestine and the larvae invade the liver especially, but can also spread to other organs.

### CASE 3825

No clinical information is available.

**The specimen** comprises portions of liver and spleen and both kidneys. The kidneys are studded with tiny 1-2mm diameter foci with a central point of pallor surrounded by a rim of inflammatory hyperaemia. The cut surface of one kidney shows that these lesions are present in both the cortex and medulla. A 15mm pale infarct is present in the spleen and there are several congested infarcts in the liver.

**Diagnosis:** Microabscesses and septic infarcts

**What is the potential pathogenesis of this pathology?** Organisms gained access to the kidney via the blood. The patient could have had infective endocarditis, the abscesses and infarcts developing secondary

to septic emboli. Another possibility is that the abscesses developed secondary to septicaemia and the infarcts resulted from septicaemia related disseminated intravascular coagulation (DIC).

#### **CASE 3869**

No clinical information is available.

**The specimen** is of a kidney measuring 12cm in length and its surface shows mild granularity from nephrosclerosis. In addition scattered small yellow punctate septic areas are visible on the surface. The cut surface shows marked acute pale necrosis of the renal papillae together with pyelonephritic streaks and points (not well seen) in the renal substance.

**Diagnosis:** Acute pyelonephritis with renal papillary necrosis

**What are the potential complications of acute pyelonephritis?**

- papillary necrosis - mainly in diabetics and in those with urinary tract obstruction
- pyonephrosis - seen in near or total obstruction. Pus fills the renal pelvis, the calyces and ureter
- perinephric abscess: extension of infection through the renal capsule into adjacent tissue
- with recurrent or ongoing low grade infection: chronic pyelonephritis resulting in chronic scarring of the kidney and chronic renal failure

**With what conditions is papillary necrosis associated?** Analgesic abuse, acute pyelonephritis (particularly in diabetics and those with obstruction), sickle cell disease.

#### **CASE 4383**

No clinical information is available.

**The specimen** consists of both kidneys each measuring about 9cm in length and of similar appearance. Both cortex and medulla are replaced by small linear cysts. No normal renal tissue can be seen with the naked eye.

**Diagnosis:** Polycystic kidney disease, probably autosomal recessive (infantile)

#### **CASE 4682**

The patient was a woman who died 9 days after delivery of her baby. She had toxæmia during the pregnancy.

**The specimen** is of both kidneys showing extensive coalescing areas of pale infarction throughout the cortices. A very narrow rim of cortical tissue survives beneath the capsule over each necrotic area. In the upper kidney almost all cortex is destroyed. Some medullary pyramids also seem to be affected. The pelves are normal.

**Diagnosis:** Diffuse cortical necrosis

**What is the proposed pathogenesis of this disease?** This condition occurs most commonly in association with obstetric emergencies. The necrosis is probably ischaemic in nature and probably results from disseminated intravascular coagulation and vasoconstriction.

**Why is a rim of subcapsular cortical tissue spared?** The subcapsular cortex has a collateral blood supply.

#### **CASE 7062**

A male baby aged 5 weeks developed a cold. Two weeks later frequent green frothy fluid bowel actions began, together with vomiting, resulting in severe dehydration. There was a swinging fever. Two days later he began to pass blood in the urine and faeces. The toes became gangrenous and gangrene spread up the feet. He died 2 days later. At post-mortem, a coagulase positive non-haemolytic staphylococcus was grown from the blood.

**The specimen** consists of the kidneys, one adrenal gland, and great vessels. One kidney shows total haemorrhagic infarction and the other kidney shows haemorrhagic infarction of the upper half. On the back of the specimen the aorta and inferior vena cava can be seen to be clear of thrombus.

**Diagnosis:** Massive renal infarction

**What are the possible causes of the renal infarction in this patient?** In the absence of further information, possibilities include disseminated intravascular coagulation (DIC) related to the septicaemia (this could also have been responsible for the gangrene) or haemolytic uraemic syndrome (though typically related to a certain strain of *E. coli* gastroenteritis).

#### **CASE 7094**

The patient was a middle-aged man with a history of pain in the right loin for 2 months. A mass was palpable but there was no haematuria. IVP showed a non-functioning right kidney. The kidney was removed.

**The specimen** consists of a coronal slice of the kidney. At the upper pole is a typical Grawitz (renal cell) carcinoma 8cm in diameter with a lobulated cut surface including areas of lipid, scarring and necrosis. Invasion of the renal vein is evident at the hilum.

**Diagnosis:** Renal cell carcinoma

**Comment:** Histology showed a renal cell carcinoma with clear-cells and papillary architecture. The mass in the branch of the renal vein that was sectioned is thrombus and not tumour.

#### **CASE 7789**

No clinical information is available.

**The specimen** consists of a coronal section of the kidney and the upper 15cm of the ureter. The kidney measures 15cm in length and shows advanced dilation of its calyces and pelvis with almost complete atrophy of the renal substance. There is a solid tumour some 10cm in length within the ureter completely obstructing it.

**Diagnosis:** Carcinoma of the ureter with hydronephrosis

**What type of tumour is this likely to be?** Transitional cell carcinoma.

#### **CASE 8029**

The patient was a man aged 64 who had angina of effort for 12 months and then suffered an acute antero-septal myocardial infarction. Very soon afterwards he became unconscious and was found to have right hemiplegia. He died 8 days after the onset of the infarct. At post-mortem a large left middle cerebral softening was found.

**The specimen** consists of a kidney divided in the coronal plane and measuring approximately 12cm in length. The cut surface shows extensive multiple partly confluent areas of pale necrosis with surrounding congestion in the cortex. A thin rind of cortical tissue survives beneath the capsule. Ante-mortem thrombus is visible in a branch of the renal artery.

**Diagnosis:** Multiple infarcts of kidney.

**Explain the likely pathogenesis of these renal infarcts and the cerebral infarct given the patients history.** This patient probably had a thrombus form on the damaged left ventricular endocardium following the myocardial infarct that has embolized to the brain and kidney.

#### **CASE 8752**

The patient was a diabetic woman aged 72. Both legs had been amputated for gangrene and one breast 6 years previously for carcinoma. The other breast was removed for carcinoma 2 years later. She died suddenly from myocardial infarction.

**The specimen** consists of a coronal slice of a kidney, which measures 13cm in length, together with 12cm of the ureter. The external surface of the kidney shows some shallow scars from old pyelonephritis together with a fine granularity resulting from arteriolar nephrosclerosis. The cut surface shows some thinning of the cortex in the lower pole and normal-appearing medullary pyramids. Many small cysts are scattered beneath the epithelium of the upper ureter and protrude into the lumen. They are up to 3mm in diameter and contain brown watery fluid.

**Diagnosis:** Ureteritis cystica

**What is ureteritis cystica?** This is the formation of small epithelial lined cysts in the wall of the ureter said to result from downward proliferation of foci of surface epithelium in the presence of chronic inflammation, which become pinched off to form small islands.

### CASE 8968

1. A phosphate calculus measuring 4.5 x 3 x 3cm. The cut surface shows a central core surrounded by radiating triple phosphate crystals.
2. An irregular urate stone.
3. A spiny oxalate calculus.
4. A small smooth cysteine calculus, usually yellow or green.

### CASE 9934

The patient was a 41-year old woman with pulmonary tuberculosis for at least 3 years, treated at various sanatoria. She was transferred to the RAH because of the development of oedema which did not respond to treatment. The oedema was generalized, BP 90/65 and she had albumin and finely granular casts in her urine. The creatinine was normal. The liver function tests were normal except for slightly raised serum alkaline phosphatase. The sputum contained acid-fast bacilli and the chest x-ray showed increased cavitation affecting both lungs. She deteriorated slowly and died. Post-mortem showed extensive secondary amyloidosis affecting chiefly the kidneys and spleen (weight 250g) and to a lesser extent the liver. There was extensive bilateral pulmonary tuberculosis with pleural effusion.

