and a large amount of blood evacuated. Progress was satisfactory and the patient discharged four days later.

Case 5.—A 24-year-old man sustained steering wheel injury, producing contusion of the left lower chest and bruising of the perineum. X-ray examination showed a fracture of the inferior pubic ramus on the right side.

Case 6.—A 22-year-old man crashed while driving a go-kart, throwing him against the steering wheel, which caused contusions of the groin and testicle on the left side.

Case 7.—An 18-year-old man sustained contusions of the right lower chest when thrown against the steering wheel in a go-kart crash.

Case 8.—A youth aged 16 sustained contusions and abrasions of the sacral region when his go-kart crashed.

Case 9.—An 18-year-old woman struck her left knee against the steering wheel when hit from behind by another go-kart. She sustained contusion and abrasion of the knee.

Case 10.—A woman aged 26 had her face and right knee contused by the steering wheel when her go-kart crashed.

Case 11.—A 16-year-old youth sustained contusions and lacerations of the right ankle when it was caught between the wheels of two go-karts.

Case 12.—A man aged 17 was injured by the steering wheel of a crashed go-kart which caused contusion and abrasions of the front of the chest and contusion of his right elbow.

Discussion

Legislation does not exist to enforce stringent safety checks or the reporting of accidents at fairgrounds. There is no statutory obligation to report non-fatal accidents to the police or to the Inspector of Accidents, and it is difficult for any

authority to build up a comprehensive picture of the incidents.

After the big dipper crash at Battersea in May 1972, when five children were killed, some local authorities decided to introduce their own code of safety standards until suitable legislation had been passed. The Home Office has stated that its review of the law governing safety at fairgrounds is continuing, but that there is no early prospect of legislation (*The Times*, 1972).

Conclusions

Though no fatalities are recorded in this series each accident involved a young person and produced a severe injury. In two of the patients admitted to hospital there is the possibility of future disability.

Almost all the injuries were caused by the steering wheel and could have been prevented or reduced in severity by the wearing of a safety belt. At the particular fairground studied seat belts are now provided, and it is hoped that this measure will reduce the rate of injury.

We are grateful to Mr. James F. Kyle, Mr. John H. Steyn, and Dr. Murdo MacLean for the provision of their case notes of the patients which they treated. We express gratitude to Mr. James Fitzpatrick for photographic material.

Reference

The Times, 14 September 1972, p. 2.

Medicine in Old Age

Urinary Tract Diseases

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Four aspects of urinary tract diseases have been chosen for this article—uraemia, prostatic disease, urinary tract infection, and incontinence—and attention is drawn to some features of these conditions of particular importance in the elderly.

Uraemia

The finding of a moderately raised blood urea (50-70 mg/100 ml) in elderly patients is so common as often to be regarded as normal—in the sense that it requires no immediate correction and is not accompanied by identifiable symptoms. Its presence, however, suggests an ageing kidney with progressive nephron depletion in the absence of other causes of a raised blood urea.

The other causes of uraemia may be divided into three parts—prerenal, renal and postrenal—but all these, of course, may

be superimposed on existing nephron loss in an ageing kidney.

PRERENAL URAEMIA

Prerenal uraemia is due to inadequate glomerular filtration caused usually by such factors as haemorrhage, loss of extracellular fluid, or severely impaired cardiac output. In the elderly, minor states of dehydration are common, based on inadequate intake, and any further factor such as diarrhoea and vomiting or a silent myocardial infarction can produce an acute uraemic state, with confusion often as its leading symptom. The blood urea level may be as high as 200-250 mg/100 ml and will rapidly fall with adequate rehydration. A distinguishing feature in such cases is the maintenance of a normal or only moderately reduced plasma bicarbonate level.

RENAL URAEMIA

Any diffuse renal disease may be present in the elderly but probably the most common is chronic pyelonephritis. Diabetic nephropathy is less common, though diabetes is a common condition. The various forms of glomerulonephritis have their incidence chiefly earlier in life, and likewise hypertensive renal disease is relatively uncommon.

