sons are specific DNA sequences that can jump from one DNA molecule to another. They do not replicate autonomously but only as inserts in a plasmid or other replicating molecule; again, a replica remains in the original molecule. Transposons can carry resistance genes, which are thus disseminated among the plasmids and chromosomes of bacteria. Plasmid-borne trimethoprim resistance may be increasing.¹ Two transposons encoding trimethoprim resistance are known—namely, Tn7 and Tn402; neither carries sulphonamide resistance. These transposable DNA sequences have been found in various naturally occurring plasmids, and Tn7 has also been found in the chromosomes of bacteria from clinical isolates.^{1 2} Possibly, with the use of plain trimethoprim, greater spread of trimethoprim-resistance transposons will occur. Trimethoprim without sulphonamide has been used for several years in Finland, but reports do not show whether trimethoprim-resistant, sulphonamide-sensitive strains of *Escherichia coli* have appeared as might result from the spread of trimethoprim-resistance transposons.¹

We studied strains of *E coli* from urinary infections, looking for trimethoprim-resistance plasmids and transposons.

Sources of strains, methods, and results

We tested three sets of urinary isolates of *E coli*: 93 from schoolgirls taking part in a long-term study of bacteriuria, 1979–80³; 187 from specimens sent by general practitioners to the diagnostic laboratory at the department of bacteriology at this hospital, January–August 1980; and 269 from inpatients in this hospital, July and August 1980.

Methods for identifying and testing the sensitivity of bacteria and for characterising plasmids and transposons were as described.⁴

The table shows the incidence of resistance to trimethoprim, sulphonamide, and ampicillin in *E coli* from the different groups. Most of the trimethoprim-

Resistance to trimethoprim (Tp), sulphonamide (Su), and ampicillin (Ap) in urinary isolates of *E coli*. (Figures are numbers (%) of isolates)

	Schoolgirls (Cardiff) (n = 93)	General practice (Hammersmith) (n = 187)	Inpatients (Hammersmith) (n = 269)
Resistant to:			
Tp		3 (1.6)	27 (10.0)
Su	12 (12.9)	42 (22.5)	81 (30.1)
Ap	16 (17.2)	47 (25.1)	73 (27.1)
Sensitive to TpSuAp	75 (80.6)	122 (65.2)	157 (58.4)
Combinations of resistance:			
Tp		1 (0.5)	2 (0.7)
Su	2 (2.2)	17 (9.1)	31 (11.5)
Ap	6 (6.5)	22 (11.8)	25 (9.3)
SuTp			6 (2.2)
ApTpSu		2 (1.1)	15 (5.6)
ApTp			4 (1.5)
ApSu	10 (10.8)	23 (12.3)	29 (10.8)

All Tp-resistant strains, but not all Tp-sensitive ones, were tested for sensitivity to a wide range of antibacterial drugs, not shown here.

resistant strains (2/3 from general practice, 24/27 from hospital) would grow on media containing high concentrations (>500 mg/l) of the drug, which is characteristic of plasmid- or transposon-determined resistance. In most of them (2/2 from general practice, 18/24 from hospital) we found genetic or physical evidence for a Tn7-like transposon.

Comment

Our findings indicate that, although trimethoprim resistance is rare in *E coli* causing infections in the community, when it is found it is likely to be transposon-determined. In the past decade the TEM β -lactamase transposon, carrying resistance to penicillins including ampicillin,⁵ has spread world wide. This is an important cause of the present high incidence of ampicillin resistance in *E coli* (table) and is also found in unrelated species including *Pseudomonas*, *Haemophilus*, and *Neisseria gonorrhoeae*.² Ampicillin has been heavily used in the community, and increasing use of trimethoprim may result in analogous spread of transposable genes for trimethoprim resistance. A veterinary example is the intensive use of trimethoprim-sulphonamide combinations in pigs, both for treatment and prophylactically. A high proportion of healthy pigs sent to two separate markets now carry *E coli* strains with trimethoprim resistance plasmids,⁵ and we have identified the Tn7 transposon in these plasmids (unpublished results).

Single courses of co-trimoxazole or trimethoprim in man do not, at present, select trimethoprim-resistant enterobacteria,¹ as would be the case if resistance was readily acquired by mutation. The incidence of

resistance acquired by gene transfer depends on the extent of the reservoir of transmissible or transposable resistance genes. With the use of trimethoprim alone, we should look for changes in this reservoir.