**The specimen** is of the kidneys and the spleen. The kidney is mildly enlarged and measures 13cm in length. The outer surface is smooth. The cut surface reveals a tan colour of the cortex. The pelvis and calyces appear essentially normal. The spleen is 12cm in length and shows 'sago' change on the cut surface.

**Diagnosis:** Amyloid infiltration

**What complication of renal amyloidosis has this patient experienced?** Nephrotic syndrome.

**What type of amyloid is it likely to be and why?** AA or secondary amyloid as she has TB (a chronic inflammatory disease).

### CASE 10213

- A. Oxalate (jack stone) of bladder.
- B. Mixed stone lower end of ureter.
- C. Cystine stone.
- D. Large phosphate stone on foreign body (pencil).

### CASE 10702

No information is available except that the patient was a man aged 58.

**The specimen** is of a kidney measuring 12cm in length. There is marked radial suppuration affecting the medullary pyramids with necrosis of their tips. The cortex appears patchily congested. There are patches of haemorrhage around the pelvis.

**Diagnosis:** Acute pyelonephritis complicated by acute papillary necrosis

**With what conditions is papillary necrosis associated?** Analgesic abuse, acute pyelonephritis (particularly in diabetics and those with obstruction), sickle cell disease.

### CASE 10942

This patient was a man aged 43 who had malignant hypertension for 12 months. A lumbar sympathectomy was performed in August 1956 but the BP remained uncontrollable. He developed hypertensive encephalopathy and early signs of uraemia, and died a few weeks later. At post-mortem there was marked cardiac hypertrophy and uraemic changes in the lungs and stomach.

**The specimen** is a slice of a slightly small kidney that measures 11cm in length. The cortex is mildly thinned and overall the kidney appears mildly congested. Tiny spotty areas of pallor are seen on the external surface.

**Comment:** The diagnosis of malignant nephrosclerosis is made histologically not macroscopically. More typically the kidney macroscopically in a more acute malignant nephrosclerosis is swollen with haemorrhagic petechial spots.

**What histological features are likely to be seen in this kidney?** Fibrinoid necrosis of arterioles with hyperplastic arteriosclerosis, foci of ischaemic necrosis of glomeruli, possibly a background of obsolescent glomeruli, tubular atrophy and interstitial scarring from pre-existing benign hypertension.

**What complication develops in the patient as a result and why?** Acute renal failure. Fibrinoid necrosis of arterioles leads to thrombotic occlusion and subsequent acute ischaemia of the kidney.

**What are the other main acute life-threatening complications of malignant or accelerated hypertension?**

Acute heart failure, intracerebral haemorrhage, cerebral oedema and raised intracranial pressure

### CASE 11373

The patient was a European migrant male aged 31 whose illness lasted 3 months. It began with fever, sore throat and frontal headache that were treated with penicillin and sulpha drugs. Orbital oedema was noted at this time. He resumed work after 2 weeks of rest, but oedema of the legs, hands and face was still present. He had passed less urine than usual and noted that it was bloodstained. He was admitted to hospital. The BP was 155/90 and there was oedema of the face, trunk and limbs. Urine: Sp. Gr. 1110, albumin 4+, blood present. The BP rose in 4 weeks to 210/145. It was reduced by hypotensive drugs but later increased again, the serum potassium fell to 2.5 and retinal haemorrhages and papilloedema were noted. Several episodes of hypertensive encephalopathy ensued and he died.

**The specimen** is a slice of a large swollen kidney that measures 14cm in length. The surface is relatively smooth. The cut surface shows widening of the cortex with congestion of the radial vessels in the medulla. The cortex is pale and petechiae are noted from the external aspect.

**Diagnosis:** Features in keeping with malignant nephrosclerosis or a rapidly progressive glomerulonephritis

**Comment:** The swollen kidney with petechial spots is seen in situations where there is acute severe glomerular injury such as with malignant nephrosclerosis or a rapidly progressive glomerulonephritis, both of which could be operative in this case.

The diagnosis is made histologically not macroscopically. Histology reportedly showed swollen glomeruli with cellular proliferation and crescent formation, the picture being that of a severe rapidly progressive proliferative glomerulonephritis. Focal hyaline thickening of glomerular loops was also evident and interstitial fibrosis was commencing. Many tubules contained hyaline and granular casts and some contained blood.

Rapidly progressive or crescentic glomerulonephritis (GN) can be associated with a variety of conditions:

- It may complicate other glomerulonephritides such as IgA or post infective (post-streptococcal) GN or GN associated with systemic lupus erythematosus
- It may be idiopathic
- It may occur as part of Goodpasture's syndrome
- It may be associated with a variety of vasculitides including Wegener's granulomatosis and microscopic polyarteritis nodosa.

The history of sore throat, features of nephritic syndrome and histological report of glomerular cellular proliferation suggest that the crescentic GN complicated a post-infective GN.

### CASE 11889

The patient was a man aged 65 who had exertional dyspnoea for 18 months accompanied by frequency of micturition during the day. The BP was 190/100, the haemoglobin low and creatinine elevated. He suffered a severe epistaxis and died of uraemia.

**The specimen** consists of coronal slices of the kidneys with attached vessels. Each kidney is grossly shrunken and measures only 7cm in length. Their surfaces are granular. The cut surface shows gross diminution of cortical thickness with loss of demarcation between cortex and medulla. The aorta shows atherosclerosis.

**Diagnosis:** Small scarred kidneys.

**Comment:** A number of processes can result in scarring of both kidneys. These include diabetic glomerulosclerosis, some of the glomerulonephritic diseases, chronic pyelonephritis, bilateral renal artery stenosis and some cases of systemic hypertension.

#### **CASE 11927**

No clinical information is available.

**The specimen** consists of a kidney measuring 14cm in length. There is marked intrarenal hydronephrosis and the region of the pelvis is filled with a mass of fungating papillary tumour that extends for 4cm down the upper end of the ureter. Several separate and distinct sessile papillary tumours are present further down the rather dilated ureter. Fibrinous exudate is present on the inner aspect of the dilated lower calyx of the kidney where there is also some intramural haemorrhage.

**Diagnosis:** Carcinoma of the renal pelvis and ureter

**Histology** showed a typical transitional cell papillary tumour.

**Comment:** Transitional cell carcinomas of the urinary tract may arise in more than one site as the predisposing factors are compounds excreted in the urine and thus have a field effect on the entire urothelium. The multiple tumours in this case could thus all be primaries, or the smaller ones could be metastases from the main one in the renal pelvis.

#### **CASE 12732**

The patient was a male child who at 3.5 years of age presented with haematuria, loss of appetite and a mass palpable in the left flank. He underwent left nephrectomy and died one year later despite post-operative radiotherapy.

**The specimen** consists of a bisected kidney that has been mounted inverted in the pot. The kidney has an enlarged lower pole where the architecture is distorted and replaced by a focally necrotic and haemorrhagic homogeneous tan coloured tumour measuring 6cm in maximum diameter. Tumour invades the renal pelvis and the upper calyces are dilated.

**Diagnosis:** Wilm's tumour

**Histology** showed dark masses of regular spindled cells forming masses and sheets embedded in fibrous tissue.

**Comment:** This diagnosis cannot be made macroscopically but is the favoured diagnosis for a renal tumour in a young child.

#### **CASE 12776**

The patient was a woman aged 37 with a history of pain in the renal angles for 4 months, becoming more persistent and severe in the last 6 weeks. She had been vomiting for 2 weeks. The liver edge was palpable and investigations showed multiple myeloma. There were masses of abnormal plasma cells in the bone marrow and a myeloma band on paper electrophoresis. Bence-Jones protein was present in the urine and on x-ray there were scattered focal rarefactions in the pelvis and spine. She declined steadily and died 2 weeks after admission. Postmortem showed widespread changes of multiple myeloma.

