contracts than they received in 1992-3, without a parallel increase in activity. Last year, providers' deadlines for issuing prices slipped several times, causing chaos to purchasers. East Birmingham's last contract was signed in August instead of the preceding March. The new regional edict is: "There are deadlines; we do not accept changes thereafter."

Howard Shaw was less enthusiastic than his director of corporate management about the workings of the internal market. "We're two months ahead of last year, but I'm not sure we've learnt that much. I don't think we've understood how to play the market, or even if the market's to be played because of the whole complexity of the system. We've got 20 units providing 50 specialties—for inpatients, day cases, and outpatients. There's a price and a volume for each of these, and you

can have price and volume variance on all these contracts. So you've got this mass of data, and we can't make head or tail of it."

His opinion was echoed by Robert Marriott. He did not think that you could decide at this stage whether the outcome of the reforms was good or bad. "Mostly it seems confusion—because of the demands being made on both purchasers and providers." Perhaps in a year's time things will be clearer.

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Lesson of the Week

Tuberous sclerosis and polycystic kidney disease

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Suspect tuberous sclerosis in young children with polycystic kidney disease

While there are many renal lesions in childhood associated with the development of cysts,¹ bilateral large polycystic kidneys are usually caused by either autosomal recessive polycystic kidney disease, autosomal dominant polycystic kidney disease, or tuberous sclerosis. Autosomal recessive disease is characterised by a delayed, mottled, or streaky nephrogram at intravenous pyelography and by microcysts on renal ultrasound. Autosomal dominant disease may present in children and is indistinguishable radiologically from the polycystic kidney disease found in tuberous sclerosis. Tuberous sclerosis is a well established association with a specific histological appearance² that is still misdiagnosed because of a lack of clinical suspicion. We present three recent cases which support this observation.

Case reports

Case 1—This boy presented at 6 months with gross abdominal distension. On examination he had bilateral renal masses, hypertension (blood pressure 155/70 mm Hg), and three hypomelanotic macules. Autosomal dominant polycystic kidney disease was diagnosed after intravenous pyelography. His parents had normal appearances on renal imaging, and genetic counselling was provided to suggest he was a sporadic case. At 12 months he was admitted with a convulsion associated with fever which lasted one hour. His blood pressure was 230/100 mm Hg, and he was treated with propranolol and chlorothiazide. At 23 months he had three or four vacant episodes. An electroencephalogram was normal. He was started on sodium valproate but was admitted at 30 months after a prolonged seizure lasting 90 minutes. Cranial computed tomography two years after presentation showed periventricular calcification and tubers consistent with tuberous sclerosis. He has since developed facial angiofibromas, and at 13 years of age is making slow academic progress. He has had no seizures for nine years and has normal serum creatinine concentration and blood pressure without taking antihypertensive agents.

Case 2—This girl presented at 5 years of age with gross haematuria after a minor fall. For six months before admission she had episodes of brief loss of consciousness, preceded by giggling and lip smacking.

Abdominal computed tomography scan showing bilateral polycystic kidney disease in child with tuberous sclerosis

Her development was normal and there was no family history of note. Examination showed a pimply facial rash, hypertension (blood pressure 145/101 mm Hg), and bilateral renal masses. Renal function was normal. Autosomal dominant polycystic kidney disease was diagnosed after intravenous pyelography and renal computed tomography (see figure) and she was discharged taking metoprolol. At follow up electroencephalography showed foci in the occipital and temporal lobes, and four months later cranial computed tomography showed periventricular calcification characteristic of tuberous sclerosis. At 7 years she has early facial angiofibromas and continues to do well in normal school. She has a normal serum creatinine concentration and blood pressure on metoprolol.

Case 3—This girl presented at 4 months with vomiting, flank masses, and hypertension (blood pressure 157/90 mm Hg). Renal ultrasound showed multiple bilateral translucent renal cysts, and autosomal dominant polycystic kidney disease was diagnosed. Both parents had normal findings on renal ultrasonography and were counselled that her disease was a new mutation. At 8 months she developed "absence seizures" and at 13 months was started on sodium valproate for suspected myoclonic epilepsy. Electroencephalography was not performed. By 18 months mild developmental delay was noted, and cranial computed tomography, performed 19 months

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after presentation, showed periventricular calcification consistent with tuberous sclerosis. Ultraviolet lamp examination showed six previously undetected hypomelanotic macules and echocardiography showed multiple rhabdomyomas. By 7 years she had facial angiofibromas and was severely retarded with no speech and poorly controlled epilepsy. Her serum creatinine concentration and blood pressure (without medication) were normal.