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POSTRENAL URAEMIA

The key to postrenal uraemia is obstruction to the flow of urine anywhere in the urinary passages. In both sexes chronic retention of urine based on faecal impaction is by no means uncommon and reinforces the necessity for routine rectal examination in the elderly. In men the commonest cause is prostatic enlargement and as many as 30% of men aged 80 and over have appreciable enlargement and often impaired flow. In women obstruction is less common but the presence of a cystocele may impair flow, and, particularly with complete procidentia, severe back pressure effects may result with the development of silent hydronephrosis. In these circumstances sudden death from acute renal failure over a matter of days may occur following a trivial alteration in renal perfusion.

MANAGEMENT

The management of acute renal failure by purely medical means is the same as in younger age groups and will not be discussed. The management of chronic uraemia depends primarily on the cause. The most immediately remediable causes, and also the commonest, lie in the prerenal group, and here the recognition of states of dehydration is important, while treatment with oral fluids is straightforward, provided it is adequately supervised. If there is any question of appreciable gastrointestinal tract loss appropriate replacement of electrolyte deficiencies is essential. A full assessment of the cardiovascular system, including an electrocardiogram, is necessary in any case of unexplained uraemia.

In postrenal causes of uraemia relief of the cause of the obstruction is the priority and age per se is no contraindication to surgery. The criterion for operation is the total clinical condition of the patient.

Provided underlying renal function is preserved, relief of prerenal and postrenal factors will eliminate uraemia: in chronic renal failure, however, relief of the cause may well be impossible and treatment then becomes a matter of compensation for the renal defect so far as is possible. In the elderly renal dialysis or transplantation is unlikely to be justifiable, because of concomitant disease and disability as well as scarcity of resources.

In the management of chronic renal failure in the elderly it is especially important to ensure that the treatment is not worse than the disease and that the measures are simple and therefore more likely to be carried out. Some points to be observed include:

Fluid Intake

Urea excretion is proportional to urine flow and with low urinary output a slowly increasing "head" of urea and other metabolites builds up in the plasma. This may be reduced by increasing the volume of urine passed and therefore the solute load excreted, even when the number of residual functioning nephrons is very severely reduced. In the elderly, however, the need to drink large quantities of fluid may be very difficult to communicate and resistance may be great, especially if there is a pre-existing degree of incontinence or lavatory facilities are inadequate. Even a moderate increase in urine flow is beneficial over a period of time. The help of relatives is invaluable in treating the patient outside hospital.

Ionic Balance

Sodium depletion may occur because of reduced sodium conservation and can cause further deterioration of renal function particularly during incidental illness. Potassium retention is well known with its dangers to the myocardium, and foods of high potassium content should be avoided as a general rule. A degree of acidosis is common and is usually well tolerated.

Protein

The elderly frequently eat a relatively high-carbohydrate, low-protein, diet and dietary control is not a major problem. Older people do not tolerate change and extreme dietary restrictions are not likely to be complied with.

Anaemia

Anaemia is invariable, is usually well tolerated, and is unresponsive to haematinics. Transfusion is only temporarily effective, hazardous, and best avoided.

Drugs

Elderly patients are frequently more sensitive to drugs of all types and in chronic renal failure drugs partly or entirely excreted through the kidneys may quickly reach toxic serum levels. This is particularly true of antibiotics, and tetracycline in particular may raise the blood urea level even further. Conversely urinary tract infection may be more difficult to treat because of lack of excretion and this is especially true of nitrofurantoin and nalidixic acid.