**The specimen** is a coronal slice of a kidney that is 13cm in length. The capsule is thin and strips readily to disclose a generally smooth but pale surface on which there are occasional petechial spots. The cut surface is pale and there is some loss of demarcation between cortex and medulla with radial streaks of congestion in the pyramids.

**Comment:** The macroscopic features of this enlarged pale kidney suggest amyloid but histology reportedly showed many hyaline casts in the tubules surrounded by varying degrees of epithelial desquamation, mononuclear infiltration and giant cell formation. Stains for amyloid were negative. **The diagnosis** is thus cast nephropathy.

**What is cast nephropathy?** Excess unabsorbed monoclonal light chains filtered by the kidney (Bence-Jones proteins) can combine with other urinary constituents and precipitate in the renal tubules as casts, damaging the tubules and initiating an interstitial giant cell inflammatory response. Patients develop acute or chronic renal failure.



### **CASE 13101**

The patient was a woman of 85 who died following a cerebral infarct. It is not known whether she had been hypertensive.

**The specimen** consists of both kidneys with the renal vessels and related segment of the aorta. Each kidney measures 11cm in length and shows a granular surface. The surface of the right kidney (right side of pot) shows a large shallow depression suggestive of chronic pyelonephritis. Several scattered small retention cysts are also present with a large collapsed simple cyst 4cm in diameter being present at the lower pole of the right kidney. The aorta shows gross calcific atherosclerosis.

**Diagnosis:** Benign nephrosclerosis with possible chronic pyelonephritis

### **CASE 13630**

A man aged 77 with myocardial ischaemia had been discharged from hospital 3 weeks previously. Two days before his last admission he slipped on his right side. At the same time he noticed a mild pain in the left loin and shortly vomited. There was some fullness and tenderness on palpation. Plain x-ray showed a large left kidney and IVP showed no secretion of dye on the left side. His haemoglobin level dropped. Then there was a further episode of pain and breathlessness and he died.

**The specimen** consists of a kidney that measures 10cm in length. Its cut surface shows no abnormalities. There is a large recent subcapsular haematoma covering the entire lateral aspect of the kidney to a depth of 4cm and extending around to the back of the organ.

**Diagnosis:** Traumatic subcapsular haematoma

### **CASE 13785**

The patient was a woman who had intermittent haematuria for 12 months. Pyelogram showed a filling defect in the renal pelvis. The kidney was removed.

**The specimen** shows a coronal slice of the kidney that measures 10cm in length. The renal substance appears essentially normal but there is a papillary tumour consisting of delicate pale fronds filling the pelvis. The tumour measures 2.5cm in diameter.

**Diagnosis:** Carcinoma of the renal pelvis

**Histology** showed transitional cell carcinoma.

### **CASE 13932**

The patient was a man aged 44 who had rheumatoid arthritis for 3 years, treated with steroids. A flare-up of arthritis occurred 3 months previously that was only partially controlled by steroids. At that time he also developed multiple neuropathy with muscular wasting and generalized loss of weight. Postmortem showed fibrinous pericarditis, cardiac enlargement, myocardial infarction and enlargement of the spleen and liver.

**The specimen** consists of a coronal slice of a kidney 11cm in length. The capsule is thin and strips readily to disclose a smooth surface with some large blotchy areas of pallor. The cut surface reveals a pale kidney with loss of demarcation between cortex and medulla. Several well-circumscribed 'encapsulated' lesions are present measuring up to 8mm in diameter. These are filled with pale material.

**Comment:** This is a difficult diagnosis to make macroscopically. The lesions are arterial aneurysms. Histology reportedly showed the classical features of polyarteritis nodosa with inflammatory destruction of the media. Similar changes were found in vessels supplying peripheral nerves and there was interstitial inflammatory infiltration in the muscles.

**What is polyarteritis nodosa and in what ways can it affect the kidney?** Polyarteritis nodosa is an autoimmune vasculitis. Classic polyarteritis nodosa affects medium sized muscular arteries such as the renal, coronary and visceral arteries. Inflammation of the vessels leads to aneurysmal dilatation and thrombosis that can cause infarction. Another form, known as microscopic polyarteritis (microscopic polyangitis, hypersensitivity vasculitis) affects arterioles, capillaries and venules. In the kidney it can cause a crescentic glomerulonephritis.

### CASE 14223

This man aged 59 was found to be hypertensive 2.5 years previously after complaining of headaches. Headaches persisted and some months before his final admission weakness and breathlessness were present, along with nocturia and thirst, vomiting and loss of weight. The BP was 250/140. There was moderate albuminuria with casts and his Hb was reduced. He was readmitted for transfusion but suddenly became unconscious with stertorous breathing and flaccidity and died. A massive pontine haemorrhage was found at postmortem. The kidneys weighed 80g and 90g.

**The specimen** shows a slice of each kidney, one measuring 8cm and the other 7cm in length. The capsule has been stripped to disclose a finely granular surface in which islands of hypertrophied tubules about 2mm in diameter are interspersed with tiny depressed areas of scarring. The cut surface shows marked narrowing of the cortex with reduced demarcation between cortex and medulla. Broad depressed cortical scars are not apparent.

**Diagnosis:** Small scarred kidneys.

**Histology** showed glomerular hyalinization, severe hypertensive vascular disease including fibrinoid necrosis of a few afferent arterioles and glomerular capillaries, together with areas of tubular atrophy and interstitial scarring.

**What are the potential underlying causes of the renal pathology in this case?** The patient's history of hypertension is not very long, so this may have been a result of the chronic renal disease rather than the cause. In the absence of a history of diabetes, pyelonephritic scarring in the kidney, histological evidence of an interstitial nephritis or significant atherosclerosis (which would presumably have been mentioned with the autopsy information) the most likely cause is some form of chronic glomerulonephritis.

**Why has this patient developed a pontine haemorrhage?** He has hypertension that is a risk factor for hyaline change in, with damage to the walls, +/- with microaneurysm formation, of arterioles, a common site of their rupture being the pons.

### CASE 14683

The patient was a man aged 70 with congestive cardiac failure. He developed slurring of speech and died 3 days later from what was said to be "cerebral insufficiency".

**The specimen**, an incidental finding at postmortem, was this calculus impacted at the upper end of the left ureter. There is moderate intrarenal hydronephrosis as a result. The kidney shows gross narrowing of the cortex. The surface shows the fine granularity of arteriolar nephrosclerosis.

**Diagnosis:** Ureteric calculus with hydronephrosis and benign nephrosclerosis

**What relationship does the benign nephrosclerosis have to the CCF and slurred speech?** Systemic hypertension is a risk factor for all (the slurred speech was probably caused by a cerebral infarct).

### CASE 14977

A boy of 16 developed acute leukaemia 4 months before death. At the onset he was hypertensive and uraemic, considered to be due to nephritis. The uraemia responded to treatment but the hypertension persisted. He was discharged on steroids and antimitotic drugs and remained reasonably well under outpatient supervision. Finally he developed persistent epistaxis and purpura and was admitted in coma. He died less than 24 hours later. At postmortem widespread purpuric haemorrhages were found and there was massive leukaemic infiltration of lymph nodes, liver, spleen and kidneys, and acute cerebellar haemorrhage.

**The specimen** consists of a coronal slice of a greatly enlarged kidney that measures 14cm in length and 9cm across. The surface is uniformly pale with widening of the cortex and medulla and loss of demarcation between the cortex and medulla. There is a patch of recent haemorrhage beneath the mucosa of the pelvis.

**Diagnosis:** Leukaemic infiltration of the kidney

**Explain the likely pathogenesis of the epistaxis, purpura and cerebellar haemorrhage in this patient.**

They are probably related to thrombocytopenia, developing either as a result of marrow destruction by leukaemic cells or chemotherapy.