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Reversible myoclonus with uraemia

Myoclonus is an uncommon complication of uraemia,¹ but it may dominate the clinical presentation. The differential diagnosis of myoclonus² includes many uncommon conditions in which the underlying disease is generally irreversible—for example, myoclonic epilepsy, subacute sclerosing panencephalitis, Jakob-Creutzfeldt disease, and postanoxic action myoclonus. I report a case of uraemic myoclonus in which treatment of renal failure reversed the involuntary movements and their electroencephalographic concomitants.

Case report

A 64-year-old man presented to his local hospital with lethargy. He had taken large doses of Distalgic (dextropropoxyphene and paracetamol) for many years for osteoarthritis of the hip. Investigations disclosed normocytic anaemia and a raised blood urea concentration of 35 mmol/l (210 mg/100 ml), and a chest x-ray film showed pulmonary infiltrates. He was treated symptomatically, and with improved hydration his urea concentration began to fall. Two months later he returned, incapacitated by myoclonus, which had been present for two days, and was transferred within 24 hours to this hospital.

There was striking myoclonus, which occurred simultaneously in all four limbs and also the truncal and bulbar muscles. The jerking occurred irregularly at a rate of 1-3 Hz at rest but was increased in amplitude and frequency by any attempt at movement of the limbs or trunk or even by attempts to speak. Passive movements and attempts to elicit tendon jerks also exacerbated the myoclonus but less so than active movement. The patient was aware of his surroundings but was unable to communicate because myoclonus made his speech unintelligible. There were no focal neurological deficits; the fundi were normal. Blood urea and serum sodium and potassium concentrations were 76 mmol/l (456 mg/100 ml), 136 mmol (mEq)/l, and 8.2 mmol (mEq)/l respectively. Peritoneal dialysis was begun. Diazepam was given several times to facilitate the insertion of intravenous lines and on each occasion reduced the myoclonus considerably for a few minutes. Within three days the myoclonus had disappeared and a neurological examination was normal. Intravenous pyelography showed changes of renal papillary necrosis, which was presumed to be related to the patient's excessive use of analgesics. Pulmonary tuberculosis was also diagnosed and treated. Electroencephalographic findings are shown in the figure.

Comment

Of all the causes of myoclonus, uraemia should probably be diagnosed most promptly because it may be associated with life-threatening electrolyte disturbances. Uraemic myoclonus is potentially rapidly reversible, as shown by the clinical and electroencephalographic findings in our patient. The electroencephalographic findings in this case have important physiological implications. The pathophysiology of myoclonus is incompletely understood. The disorder may arise at several different levels in the nervous system, from the cerebral cortex to the spinal cord.²

Chadwick *et al* divided a group of patients with supraspinal myoclonus into three categories.³ One group responded poorly to serotonergic drugs—namely, clonazepam and 5-hydroxytryptophan; a second group had proximal myoclonus, prominent spikes on the electroencephalogram, excellent response to serotonergic drugs, and physiological features suggesting that abnormal discharges originated in the brain-stem reticular formation (reticular reflex myoclonus). The third group showed mainly distal myoclonus, few sharp waves on the electroencephalogram, and only moderate response to serotonergic drugs; a cortical origin of the myoclonus was postulated for this group. Recently Chadwick and French⁴ suggested that two uraemic patients whom they studied clinically had reticular reflex myoclonus.

Top: electroencephalogram before peritoneal dialysis showing bilateral, synchronous spike discharges occurring irregularly and related temporally to the myoclonic jerks. Bottom: electroencephalogram recorded three days later, when myoclonus no longer occurred, showing no spike discharges, the only abnormality being a moderate diffuse excess of theta activity.

Electroencephalographic and other physiological data were unfortunately not available.

The bilaterally synchronous nature of the spike discharges in the present case suggests an abnormality arising in deep structures projecting to both hemispheres, and would support the view that a reversible biochemical insult to the brain-stem reticular formation may play a major part in the production of uraemic myoclonus.