Prostatic Disease

The usual presentation of prostatic disease—increasing difficulty in micturition—may be masked in the elderly, and the initial symptoms may be haematuria, or, as with younger patients, acute retention precipitated by diuretic therapy or anticholinergic drugs. Less widely recognized perhaps are dribbling incontinence due to retention with overflow and unrecognized acute retention causing a confusional state. A uraemic syndrome in a man always requires exclusion of prostatic obstruction as a cause. Treatment at present is essentially surgical and good results in suitable patients at any age are to be expected. Trials of various hormone preparations hold hope for future medical management.

Carcinoma of the prostate is the commonest neoplastic disease of the elderly man, said to be present in 95% of histologically examined prostates in the 8th decade. Presentation may be through urinary symptoms but not uncommonly is due to metastatic disease. In particular the diagnosis should be thought of in previously fit men in their 80's and 90's who complain of nothing more than mild malaise or whose social behaviour deteriorates for no apparent reason over a short time. Bone pain, particularly in the lumbosacral spine or pelvis, is a relatively frequent metastatic presentation but very widespread bony metastases may be asymptomatic. The plasma acid phosphatase level is variable but is frequently raised, sometimes to very high levels, and with extensive bone involvement a raised alkaline phosphatase and sometimes a peripheral blood picture of leucoerythroblastic anaemia may be seen. Treatment with oestrogens in most instances is successful and lengthy remissions are frequently seen.

Urinary Tract Infection

The spontaneous rate of urinary tract infection in women seen in domiciliary practice is said to be around 2%, but surveys in the elderly have found rates of around 20% in Britain, and in hospital rates as high as 67% have been quoted; in men spontaneous infection below the age of 70 is rare but its occurrence is said to be similar to that in women above this age. Possibly a prostatic antibacterial factor may account for this difference between the sexes at younger ages.

In elderly men collection of a reliable mid-stream urine speci-

men (M.S.U.) is relatively straightforward; in elderly women, on the other hand, it is a task of some difficulty and the average M.S.U. is almost certainly not midstream, and infrequently composed solely of urine. Thus urine specimens from elderly women submitted for bacteriological examination are often contaminated from various sources and this is reflected in the reported results of culture, before which the specimen may frequently be "incubated" at room temperature for several hours. This last difficulty is obviated by "dip slide" techniques, but the reliability of the results of a specimen "dipped" still remains in some doubt. In hospital conditions M.S.U.s. in elderly women have been shown to have a 57% false-positive rate, and though suprapubic aspiration gives totally reliable specimens, it is technically unsuitable for routine use. Alexa bag specimens show a similar order of reliability and could be used to check "abnormal" M.S.U.s.

The interpretation of the results of laboratory examination depends primarily on the quantitative bacterial count. Significant infection is associated only with bacterial counts above 100,000/mm³. There must be only one organism and in domiciliary practice this is likely to be *Escherichia coli* or a proteus in a pure culture. Two or more organisms reported as co-existing are due to contamination no matter how high the count. The presence or absence of pus cells is in general unhelpful and microscopical haematuria is uncommon.

Infection of the upper urinary tract in elderly patients is very difficult to establish. The classical clinical picture of acute pyelonephritis is uncommon and chronic pyelonephritis, though common (6% in one survey) as a post-mortem finding, is seldom accompanied by local symptoms in life. Suspicion may be aroused by heavy pyuria, or the results of a plain x-ray film or pyelography.

TREATMENT

Significant bacteriuria is likely to be asymptomatic in the elderly even more than in the younger age groups. It should be treated because of the deleterious effects of urinary infection on renal function, which is already likely to be compromised, as well as the known high incidence of chronic pyelonephritis. Fluids should be greatly encouraged, any fear of dilution of antibiotic concentration being far outweighed by the decreased reproduction rate of *E. coli* in diluted urine and the washout effect of the high urine flow on the bacterial numbers. The vast majority of *E. coli* found in domiciliary practice will be sensitive to sulphonamides, which are safe and effective. Otherwise, antibiotic treatment should follow the sensitivities found on culture and with appropriate manipulation of the urinary pH to match the organism concerned and the antibiotic chosen.

