mental or peripheral symptoms will follow much smaller doses. Children (Tyson, 1889; Kelynack, 1890; Scally, 1936; Duggan, 1937; Belz, 1949; Fleury and Marx, 1949) and the elderly (Métivier, 1935) are particularly affected.

Recommendations to reduce the risk of side-effects from atropinization of the eye have included the use of a 0.5% solution, precautions to avoid concentration of the solution by evaporation, and compression of the internal angle of the eye to obstruct the lacrimal duct during instillation (Belz, 1949; Fleury and Marx, 1949).

It would be interesting to know if any positive correlation could be found between the more minor emotional disturbances and restlessness which often accompany eye surgery, and any particular dosage or method of atropine administration.

Summary

A case is described in which an acute confusional psychosis resulted from the routine administration of 1% atropine sulphate drops in the treatment of retinal detachment. The psychosis was accompanied by myocardial changes giving rise to considerable concern. Other peripheral signs of atropine intoxication were absent. A remission of the confusional state followed discontinuation of the eye-drops and a short course of electroplexy; paranoid trends and emotional lability persisted for a further few days.

At a later date, in order to establish a diagnosis, small test doses of atropine were given by injection. Both the psychotic symptoms and the myocardial change seen when the patient was having atropine eye-drops were reproduced.

The literature concerning mental symptoms following the use of atropine eye-drops is reviewed and possible preventive measures against intoxication are described.

It is suggested that closer investigation might be made into the origin of states of minor emotional disturbance, usually attributed to psychological stress, in patients undergoing eye surgery with prolonged routine atropinization. E.C.G. changes appear to be useful in establishing a diagnosis of atropine sensitivity where other peripheral signs of intoxication are lacking.

Our thanks are due to Dr. Leslie Ford, medical superintendent of Three Counties Hospital, for permission to publish this case, to Dr. L. G. M. Page, deputy medical superintendent, for his help and advice, and to Dr. D. W. Hill for details of treatment at Moorfields Eye Hospital.

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Opening a conference on cerebral palsy, held in London on November 21 by the British Council for the Welfare of Spastics, Mr. R. H. M. THOMPSON, Parliamentary Secretary to the Ministry of Health, said that the overall needs of children and young people suffering from cerebral palsy were early ascertainment, full assessment, expert treatment, education, training for future employment, and continuing aftercare in the community. At the same time the parents needed guidance in the child's home management, and help in coping with their own numerous practical and personal problems. The need was to build up a system of comprehensive care available to sufferers throughout their lives. Mr. Thompson thought the greatest need was for further understanding of the causation of the disease, for it was only in this way that we could prevent it. Research into its causation and treatment would ultimately be of benefit to children suffering from other handicaps also.

RENAL COLIC AND ANURIA FROM ACETAZOLAMIDE

BY

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Acetazolamide, "diamox," is a sulphonamide derivative and inactivates carbonic anhydrase. By oral administration it is rapidly absorbed, and is excreted largely unchanged by the kidney within 6-12 hours. The inhibition of carbonic anhydrase leads to increase of sodium bicarbonate in the urine and increased potassium output.

Acetazolamide is widely used for glaucoma and as a diuretic in cardiac disease, and is reputedly very free from serious complications; only three papers have appeared in America reporting complications and none at all in Great Britain, which is the reason for the publication of this case.

Case Report

The patient, a man aged 54, was quite well until 5:30 p.m. on May 1, 1958, when he passed urine normally. Shortly afterwards urgency developed and a quantity of "very thick urine" was passed with pain. Pain then developed in the right loin; it radiated to the groin and was associated with frequency, penile pain, and haematuria. He was seen by Dr. J. Williams, who diagnosed renal colic.

Next day the patient voided 15 oz. (425 ml.) of clear urine in the morning and complained only of a dull ache in the right loin. Later, severe low back pain developed with left-sided abdominal pain and vomiting.