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Ruptured popliteal cyst and pyogenic arthritis

Rupture of a popliteal cyst is well recognised, producing pain and swelling in the calf which may be mistaken for deep vein thrombosis.¹ Though far more common in patients with established arthritis of the knee, particularly rheumatoid arthritis, rupture of a popliteal cyst has also been described in normal knees.² I describe two patients in whom rupture of a popliteal cyst was the presenting sign of pyogenic arthritis of the knee. Neither patient had rheumatoid arthritis.

Case 1

A 72-year-old woman in previous good health had sudden onset of pain and swelling of the right knee and calf shortly after walking to the shops. Pain and swelling increased over the next few days, and walking became impossible. She had previously noticed a small swelling at the back of the knee but this had disappeared at the onset of pain. On admission she was afebrile. The right knee and lower leg were grossly swollen, warm, and tender. There was no erythema or cellulitis and she was clinically euthyroid. The left knee and general medical examination were normal, though she was overweight. Phenylbutazone had had no effect, and it was decided to aspirate the knee at the time of arthrography. Thick pus was aspirated from the knee, however, and arthrography was not performed. Culture grew *Staphylococcus aureus*. Results of other relevant investigations were: haemoglobin concentration 9.4 g/dl, white cell count $8.1 \times 10^9/l$ (83% polymorphs), platelet count $625 \times 10^9/l$, erythrocyte sedimentation rate 125 mm in first hour, blood urea concentration 16.5 mmol/l (99 mg/100 ml), normal electrolyte and plasma glucose values, negative RA latex test result, absent antinuclear factor, and positive antibody titres against thyroid microsomes and thyroglobulin. No crystals were found in the synovial fluid, and blood cultures were sterile. Chest radiograph was normal. Radiography showed normal hips but osteoarthritis of the knees, most distinct on the right.

After a long stay in hospital complicated by haematemesis and melaena, which required transfusion and may have been due to anti-inflammatory drugs (barium-meal findings were normal), she was left with stiffness of the right knee and needed a stick. There was no effusion and the calf swelling had subsided. Treatment of the septic arthritis consisted of intravenous antibiotics initially, arthrotomy and drainage of the right knee, and oral antibiotics for five months. Blood urea concentration returned to normal, and erythrocyte sedimentation rate fell to 24 mm in first hour.

Case 2

An 80-year-old nun developed pain and swelling of the right knee which did not settle with anti-inflammatory drugs. Haemoglobin concentration was 11.2 g/dl, white cell count $6.5 \times 10^9/l$ (81% polymorphs), platelet count normal, and erythrocyte sedimentation rate 77 mm in first hour. She had noticed a painless swelling at the back of the right knee a few weeks before, but this was no longer palpable, and examination showed gross swelling of the right calf and ankle. The right knee was swollen, hot, and tender, with overlying erythema and she was unable to walk. In 1973 she had undergone anterior resection for carcinoma of the sigmoid colon with no evidence of metastases at operation or on follow-up. She had also been found to be hypothyroid two months before admission and was taking thyroxine. There was no other history of any joint problem.

On admission she was afebrile and clinically euthyroid. Fluid aspirated from the right knee contained thick yellow pus, which on culture grew *Escherichia coli*. Other investigations showed normal urea and electrolyte values, normal plasma glucose concentration, negative RA latex test result, strongly positive thyroid antibodies, absent antinuclear factor, absence of crystals in the synovial fluid, sterile blood cultures, and a normal chest radiograph. Radiography of the knees showed osteoarthritis and osteoporosis.

She was started on amoxycillin by mouth, and 500 mg of this drug was injected into the right knee at weekly intervals for three weeks after aspiration of fluid. The third aspirate was sterile. Gradual mobilisation followed several weeks of bed rest, and when discharged she could walk slowly using a frame. The swelling of the right knee and calf gradually subsided. Oral antibiotics were continued for a further three months with a gradual fall in the erythrocyte sedimentation rate.

Comment

A ruptured popliteal cyst as the presenting feature of pyogenic arthritis which occurred shortly after a total hip arthroplasty on the opposite side was recently reported in a patient with rheumatoid arthritis.³ My two patients had underlying osteoarthritis, not surprising in view of their ages, and there were no special features to account for any increased susceptibility to infection. Both had antibodies to thyroid microsomes and thyroglobulin but were euthyroid at the