### **CASE 15061**

A woman aged 77 had cardiac failure and angina of effort. Three weeks before her final admission she spent a period in a private hospital with persistent chest pain not relieved by trinitrin. At her last admission the BP was 240/150, the JVP was raised and the liver was palpable. She suffered an attack of syncope with cyanosis. During the attack the pulse was absent but returned within a few moments at a rate of 44/minute. The next day she had a further Stokes-Adams attack and died.

**The specimen** consists of the kidneys, renal vessels and attached aorta. The aorta shows gross ulcerative atherosclerosis. The larger right kidney measures 11cm in length and the capsule strips to disclose fine arteriolar nephrosclerosis. The renal artery to this kidney is patent. The left kidney is small and measures 10cm in length. A patent aberrant artery supplies the lower pole that shows pyelonephritic scarring on a background of nephrosclerosis. The upper two thirds of this kidney is supplied by a second artery, the origin of which is largely occluded by pultaceous atheroma. The renal substance supplied by this artery shows general symmetrical atrophy but no arteriolosclerotic granularity.

**Diagnosis:** Renal artery stenosis with ischaemic atrophy of kidney.

### **CASE 15586**

The patient, a 19-year old girl, presented with anaemia and hypertension and subsequently died from chronic renal failure.

**The specimen** consists of a section from the heart, aorta, portion of the inferior vena cava with renal veins, both kidneys, adrenals, ureters and bladder. The bladder is small but essentially normal. The lower left ureter is normal but above the pelvic brim it is reduced to a thin fibrous cord. A small nodule of tissue is all that is present of the left kidney. The right kidney is small, scarred and contracted with loss of demarcation between the cortex and medulla. The adrenals are essentially normal and the left ventricular myocardium is thickened to 21m.

**Diagnosis:** Congenital abnormality of the kidney, chronic pyelonephritis

**Correlate the clinical information with the pathological findings.** Patients may live with one kidney. However, this patient developed recurrent infections of the initially healthy right kidney leading to chronic pyelonephritis that ultimately caused chronic renal failure leading to anaemia and systemic hypertension, the latter leading to concentric left ventricular hypertrophy.

### **CASE 15675**

A woman of 63 had increasing shortness of breath, polydipsia, polyuria, ankle swelling, weakness and malaise. The BP was 240/110 and the urine had a sp. gr. of 1030 and showed moderate albumin. The creatinine level was elevated and Hb 78 g/L. There was a pericardial friction rub. She died of uraemia two days later. At postmortem, left ventricular hypertrophy, uraemic haemorrhages in the bowel and fibrinous pericarditis were found. The kidneys weighed 120 and 140gm.

**The specimen** is a slice of one kidney measuring 11cm in length. The surface is coarsely granular. The cut surface shows slight diminution of cortical thickness and congestion and congestion of the medulla.

**Diagnosis:** Benign nephrosclerosis.

### **CASE 15730**

The patient was a 57-year old man who died from the effects of a pyogenic abscess in his right temporal lobe. His final illness was complicated by his unstable diabetic state.

**The specimen** consists of one half of a swollen, congested kidney. Small dilated vessels are prominent on the surface. The mucosa of the pelvis is also congested.

**Diagnosis:** Acute pyelonephritis

**What are the potential complications of acute pyelonephritis?**

- papillary necrosis - mainly in diabetics and in those with urinary tract obstruction
- pyonephrosis - seen in near or total obstruction. Pus fills the renal pelvis, the calyces and ureter
- perinephric abscess: extension of infection through the renal capsule into adjacent tissue

- with recurrent or ongoing low grade infection: chronic pyelonephritis resulting in chronic scarring of the kidney and chronic renal failure

#### **CASE 16005**

This 80-year old man had a known carcinoma of the bladder for one year. This was treated with radiotherapy. He died from uraemia.

**The specimen** consists of one half of a kidney together with the pelvis and upper 6cm of ureter. The renal parenchyma and pelvis appear patchily congested. There are numerous tiny pale abscesses scattered about the cortex and medulla.

**Diagnosis:** Acute pyelonephritis with microabscess formation

**Describe the expected histological findings in the kidney.** The kidney would show a patchy neutrophil infiltrate in the tubules and interstitium with tubular epithelial damage. Small vessels would be dilated and congested. There would be scattered tiny abscesses – areas of necrosis containing necrotic and viable neutrophils.

#### **CASE 16014**

The patient was a man aged 72 in whom carcinoma of the prostate with gross bone involvement was found two years before his death. At that time there was back pain that extended to the back of both legs. A partial spinal block at the level of T12 was demonstrated by intrathecal contrast medium. A laminectomy was performed but the disease progressed to complete paraplegia. Bladder control was lost early and recurrent urinary infections occurred, progressing finally to oliguria with a rising creatinine, peripheral circulatory failure and death in uraemia.

**The specimen** consists of half a kidney that measures 11cm in length. The surface is generally smooth but there is a large depressed pyelonephritic scar near its upper pole and a collapsed unilocular cyst 3cm in diameter on the surface just below the midpoint. The cut surface shows pallor, irregular cortical thinning and loss of demarcation between cortex and medulla. A fibrous collapsed area in the subapical region corresponds to the large surface scar. The upper calyx is dilated with a thickened wall and its pyramid is necrotic. Some exudate adheres to its mucosal surface. The lower calyx and the upper end of the ureter similarly show thickening of their wall.

**Diagnosis:** Chronic pyelonephritis with papillary necrosis

**With what conditions is papillary necrosis associated?** Analgesic abuse, acute pyelonephritis (particularly in diabetics and those with obstruction), sickle cell disease.

#### **CASE 16453**

A man of 57 had a palliative resection for a ring carcinoma of the pelvic colon. He was treated with antimetabolic drugs for some time but gradually became progressively short of breath. At his final admission there was dizziness, cyanosis, a raised JVP and hepatomegaly. At postmortem gross metastatic tumour involvement was present in both lungs, the liver and the abdomen.

**The specimen** consists of a slice of each kidney. The left kidney (on the right in the jar) is small and measures 10cm in length. The cortex is thinned and there is a thrombus in the renal vein. The right kidney measures 13cm and appears relatively normal.

**Diagnosis:** Renal vein thrombosis

**What are the risk factors for renal vein thrombosis?** Hypercoagulable states such as nephrotic syndrome, malignancy, high oestrogen levels and the oral contraceptive pill, genetic.

#### **CASE 16656**

The patient was a man aged 49 who developed a subarachnoid haemorrhage from a right middle cerebral artery aneurysm. This was treated by clipping and packing but many complications developed and he died 2 months later. The specimen was an incidental finding at autopsy. There were metastases in the lungs and pons.

**The specimen** is kidney with renal vein and a portion of inferior vena cava. There is a tumour 10cm in diameter involving the lower and midportions of the kidney. The cut surface shows the tumour to have an irregular margin and the typical lobulated appearance of yellow masses of cells with much haemorrhage and necrosis. Frank invasion of the renal vein is present at the hilum (reverse of specimen).

**Diagnosis:** Renal cell carcinoma

**Histology** showed areas of typical clear-cell renal carcinoma but in other areas the cells were more pleomorphic and anaplastic.

**Is there any relationship between renal cell carcinoma and berry aneurysm? If so, what?** Yes, in some cases there can be. One of the risk factors for renal cell carcinoma is adult polycystic kidney disease. Patients with this disease are also predisposed to berry aneurysms.

#### **CASE 16894**

The patient was a 76 year old male with a history of myocardial infarction. On his final admission he presented with shortness of breath, leg oedema and ascites. A diagnosis of nephrotic syndrome was made. He died a month later.

**The specimen** comprises both kidneys with attached vessels, aorta and inferior vena cava. The kidneys measure 9–10cm in length. Both appear pale but no significant focal lesions are apparent. Within the left renal vein is a thrombus extending into the IVC. The aorta is atherosclerotic.

**Diagnosis:** Renal vein thrombosis.

**What are the risk factors for renal vein thrombosis?** Hypercoagulable states such as nephrotic syndrome, malignancy, high oestrogen levels and the oral contraceptive pill, genetic.

