Biochemical values throughout the patient's illness.

glycaemic, hypokalaemic, or hypercalcaemic. Because of the reports that this condition can occur after methoxyflurane anaesthesia he received no more of this drug.

After rehydration it was noticed that the urinary urea concentration had fallen while the blood urea level was raised. This situation of "polyuric acute renal failure" was treated with three daily injections of nandrolone phenylpropionate 25 mg intramuscularly, maintenance of a high calorie intake, and encouragement of the high urine output by maintaining good hydration with a fluid intake of up to 7 l./day. This proved very successful.

The possibility that the diabetes insipidus was due to a hypothalamic lesion was investigated by observing the response to exogenous pitressin tannate in oil. The absence of any response at all in urinary output or osmolarity, even after repeating the dose one day later, was thought significant.

The serum and urinary oxalate levels were measured and a very high urinary output of oxalate and a serum level raised to

about three times normal were shown. A slightly lowered plasma calcium level was also found (see Chart). These values slowly returned to normal, though the response to pitressin was still reduced when the patient was discharged home six weeks after his accident.

Comment

The mechanism of the nephrotoxicity of methoxyflurane is not clear but would appear to be dose-dependent. Metabolic degradation products of methoxyflurane including oxalate and inorganic fluoride have been incriminated (Mazze *et al.*, 1971). Its use has been associated with an increased oxalate excretion in the urine of all cases studied (Silverberg *et al.*, 1971). In the present case the plasma level of oxalate was far greater than could be accounted for by the degree of renal failure.

The source of the excess oxalate remains in doubt. Usually 60% of it is derived from glycine and ascorbic acid (Atkins *et al.*, 1964). It has been suggested that antibiotics might upset the intestinal flora, causing abnormal bile acid deconjugation, freeing glycine which could be metabolized to oxalate (Greenberg *et al.*, 1970). Another possible mechanism for the increased oxalate load from glycine lies in the antianabolic effect of tetracyclines. The amino-acids freed by continued protein catabolism are no longer utilized for protein synthesis (Shils, 1962).

In view of the increased utilization of methoxyflurane in Britain and the possibility of its use concurrently with antibiotics of the tetracycline group the nephrotoxic effects of these drugs should be thoroughly appreciated.

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Nocturnal Enuresis as a Late Complication of Meningitis

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Enuresis is described as primary when referring to a child who has never learnt to be consistently dry, and secondary in the situation where someone who has been dry for a period of months or years starts wetting again. After the age of 6 years secondary enuresis is more common (Meadow, 1970). While

psychological stress, insecurity, and immaturity are among the usual causes, organic factors do occur. These include diabetes mellitus and other causes of polyuria, urinary tract infection, and neurological conditions, of which spina bifida occulta and spinal tumour are the most commonly described. The case reported here is that of a child who developed nocturnal enuresis about two years after recovery from severe meningitis. The underlying lesion was found to be chronic adhesive arachnoiditis with an associated cyst, and freeing of the nerve roots of the cauda equina and excision of the cyst resulted in a cure.

Case Report

A 13-year-old girl was seen because of nocturnal bedwetting for five years and headaches of recent onset. She was healthy, of normal intelligence, and a sacrococcygeal sinus was the sole positive clinical finding. Review of her past history disclosed that at the age of 6 years she had a severe attack of meningitis associa-

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Anteroposterior lumbar myelogram showing circumscribed filling defect (arachnoid cyst) with dilated vessels running into it.

ted with paraplegia and retention of urine. A myelogram done at that time was reported merely to show no block. Intrathecal therapy was not given. Subsequently she made a complete recovery. The sacrococcygeal sinus appeared to have escaped notice. Four years later an orthopaedic opinion was sought because of low back pain and a slight limp, but these symptoms eventually cleared up.

In the plain x-ray films of the lumbar spine there was no evidence of spina bifida or any other abnormality. A myelogram showed a circumscribed, nodular intradural lesion at the level of L4 with dilated vessels running into it (see Fig.) It was thought to be most likely a dermoid cyst. Lumbar laminectomy showed a

dense arachnoiditis involving the cauda equina with a central arachnoid cyst containing dirty-grey, chalky material. The roots of the cauda equina were freed and the cyst was excised. Histological examination disclosed the features of arachnoiditis with cyst formation and no evidence of dermoid. For the next two weeks postoperative retention of urine required daily catheterization. After her discharge from hospital shortly afterwards only one episode of bedwetting occurred.

Comment

A congenital dermal sinus may serve as a pathway of infection into the central nervous system and its coverings, and in 1944 Shenkin, Hunt, and Horn (quoted by Epstein, 1968) reported a case similar to the present one in which a 2-year-old infant had transverse myelitis and widespread leptomeningitis arising by this means. Thus there is general agreement that this lesion should be obliterated by prompt surgery. Among the causes of arachnoiditis are infective conditions such as meningitis, syphilis, and tuberculosis; parasitic infestations; trauma, including surgical manoeuvres; subarachnoid haemorrhage; spinal cord tumours; and intrathecal injections. In some cases no cause can be found. The lesion in the arachnoid may be extensive or locally circumscribed and may be associated with cyst formation. The clinical course is also irregular, with periods of remission or exacerbation ranging from a few weeks to several years. Some workers state that spinal arachnoiditis is more common in the cervical and thoracic regions, but others have encountered it more frequently in the lumbar region (Epstein, 1968).

Thanks are due to Dr. Val Massiah, principal pathologist, for the histological examination.

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Spontaneous Fractures of Pelvis in Rheumatoid Arthritis

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Spontaneous fractures occurring in the long bones and neck of the femur are well recognized in patients with rheumatoid arthritis (Baer, 1940; Haider and Storey, 1962; Devas, 1965).

We report six cases of rheumatoid arthritis with fractures of the innominate bone. They were associated with little or no trauma, and only one of the patients was receiving corticosteroid therapy.

Patients and Treatment

Details of the patients are given in the Table and their fractures are illustrated in Figs. 1 to 3. The first three patients, who had severely involved hip joints, had sustained fractures through the acetabulum. The fourth patient had a fracture of the right ilium, and the fifth, amazingly, had fractured the ilium and pubic rami on the right. In the last patient the fracture was through the right superior pubic ramus and subsequently also through the acetabulum.

Five of the patients denied any form of trauma. One noticed the pain suddenly when she rose from her hairdresser's chair. The other four did not remember a sudden event but complained of more than usually severe pain in the region of the hip for one to three weeks. Walking had become difficult or impossible. In only one patient (Case 4) was there any form of trauma. She had stumbled over the edge of a carpet and fallen.

Details of the Six Patients

Case No.	Age	Sex	Duration of Arthritis (years)	Rose-Waaler Titre	E.S.R. (mm/hr)	Serum Calcium (mg/100 ml)
1	75	F.	7	1/2,048	53	8.6
2	40	F.	6	1/1,024	53	8.6
3	80	F.	50	1/512	54	8.9
4	40	F.	5	1/512	54	9.0
5	54	F.	2	Negative	7	10.0
6	59	F.	14	Negative	34	10.2

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