Discussion

These three cases of polycystic kidney disease associated with tuberous sclerosis were all misdiagnosed as autosomal dominant polycystic kidney disease despite clinical features in each case which might have aroused suspicion. This has important implications for genetic counselling and patient management.

Tuberous sclerosis is an autosomal dominant condition with an incidence of about one in 6000 births—70% being new mutations.³ In patients with tuberous sclerosis polycystic kidneys have been found in 53% at necropsy and in 18% of those undergoing renal imaging.⁴ In a population study 1-2% presented with polycystic kidney disease (personal observation).

We have reviewed 36 cases of polycystic kidney disease associated with tuberous sclerosis reported since 1970 (references available on request). There was a male preponderance of 1.5:1, and most patients (18/33) presented under 3 years (14 under 1 year) with abdominal distension and enlarged kidneys. The remainder were detected by routine investigation (24%) or presented at a later age with renal impairment (15%). One patient presented with gross haematuria, two at necropsy, and the reason for presentation was unknown in three. Eighteen of the 20 patients in whom blood pressure was recorded were hypertensive at presentation.

There is a lack of information about the long term outlook for renal function in patients with tuberous sclerosis and polycystic kidneys. The combination with renal angiomyolipomas seems to hold a poor prognosis as 11 out of 15 patients with renal impairment at follow up had mixed lesions. Among eight patients with documented renal failure (range 17-38 years, mean 25 years) six were women. The higher prevalence of renal angiomyolipomas in women with tuberous sclerosis may explain this. Normal renal function to the age of 16 and 17 years has been documented in three boys, and five patients have had successful renal transplants.⁵

With a prevalence of about one in 1000 autosomal dominant polycystic kidney disease is an important cause of chronic renal failure in adults, but presentation in childhood is uncommon. In one series of 350 cases only one had clinical onset of symptoms before the age

of 10 years.¹ By ultrasound screening of potential familial cases 20-30% of cases can be diagnosed under 18 years, but most of these are asymptomatic.^{6,7} Sedman *et al* found that two out of three infants with large kidneys progressed to renal failure at 3 years and 15 years, while one out of 15 children who presented later developed renal failure at 39 years.⁷ Reports of presentation in the fetus, neonate, and young infant suggest a poorer outlook when this does occur. In a review of 27 cases reported between 1964 and 1978⁸ seven were stillborn, two were aborted, and among 18 liveborn infants 11 (61%) had died by 9 months. Polycystic kidney disease associated with tuberous sclerosis in infancy may possibly be associated with a better prognosis.

We believe that in the clinical assessment of infants and young children who present with "autosomal dominant-like" polycystic kidney disease the possibility of tuberous sclerosis should be seriously considered. Assessment should include (a) a search for the early cutaneous features of tuberous sclerosis (hypomelanotic macules, mostly easily seen with a Woods lamp in a darkened room; a shagreen patch; a forehead fibrous plaque; and early angiofibromas); (b) direct funduscopy through dilated pupils; (c) echocardiography; and (d) cranial imaging (computed tomography or magnetic resonance imaging), though in the first months of life cranial computed tomography may be normal. The definitive diagnosis of polycystic kidney disease in tuberous sclerosis can be made at biopsy. The finding of cysts lined with a hyperplastic epithelium containing cells which are strongly eosinophilic with large and hyperchromatic nuclei is thought to be unique for tuberous sclerosis.²

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A MEMORABLE PATIENT

Charles Lamb obtains an opinion in forensic psychiatry

George Dyer was an unworldly scholar and bibliophile of whom Charles Lamb (1775-1834) made affectionate fun in the *Essays of Elia*. On this occasion, recalled by his editor Thomas Talfourd, Lamb was unsuccessfully trying to get Dyer to speak ill of any other human being:

"Or shall I recall the visible presentment of his [Dyer's] bland unconsciousness of evil when his sportive friend taxed it to the utmost, by suddenly asking what he thought

of the murderer Williams, who after destroying two families in Ratcliffe Highway, had broken prison by suicide, and whose body had just been conveyed, in shocking procession, to its cross-roads grave! The desperate attempt to compel the gentle optimist to speak ill of a mortal creature produced no happier success than the answer, 'Why, I should think, Mr Lamb, he must have been a rather eccentric character.'"

Talfourd TN, ed. *The works of Charles Lamb*. London: Moxon, 1852: 285.