**What are the potential causes of the nephrotic syndrome in this patient?** In the absence of a history of diabetes, the most likely causes are membranous nephropathy and renal amyloid (other causes include a variety of other glomerulonephritic diseases).

#### **CASE 18074**

The patient was a man aged 50 who had pain and a palpable mass in the flank.

**The specimen** consists of a slice of kidney. At the lower pole is a Grawitz tumour measuring 9cm in maximum diameter. The cut surface shows the characteristic well-circumscribed, encapsulated tumour with heterogenous structure with a varying appearance of yellow lipid-containing cellular masses, necrosis, haemorrhage and cystic degeneration. The remaining renal substance appears essentially normal.

**Diagnosis:** Renal cell carcinoma

#### **CASE 18218**

The patient was a hypertensive man aged 52 who was admitted with pulmonary oedema. He was known to have a non-functioning right kidney and on cystoscopy the right ureteric orifice could not be found. The pulmonary oedema responded to treatment and he was discharged, but he was readmitted 4 months later with a left hemiplegia involving face, arm and leg and the left 7th and 12th nerves. Carotid angiogram showed internal carotid occlusion. He slowly improved but two months later had a further episode involving a similar distribution. He died of bronchopneumonia 3 months later. At postmortem there was an old myocardial infarct, extensive confluent bronchopneumonia and an acute abscess in the left upper lobe. A large cystic softening involving almost the whole of the right middle cerebral arterial territory was seen in the brain, and the right internal carotid artery was occluded by thrombus. The left kidney was larger than normal. The right kidney was small.

**The specimen** is a coronal slice of the right kidney with the upper 10cm of the ureter. The kidney is small, measuring 7cm in length, and shows old intrarenal tuberculous pyonephrosis with inspissated caseous material filling the calyces that are dilated and scarred. The parenchyma is significantly atrophied. The ureter is filled with old caseous material.

**Diagnosis:** Renal tuberculosis

### **CASE 19237**

The patient was a man aged 60. Fourteen years previously there had been left renal colic and x-ray showed large stones in both kidneys. These were observed for 8 years by serial IVPs. Renal function was apparently adequate. Before his last admission there had been intermittent dysuria and haematuria and the creatinine level was rising. He was hypertensive. Cystoscopy showed carcinoma of the bladder, which was irradiated. He became uraemic and died soon afterwards.

**The specimen** is of the right kidney 15cm in length. There is great dilatation of the pelvis and calyces with marked atrophy of much of the overlying parenchyma. Portions of renal tissue survive at the apex and near the lower pole. Two large irregular stones lie in the upper and lower calyces. There is no evidence of infection.

**Diagnosis:** Renal calculi with hydronephrosis

### **CASE 19359**

The patient was a hypertensive man aged 50. Investigations showed a non-functioning kidney.

**The specimen** consists of an enlarged kidney measuring 13cm in length. The pelvis and calyces are dilated and filled with inspissated caseous material. The exudate extends down the ureter as a solid caseous mass for at least 15cm (not well seen). The renal parenchyma is totally atrophied.

**Diagnosis:** Tuberculous pyonephrosis

### **CASE 19927**

The patient was a man aged 75 who died of acute small bowel obstruction from a fibrous band (adhesion).

**The specimen** consists of half the kidney opened to show a very large staghorn calculus entirely filling the pelvis. There is dilatation of the calyces and flattening of the pyramids and moderate atrophy of the renal substance.

**Diagnosis:** Staghorn calculus and hydronephrosis

### **CASE 20508**

The patient was a man aged 28 who died from bronchopneumonia at the end of a 7-year illness resulting from an ependymoma of the cervical spinal cord, with paralysis progressing to quadriplegia. Recurrent urinary and chest infections complicated the quadriplegia, and there were bedsores and osteoporosis.

**The specimen** consists of both kidneys, the ureters and the bladder. The bladder is dilated. Both ureters are dilated and tortuous. The kidneys measure 12 and 13cm in length and show dilatation of the pelvis and calyces that contain patchy purulent exudate. The surviving renal substance is congested and thinned and there are large depressed scars on the renal surfaces.

**Diagnosis:** Active chronic pyelonephritis with pyonephrosis and hydroureters

### **CASE 21268**

The patient was a woman aged 86 who died from small bowel obstruction consequent upon peritoneal adhesions.

**The specimen** is of a small and contracted kidney measuring 8cm in length. The surface is irregular and studded with the large U-shaped depressions of chronic pyelonephritis. The cut surface shows gross scarring and irregular narrowing of the cortex but relatively normal-appearing medulla. The pelvis and calyces appear normal.

**Diagnosis:** Chronic pyelonephritis

**Histology** showed depressed fibrous cortical scars containing many hyaline glomeruli and scattered collections of lymphocytes. Larger arteries showed intimal thickening but little medial hypertrophy. Some tubules contained hyaline casts.

**What are peritoneal adhesions and how do they develop?** Peritoneal adhesions are fibrous bands linking portions of peritoneum, often between loops of bowel. They develop following episodes of inflammation in the peritoneal cavity – a common cause of which is surgical handling. The acute serosal inflammatory exudate is predominantly composed of fibrin that heals by organization (scarring).

### **CASE 21388**

The patient was a man aged 33 who gave a history of "cystitis" 5 years previously. For the last 2 days there had been haematuria, frequency and dysuria. Examination showed an enlarged seminal vesicle and an irregular prostate. The urine contained many leucocytes and acid-fast bacilli. IVP showed pelvicalyceal dilatation and delay in excretion of the right kidney and a normal left kidney. He was treated for 2 years with streptomycin, PAS and INH, and the urine became sterile. However there was progressive deterioration in the function of the right kidney from pelvi-ureteric and uretero-vesical obstruction. The kidney and ureter were therefore resected. Recovery was uneventful.

**The specimen** of kidney measures 11cm in length. A portion of the upper ureter is attached. There is marked intrarenal hydronephrosis with thick caseous exudate in the dilated lower calyces. The renal substance is largely destroyed over the central and lower parts of the organ but a comparatively broad rim of renal tissue remains at the upper pole. There is marked thickening of the ureter some distance below its upper end.

**Diagnosis:** Tuberculous pyonephrosis

### **CASE 21426**

The patient was a man aged 49 who had had chronic lymphatic leukaemia for 12 years with episodes of mycosis fungoides and more recently lymph node enlargement treated with radiotherapy. He then developed severe intermittent projectile vomiting which had been present for 6 months. A gastroenterostomy and cholecystojejunostomy were performed but he died on the 11th day after the operation. At post-mortem there was widespread leukaemic involvement of nodes in the abdomen, thorax, neck, axilla and groin. There were nodules in the liver and in the hilum of the spleen and there was massive infiltration of the kidneys.

**The specimen** includes kidneys, aorta and para-aortic lymph nodes. The kidneys are enlarged and pale and show reduced demarcation between the pyramids and cortex. The para-aortic nodes are also obviously enlarged.

**Diagnosis:** Leukaemic infiltration of kidneys and para-aortic nodes

**Comment:** Leukaemic cells in the blood may be filtered out in various organs, the reticuloendothelial organs (spleen, liver, bone marrow, lymph nodes and other lymphoid tissues) in particular, but other organs such as kidney may also be involved.

### **CASE 21579**

No clinical information is available.

**The specimen** consists of half the kidney together with the upper ureter. There is a pale fleshy almost totally occlusive tumour blocking and dilating the ureter over a distance of some 7cm. The tumour commences 4cm below the pelvi-ureteric junction. There is intrarenal and extrarenal hydronephrosis. The kidney substance is markedly pale with loss of demarcation between the cortex and medulla.

**Diagnosis:** Carcinoma of the ureter

**Histology** showed a papillary and solid transitional-cell carcinoma of the ureter with quite numerous mitotic figures and some giant cells. The kidney showed diffuse fibrosis and chronic inflammatory infiltration in the connective tissue of the cortex. There were many hyaline glomeruli and small blood vessels are thickened.