The length of treatment for a straightforward urinary infection is customarily one week and for acute pyelonephritis two weeks. In chronic pyelonephritis recommendations for length of treatment vary from six weeks to six months, using rotating antibiotics, but there is little further evidence as to their efficacy or necessity. A short (two-week) initial course with careful follow-up is probably preferable.

Relapse or re-infection is as common as in the younger age groups; if it persists, investigation is required to determine the cause, as treatment will be without lasting benefit until the cause is eliminated. By the same token a urinary infection should always be checked after treatment to confirm relief and, if pyelonephritis is suspected, at monthly intervals for at least six months.

Incontinence

When the intravesical pressure exceeds the urethral resistance voiding normally occurs; voiding becomes incontinence when it happens in an uncontrolled fashion. In the elderly lack of ade-

quate higher cerebral control is often an important cause, though the local mechanisms remain intact. This is seen transiently in early strokes, acute confusional episodes and states of altered consciousness, and epilepsy. It may also be seen in some frontal lobe lesions and particularly in established dementia.

Despite normal higher cerebral control, environmental factors may be vitally important as a source of apparent incontinence when access to the lavatory is restricted or it is too far away, or toilet rounds are inflexible, or attendants fail to realize that the matter is urgent. Being bed- or chair-fast are powerful overriding factors. Rarely with normal higher control and intact bladder mechanisms psychological factors may underlie apparent incontinence as a facet of a "call for help."

Local causes affecting the bladder mechanisms may firstly overstimulate the detrusor by irritating it, as in acute cystitis, bladder stone, or neoplasm. All these cause urgency, and incontinence if help is not at hand. How far urinary infection on its own is responsible for incontinence is less certain. After many months of contracting against prostatic obstruction the detrusor may dilate, become unable to expel the last part of the urine, and finally become an inert and grossly distended bag stretching the bladder neck and causing continuous dribbling incontinence. Stress incontinence in women is fairly common in the elderly and depends on the altered anatomical relationship between the bladder neck and urethra, on the one hand, and the pelvic floor, on the other. Urethral resistance is sometimes diminished by invasion by prostatic carcinoma resulting in dribbling incontinence; otherwise urethral malfunction is almost unknown as a cause of incontinence.

Interference with the nerve supply to the bladder will also interfere with the balance between the detrusor and the urethra plus the external sphincter. Thus incontinence may result from a wide variety of causes, from cord lesions to peripheral neuropathy. In multiple sclerosis, for instance, there is frequently a progression from detrusor over-activity early, with incontinence, to increased outflow resistance later, with retention.

TREATMENT

Local causes require local treatment and must always be sought before accepting incontinence as being due to loss of higher control. The transient causes may be allowed to resolve as the underlying condition improves, while environmental factors in particular should be amenable to alteration and explanation. The importance of getting the patient out of bed with its connotations of helpless dependence cannot be overemphasized. Also of vital importance is the avoidance of unnecessary hypnotics and the initiation of regular toileting and habit training, which can often greatly improve incontinence of so-called cerebral origin. Surgical help should always be sought in appropriate circumstances.

In some instances, despite correction of all remediable abnormalities, the patient is left with intractable incontinence. In women, especially if confused, it is impossible to fit an adequate external appliance, though some devices are suitable for the mentally alert and well motivated. A catheter is therefore the only practical solution and if of small size, with a small bag and adequately cared for, success for a period of years can be obtained and infection is rarely a major problem. In men long-term catheterization can cause troublesome periurethral problems, but in practice the relief to all concerned outweighs these dangers and a successful catheter life can be led for many months or even years. Before inserting a catheter, however, consideration should be given to the wide variety of incontinence appliances available. If fitted carefully these may be of considerable help, especially when the patient is out of bed. Nearly all appliances suffer from reflux problems in bed and considerable co-operation by the patient is needed for success. Electronic implants for increasing outflow resistance may help in selected cases of both sexes and are under continuing development.