### CASE 21886

A woman aged 76 died from brain-stem infarction consequent upon thrombosis of the basilar artery. The specimen was an incidental finding at postmortem.

**The specimen** includes both kidneys, attached vessels and aorta. The right kidney is small and measures 9cm in length. The kidney is supplied by two renal arteries, one entering each pole. The left kidney is 10cm in length and shows marked intrarenal and extrarenal hydronephrosis. The pelvis is particularly dilated and the upper end of the ureter is kinked over an aberrant artery that enters the lower pole of the kidney. There is also an atherosclerotic aneurysm 5cm in diameter projecting anteriorly from the lower aorta.

**Diagnosis:** Aberrant renal arteries

### CASE 22426

The patient was a man aged 66 with widespread atherosclerotic disease. He died from congestive cardiac failure supervening on myocardial infarction. There was no antemortem thrombus in the left side of the heart.

**The specimen** is of a slice of kidney that measures 10cm in length. Much of the central region is occupied by a large pale wedge-shaped infarction 7cm across. A narrow rim of cortical tissue survives over its external surface. There is some marginal congestion. An atheromatous plaque with superadded thrombus is visible in a branch of the renal artery lying in the renal pelvis.

**Diagnosis:** Renal infarct

**Why is a rim of subcapsular cortical tissue spared?** The subcapsular cortex has a collateral blood supply.

**What type of necrosis is seen in a renal infarct?** Coagulative.

**What symptoms and signs may renal infarction cause?** They may be asymptomatic but they can cause haematuria and loin pain.

**What are the potential causes of renal infarction?** The commonest cause is embolism. Thrombus formation over an atherosclerotic plaque is another. A vasculitis such as polyarteritis nodosa is a rarer cause.

### CASE 22621

The patient was a man aged 89 who was known to have renal calculi and chronic pyelonephritis for 10 years. He died 5 days after an overdose of Carbrital. At autopsy there was moderate trabeculation of the bladder and a small fibrous prostate. There was a large stone in the lower calyx of the other kidney. The calyces of the specimen kidney were reportedly filled with pus at autopsy.

**The specimen** consists of a kidney measuring 15cm in length. There is great dilatation of the pelvis and calyces that are not obviously inflamed. The renal substance is reduced to a thin rind. It is slightly congested. A large staghorn calculus is wedged in the pelvis and in the upper end of the ureter.

**Diagnosis:** Renal calculus and pyonephrosis (the latter not obvious in the specimen currently)

### CASE 22704

An old man of 91 passed several melaena stools. Laparotomy showed a bleeding gastric ulcer on the greater curvature. This was oversewn and a gastroenterostomy was performed, but re-operation and splenectomy were needed a day later for intraperitoneal bleeding. Twelve days later the wound broke down and he died shortly thereafter. The creatinine level was consistently elevated during his hospital stay.

**The specimen** consists of half a kidney that measures 9cm length. The capsule strips readily to disclose a grossly granular surface with many large and small irregular scars. The cut surface shows irregularity with thinning of the cortex and loss of demarcation between cortex and medulla. Many small cystic spaces are visible on the cut surface.

**Diagnosis:** Small scarred kidney, possibly due to chronic pyelonephritis, cystic change.

**Comment:** The cysts are unusual and don't look like typical simple cysts. They are possibly of congenital origin.



### **CASE 22806**

The patient was a woman aged 82 who died from a massive cerebral infarction that was preceded by blood loss from a chronic duodenal ulcer.

**The specimen** consists of the kidney that measures 9cm in length. The surface is irregularly pitted and scarred and shows large U-shaped depressions of chronic pyelonephritis and smaller irregularities from nephrosclerosis. The cut surface shows a thin cortex but normal-appearing medulla and pelvis.

**Diagnosis:** Severe benign nephrosclerosis

### **CASE 22835**

A woman aged 82 had haematuria for about one year. IVP showed a nonfunctioning right kidney. On cystoscopy a tumour was seen protruding from the right ureteric orifice. The right kidney and ureter were excised.

**The specimen** consists of the sectioned kidney that measures 9cm in length, together with the ureter. The cut surface of the kidney shows very marked intrarenal and extrarenal hydronephrosis and the renal substance is reduced to a relatively thin rim. The proximal 5cm of the ureter is dilated. The lower three quarters of the ureter is filled with pale fleshy tumour that shows areas of necrosis and haemorrhage. A small portion of bladder is present at the lower end.

**Diagnosis:** Carcinoma of the ureter with hydronephrosis

**Histology** showed papillary transitional cell carcinoma.

### **CASE 23254**

This is a surgical specimen from a 50-year old woman who presented with an abscess over the upper part of the left buttock. This was excised but continued to drain small amounts of pus. She was known to have a stone in her left kidney that had been present for some years. Investigations showed that there was a large staghorn calculus present in this kidney that had led to the development of a perinephric abscess. This perinephric abscess had pointed in the upper part of the buttock. A nephrectomy was therefore performed.

**The specimen** consists of a portion of the kidney and surrounding adipose tissue removed at operation. The outline of the kidney can be recognized. The calyces are dilated and lined by pus. Part of the calculus is visible, apparently in the upper end of the ureter. The renal parenchyma has been reduced to a thin rim.

**Diagnosis:** Calculus pyonephrosis

**Histology** of renal substance (2 sections) showed some atrophic tubules containing hyaline casts but no glomeruli. There was an intense chronic granulomatous inflammatory reaction with large numbers of plasma cells and lipid-filled foamy macrophages.

### **CASE 23751**

This 55-year old man presented with haematuria of 8 weeks duration. Examination revealed a left renal mass. Investigations included an IVP showing destruction and distortion of calyces. Chest x-ray showed secondaries.

**The specimen** of kidney shows an 11cm diameter tumour involving most of the organ. It is lobulated and contains areas of haemorrhage and necrosis. Massive invasion of the renal vein is seen.

**Diagnosis:** Renal cell carcinoma

### **CASE 23809**

This 67-year old woman had been diagnosed with pulmonary tuberculosis 45 years previously. She had had a six month history of frequency, dysuria and left flank pain. On examination there was suprapubic tenderness, but she was otherwise normal. Direct smear of urine revealed acid-fast bacilli and 100-150 leucocytes per high power field. Culture grew T.B.-like colonies.

**The specimen** shows marked dilatation of calyces that are lined by pale exudate that extends into the pelvis. The renal substance is considerably thinned.

**Diagnosis:** Tuberculous pyonephrosis

**Comment:** The diagnosis of tuberculosis is not readily suggested by the macroscopic features in this case.

#### **CASE 23984**

This 41-year old woman had a 'reticulum cell sarcoma' diagnosed in 1964. She died with disseminated lymphoma including spinal cord deposits in 1972.

**The specimen** shows the kidneys and intervening aorta. Both kidneys are larger than normal, showing pale ill-defined tumour infiltration, the right more than the left.

**Diagnosis:** Lymphoma involving the kidneys

**Comment:** Reticulum cell sarcoma is an out of date term for a tumour that would now be regarded as a type of non-Hodgkin's lymphoma.

#### **CASE 24002**

This 57-year old man presented with a 3-week history of haematuria and pain in the right iliac fossa, thought to be due to clot colic. An IVP and renal arteriogram showed a space-occupying lesion of the lower pole of the kidney.

**The specimen** shows the cut surface of the kidney with a typical 8cm diameter Grawitz tumour at its lower pole. There are lobular yellow areas of tumour interspersed with fibrous septa and areas of haemorrhage and degeneration.

**Diagnosis:** Renal cell carcinoma

**What are the complications of renal cell carcinoma?** Metastases and paraneoplastic syndromes including polycythaemia (from the production of erythropoietin), hypertension (via the production of renin), hypercalcaemia (from the production of a PTH-like substance) and Cushing's syndrome (from the production of an ACTH-like substance).

#### **CASE 24039**

The patient was a 55-year old man who died following a massive myocardial infarction. The kidney lesion was an incidental finding.

**The specimen** shows a sectioned kidney that contains multiple large irregular yellow stones. One of these can just be seen in the region of the pelvi-ureteric junction. The remainder of the kidney shows patchy narrowing of the cortex with some depressed cortical scars externally.

**Diagnosis:** Renal stones with probable chronic pyelonephritis

#### **CASE 24377**

This 70-year old man was a heavy smoker and was known to have emphysema. He was admitted with bilateral bronchopneumonia and biventricular heart failure. He continued to deteriorate in spite of treatment and died 3 days after admission.

**The specimen** is a kidney of normal size with a mildly granular surface. There is clear demarcation of cortex and medulla and the cortex is of normal width. There is a well-demarcated encapsulated lesion filled with inspissated caseous material measuring 3 x 5cm in the middle of the organ. On the back of the specimen this extends to the renal pelvis.

**Diagnosis:** Tuberculoma of the kidney

#### **CASE 24381**

This 32-year old woman was diagnosed as having a lymphoma with blood involvement some 8 months before her death. She was treated with a MOPP regime, long-term antibiotics and transfusion. Her final presentation was with purpura and vaginal bleeding from acute leukaemia. Despite therapy the bleeding tendency and coagulation disorder persisted, she developed a urinary tract infection and a chest infection and died.

**The specimen** is a pale kidney of normal size. Throughout are numerous small haemorrhagic lesions with a pale centre. There is good corticomedullary demarcation and normal depth of renal cortex.

**Diagnosis:** Microabscess formation

**Histology** showed scattered focal haemorrhages, some of which contained masses of organisms and acute inflammatory cells forming early abscesses.

#### **CASE 24429**

This 58-year old man had a 2-year history of progressive motor neurone disease, and died with hypertension and bronchopneumonia.

**The specimen** shows his kidneys, both of which are enlarged, the right more than the left, and both contain numerous cysts of varying size up to 8cm in diameter replacing much of the renal parenchyma, however, patchy areas of parenchyma remain. The aorta shows patchy atherosclerosis.

**Diagnosis:** Polycystic kidneys, probably autosomal dominant (adult)

#### **CASE 24462**

This 75-year old died with a gram-negative septicaemia and respiratory problems after a three month history of polyuria and polydipsia and an acute onset of confusion.

**The specimen** is of a single large horseshoe-shaped kidney with acute pyelonephritis in the form of focal patchy areas of suppuration. The pelves and ureters lie in front of the kidney and the pelvis on the right shows some dilatation. The right ureter, at an area of thickening 10cm below the pelvi-ureteric junction, contains a group of mucosal cysts up to 5 mm in diameter, filled with brown fluid.

**Diagnosis:** Acute pyelonephritis in a horseshoe kidney with ureteritis cystica in the right ureter

**What is ureteritis cystica?** This is the formation of small epithelial lined cysts in the wall of the ureter said to result from downward proliferation of foci of surface epithelium in the presence of chronic inflammation, which become pinched off to form small islands.

#### **CASE 24496**

This patient had many admissions to hospital for chronic gout, glaucoma, bilateral cataracts and progressive chronic renal failure. He died after an operation for lens extraction.

**The specimen** is of a small kidney. Its outer surface (on the back of the specimen) is finely granular with multiple small retention cysts. The cut surface is pale with further cystic spaces. There is poor cortico-medullary demarcation and a variable cortical narrowing.

**Diagnosis:** Small scarred kidney

**What would you expect to see histologically in this kidney?** Many hyalinized glomeruli, atrophied tubules, interstitial fibrosis and chronic inflammation. There will probably also be hyalinized arterioles and thickening of the walls of small arteries related to hypertension (which could have been a cause or effect of the pathology).

#### **CASE 24654**

This 38-year old patient had a history of backache for years. Radiology showed a staghorn calculus in the right kidney. There were no urinary tract symptoms. Nephrectomy was performed.

**The specimen** consists of a coronal section through the kidney showing total atrophy of the renal substance, hydronephrosis and a large staghorn calculus filling the pelvis.

**Diagnosis:** Calculus hydronephrosis

#### **CASE 24970**

This 74-year old woman presented three years before her death with malaise and painless jaundice. Liver biopsy showed a cryptogenic cirrhosis with a heavy chronic inflammatory cell infiltrate. She was treated with prednisolone and progressed well for 2 years before being readmitted with a further episode of jaundice. Urine cultures during her admission showed initially *E. coli* and *Strep. faecalis* infection, followed by a klebsiella species, which persisted.

**The specimen** consists of a swollen and congested kidney with scattered tiny pale abscesses seen through the capsule. The pelvic mucosa is congested and haemorrhagic.

**Diagnosis:** Acute pyelonephritis

**Describe the expected microscopic abnormalities in the kidney.** The kidney would show a patchy neutrophil infiltrate in the tubules and interstitium with tubular epithelial damage. Small vessels would be dilated and congested. There would be scattered tiny abscesses – areas of necrosis containing necrotic and viable neutrophils.

**What symptoms and signs may this patient have had?** Fever, malaise, loin pain, haematuria, dysuria, cloudy urine, tachycardia.

#### **CASE 25056**

This man was aged 66 and had a history of excessive analgesic intake. He had a partial gastrectomy performed 23 years ago for duodenal ulceration. An IVP showed the features of papillary necrosis.

**The specimen** consists of both kidneys that are small with pitted surfaces and focal scars of varying sizes. The cortex is reduced in width, with decreased cortico-medullary demarcation. Both kidneys show blunting of the renal pyramids, the papillae of which have been lost due to necrosis, and there are calculi impacted at the pelvi-ureteric junctions. On the left side a small calculus is visible in a calyx just below the midpoint of the kidney.

**Diagnosis:** Old renal papillary necrosis and renal calculi

**With what conditions is papillary necrosis associated?** Analgesic abuse, acute pyelonephritis (particularly in diabetics and those with obstruction), sickle cell disease.

#### **CASE 25140**

The patient was a man of 78 who died from a massive left middle cerebral softening.

**The specimen** consists of a normal sized kidney that measures 11cm in length. The surface is granular with several larger pyelonephritic surface scars. The cut surface is pale but there is no obvious acute infection. An irregular calculus is impacted at the pelvi-ureteric junction and the mucosa of the pelvis and calyces is moderately inflamed.

**Diagnosis:** Renal calculus

#### **CASE 25232**

The patient was a woman aged 88 who died of an intracerebral haemorrhage. It is not known whether she had a history of hypertension, however, on the final admission her BP was 180/100.

**The specimen** consists of a coronal slice of a slightly small kidney that measures 11cm in length. The capsule strips readily to disclose a granular surface. The cut surface shows narrowing of the cortex. The pelvis and calyces appear normal. There is some atherosclerosis of the renal artery.

**Diagnosis:** Benign nephrosclerosis

**What would you expect to see histologically in this kidney?** Many hyalinized glomeruli, atrophied tubules, interstitial fibrosis and chronic inflammation, thickened hyalinized arterioles and thickening of the walls of small arteries.

**What is the pathogenesis of this condition?** Benign nephrosclerosis occurs in situations (older age, diabetes mellitus, hypertension) where there is hyaline narrowing of arterioles leading to tiny foci of ischaemia in the kidney. Ischaemia leads to focal atrophy of glomeruli and tubules with interstitial inflammation and scarring, the latter causing small depressions in the surface of the kidney.