Further Reading

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Any Questions?

We publish below a selection of questions and answers of general interest

Treating Aphthous Ulcers

Is copper sulphate applied locally of any value in treating aphthous ulcers?

Aphthous ulcers are painful holes in the wide if thin membrane of medical knowledge. Their cause is unknown but they are extremely common with quoted incidences of up to 50%. The ulcers begin with a cellular infiltrate which rapidly proceeds to necrosis. A primary vascular event has also been suggested as well as autoimmunity. Viruses have not been found and the bacteria appear to be secondary invaders. The puzzle is all the greater because these common aphthous ulcers may be totally indistinguishable from the ulcers of Beçhet's syndrome and the oral ulceration of ulcerative colitis. The individual ulcers usually heal in a week but they may become quite large and indolent. The treatments used are as varied as our ideas on aetiology and include antibiotics (for example, tetracycline locally), oestrogens, corticosteroids (in orabase, as oral tablets, and even by injection), and surface coagulants such as silver nitrate. I imagine the copper sulphate belongs to this last group. Undoubtedly use of copper sulphate crystals helps the pain and this is the patient's main problem.

Is there an Age Limit for Starting Oral Contraceptives?

Is there any objection to an apparently healthy woman in her mid-forties taking an oral contraceptive? She has not done so before

There is no clear age limit beyond which the risks of untoward effects from oral contraceptives become unacceptable. In general, carbohydrate metabolism becomes less efficient and the liability to venous thrombosis increases with age so that there is an increasing pressure to use other forms of contraception for older women. The possibility of inserting an intrauterine contraceptive device deserves consideration. The objection that such a means of contraception is less efficient than the oral contraceptive has much less force in the older women whose fertility will already have declined. Fears of a delay in the onset of the menopause or difficulty in appreciating that it has occurred can be discounted. Test withdrawals of therapy for a few months will demonstrate whether spontaneous menstrual cycles are still occurring and the steroids themselves are likely to have a beneficial effect on menopausal symptoms.

Screening Nursing Staff after Gastroenteritis

What procedure should be adopted by the staff medical officer of a hospital for screening nurses who have been off sick with a diagnosis—according to their medical sickness note—of gastroenteritis? While many of them may suffer only from dietetic overindulgence others can be victims of an infection and thus perhaps unsafe to return to nursing patients.

To require specimens of faeces as a routine is undesirable and may be misleading. The nurse, and this should also apply to certain other categories of hospital staff must be interviewed and a history of the illness taken. If this suggests an intestinal infection, then two stool specimens at an interval of about a week should be required for bacteriological examination. There is no need for the individual to be kept off duty unless there are indications either from the history or examination that there may still be active infection. The nurse should be reminded of the importance of careful personal hygiene and hand washing.

Dietary Advice for a Pregnant, Vegetarian Patient

What dietary advice should be given to a vegetarian woman who is pregnant?

Assuming that the woman is a lacto-vegetarian—namely, someone who is not adverse to eating eggs and dairy produce—then little dietary advice is necessary. Such a woman will possibly have an adequate supply of all known nutrients both for herself and for the fetus. Even so she should take vitamin tablets. It may also be necessary to recommend iron tablets because vegetables do not generally contain as much iron as animal foods. If, however, the woman is a "vegan" and refuses eggs and all dairy products, she may well be deficient in essential nutrients, mainly as a result of lack of animal protein. Several milk substitutes of vegetable origin are marketed and these can help to make good the deficiency. Nevertheless, many vegans have had to return to consuming milk and eggs to restore their health and it is likely that a vegan woman who is pregnant may need to do the same for the health of her future baby. Furthermore, the vegan is likely to be very short of vitamin B₁₂. There is no satisfactory vegetable source of this vitamin but products of vegetable origin to which the vitamin has been added are available.

¹ Ellis, F. R., and Wokes, F., *Nutritio et Dieta*, 1967, 9, 81.