#### **CASE 25239** (Old specimen No. 7081)

The patient was a man aged 64 who was an inmate of a mental hospital. Though formerly willing he lost interest in work and began to complain of anorexia, weakness and pain in the thighs. The urine showed 8-10 RBC and 3-6 leucocytes/HPF. Cultures grew gram-negative bacilli. There was no fever. He died a month later. At postmortem the right kidney was grossly pyonephrotic and there was a large tumour at the lower pole. Histological section of the tumour in the kidney showed poorly differentiated transitional cell carcinoma. This probably arose in the renal pelvis.

**The specimen** consists of the prostate, the base of the bladder and the lower end of the right ureter. A mass of papillary carcinoma protrudes from the ureteric orifice and tumour is visible covering the ureteric mucosa. The bladder and prostate themselves appear normal.

**Diagnosis:** Carcinoma of the ureter

#### **CASE 25281**

The patient was a man aged 76 who died of congestive cardiac failure. He also had ulcerating atherosclerosis of the aorta.

**The specimen** consists of sections of both kidneys. The kidney on the left shows simple cortical infarctions that have yellow centres, resulting from coagulation necrosis, and congested borders. A small rim of cortical tissue survives over the infarct beneath the capsule. There are also similar small infarcts in the kidney on the right. Single occluded small vessels are seen in the hilum on each side.

**Diagnosis:** Renal infarcts

**What is the likely pathogenesis of these infarcts?** As they are multiple, they have most likely arisen as a result of embolism, in this case probably atheroemboli from the aorta.

#### **CASE 25291**

The patient was a woman aged 78 who presented with a hard irregular mass in the right side of the abdomen. It measured approximately 15 x 10 x 10cm and was slightly mobile. It was thought to be a renal cell carcinoma or a carcinoma of the caecum. Intravenous pyelogram showed slow and patchy excretion of dye. The creatinine clearance was normal. The BP was 190/100.

**The specimen** consists of an enlarged polycystic kidney measuring 17cm in length. The cut surface shows uniform replacement of the renal substance by thin walled cysts varying in size from a few mm to 2cm in diameter. They contain clear watery fluid and no normal renal substance can be seen with the naked eye.

**Diagnosis:** Polycystic kidney

**Is this likely to be adult polycystic kidney disease? Why or why not?** It probably isn't. Adult polycystic kidney disease is bilateral. The patient's other kidney must be essentially normal, otherwise here creatinine is likely to be elevated.

#### **CASE 25606**

No clinical information is available for this patient who lived in the country (Whyalla).

**The specimen** consists of a kidney, which measures 14cm in length, sectioned vertically. Projecting medially from the upper pole is an ovoid Grawitz tumour measuring 9 x 6cm. The tumour has a thin fibrous capsule. The cut surface shows characteristic variegated areas of yellow tissue, cystic degeneration and areas of necrosis and haemorrhage. The tumour has caused considerable lateral displacement and distortion of the pelvis and upper and medial calyces. The remainder of the kidney substance appears normal. **Diagnosis:** Renal cell carcinoma

**Histology** showed a variable pattern. Some areas consisted of characteristic clear cells arranged in a solid alveolar pattern and trabeculae. Other areas showed much smaller granular cells. There were also many bizarre and multinucleated cells.

#### **CASE 19243/80**

The patient was a woman aged 71. No further clinical information is available.

**The specimen** consists of a kidney in which the hilum and lower pole are distorted by a spherical tumour mass measuring 7cm in diameter. The mass is apparently encapsulated and has a variegated cut surface with yellow, fibrous and haemorrhagic areas.

**Diagnosis:** Renal cell carcinoma

**CASE 50364/82      NORMAL KIDNEY**

**CASE 50378/82 x2      NORMAL KIDNEY**

**CASE 50559/82 x2**

The patient was a woman aged 61. No clinical information is available. At autopsy she was found to have very severe ulcerating atheroma of the aorta and the renal arteries were also atheromatous.

**The specimen** consists of both kidneys in separate pots with their capsules stripped to reveal a granular surface. Both coarse and fine scarring are present. This scarring is associated with cortical narrowing. The lower pole of the smaller kidney focally appears congested.

**Diagnosis:** Benign nephrosclerosis

**Comment:** The fine granular scarring is indicative of benign nephrosclerosis. The more coarse scarring could be due to chronic glomerulonephritis. On histology there was atrophy of glomeruli and tubules associated with an interstitial mononuclear cell infiltrate. Microscopy also demonstrated atheromatous emboli in small vessels and that the congestion in the smaller kidney is related to infarction.

**CASE 50287/83**

The patient was a woman aged 62 who developed chronic renal failure in her fifties.

**The specimen** consists of a kidney that measures 19cm in length. The parenchyma has been destroyed by large numbers of variably sized cysts. The cysts are thin-walled and contain clear or brown fluid.

**Diagnosis:** Polycystic kidney, autosomal dominant (adult)

**CASE 50348/83**

The patient was a man aged 72 who had malignant lymphoma and developed septicaemia secondary to bronchopneumonia. *Staphylococcus aureus* was cultured from the kidney at postmortem.

**The specimen** consists of the kidney that is swollen. The subcapsular and cut surfaces of the specimen show a variegated appearance with mottled dark and pale areas indicating congestion and inflammation. Three of the papillae appear very pale suggestive of incipient papillary necrosis. The renal pelvis is also inflamed.

**Diagnosis:** Acute pyelonephritis.

**Histology** showed oedema and congestion with extensive but patchy infiltration of the parenchyma by neutrophils and numerous colonies of bacteria.

The renal infection in this case will have been blood borne.

**What are the potential complications of acute pyelonephritis?**

- papillary necrosis - mainly in diabetics and in those with urinary tract obstruction
- pyonephrosis - seen in near or total obstruction. Pus fills the renal pelvis, the calyces and ureter
- perinephric abscess: extension of infection through the renal capsule into adjacent tissue
- with recurrent or ongoing low grade infection: chronic pyelonephritis resulting in chronic scarring of the kidney and chronic renal failure

**CASE 50424/83**

The patient was a man aged 70 with deteriorating renal function thought to be due to renal artery stenosis. At autopsy, athero-emboli were identified in kidneys, liver, stomach, small and large intestine, pancreas and prostate.

**The specimen** consists of the aorta and both kidneys. The aorta is very atheromatous and shows a recently inserted graft 3cm below the origin of the renal arteries. The left renal artery is completely occluded and this has given rise to the severely contracted left kidney that measures 4.5cm in length. The right kidney has a granular surface with fine and coarse scarring. It also demonstrates patches of congestion suggestive of infarction. This has followed the insertion of a vein graft from the aortic graft into the right renal artery. The right renal artery stenosis can be identified as can the vein bypass graft.

**Diagnosis:** Left renal artery stenosis with severe atrophy of left kidney. Chronic ischaemic changes and recent infarction of the right kidney.

**Histology** showed extensive athero-embolic disease of the right kidney.

**Comment:** The larger scars in the right kidney could be related to old embolic infarcts.

#### **CASE 50542/83**

The patient was a woman aged 56 who was a known diabetic.

**The specimen** of kidney demonstrates dilated calyces lined by purulent exudate with gross narrowing of the overlying renal tissue. The ureter appears narrowed on cross section.

**Diagnosis:** Pyonephrosis

#### **CASE 50546/83**

The patient was a woman aged 72.

**The specimen** consists of the kidney with the aorta and renal arteries. The lower poles of the kidney are linked by a bar of renal tissue with the ureters passing anterior to the renal parenchymal bridge. The aorta is atheromatous.

**Diagnosis:** Horseshoe kidney

**Comment:** Horseshoe kidney is a congenital abnormality.

#### **CASE 50474/90**

The patient was a man aged 67.

**The specimen** is part of a normal sized kidney with scattered areas of pallor surrounded by congestion in the cortex. The larger infarct at the upper pole is wedge shaped with its base on the capsule. The surface of the kidney is finely granular.

**Diagnosis:** Multiple recent infarcts of the kidney

**What is the likely pathogenesis of these infarcts?** As they are multiple, they have most likely arisen as a result of embolism, in this case probably atheroemboli from the aorta.