On May 3 the severe low back pain and vomiting continued and no urine was passed for 24 hours. The patient was admitted to Leatherhead Hospital; temperature 99° F. (37.2° C.). No stones were seen by straight radiograph. Cystoscopy (lignocaine gel analgesia) showed the bladder to be empty but otherwise normal. The right ureter was inactive and a catheter could not be passed beyond 1 cm. The left ureter was obstructed at 5 cm., but a catheter with stylet was successfully forced through and bloody urine poured down the ureteric catheter under considerable pressure.

The ureteric catheter was tied in and 38 oz. (1,077 ml.) drained through it during the night. Distaquaine penicillin, 300,000 units, was given daily for six days from May 3. Sulphonamide crystalluria was diagnosed, and sodium bicarbonate, 60 gr. (4 g.) 4-hourly, was given orally and intravenous saline discontinued early, as the patient took well by mouth.

On May 4 the blood urea was 95 mg. per 100 ml.; plasma CO₂, 16.1 mEq/l.; serum chlorides, 106 mEq/l.; sodium, 139 mEq/l.; potassium, 4.6 mEq/l. Urine: bladder and left ureter, sterile; red cells ++; no crystals.

Progress was satisfactory; urine drained well from the ureteric catheter and the left renal pain was relieved at once. After about 12 hours the patient voided a few ounces of urine around the catheter; this was thought to be from the right kidney, as relief of right renal pain then occurred. The blood pressure was 150/85. The ureteric catheter was removed on May 6 after retrograde pyelography had shown a curious beaded appearance at the lower end of the ureter which might have been due to oedema or collections of crystals. The blood urea had fallen to 72 mg./100 ml.

The following day the patient was passing clear urine, but a peak of temperature followed, due to pyocyanus infection of the urine, which responded well to a five-day course of chloramphenicol.

On May 18 the patient was discharged well with a blood urea of 29 mg./100 ml.

Discussion

The diagnosis of this case lay between bilateral non-opaque ureteric calculi and crystalluria. The obstruction to the ureteric catheter very closely resembled the blockage experienced in sulphonamide crystalluria.

It was known that the patient had attended elsewhere for blurred vision (? glaucoma) in the left eye; he had improved somewhat on 2% pilocarpine, and was then given acetazolamide as follows: Two tablets on April 25, 26, 27, and 28, none on the 29th, two on the 30th, and one on May 1. The thick urine appeared during the evening of May 1 and was rapidly followed by bilateral renal colic and anuria; it seemed reasonable, therefore, to blame the tablets. Advice was sought from various medical colleagues, and it was concluded that the patient might have been taking sulphonamide tablets instead of the "harmless diuretic" acetazolamide.

Mr. C. R. Davenport, senior pharmacist at King's College Hospital, pointed out the sulphonamide nature of acetazolamide, of which I and most of my colleagues appeared to be ignorant. This seemed to clinch the diagnosis, and Messrs. Lederle, the manufacturers, were contacted, and provided helpful information.

Dr. L. H. Worth reported the following case at the Royal Society of Medicine on February 28, 1956, but the account was not published.

A man, aged 47, was given acetazolamide, 1 tablet twice daily, for two weeks from January 13, 1956, and the dose was increased to 1 tablet thrice daily on January 27. From the evening of January 31 until his death on February 5 he had complete anuria. The bladder was empty and no urine was obtained by ureteric catheterization. No crystals were found to be obstructing the moderately distended and oedematous ureters.

The story in Dr. Worth's case closely resembles the story in the present case.

Persky, Chambers, and Potts (1956) report three cases of ureteric colic following acetazolamide administration. Stones were removed by cystoscopy from the ureter in two patients, and it was suspected that some had been voided naturally in the third. The stones were not analysed. All three patients voided an acid urine, which is against phosphaturia, and it is suggested that the suppression of citrate production was the cause.

Glushien and Fisher (1956) reported post-mortem findings on a man of 55 who had had 250 mg. of acetazolamide thrice daily for four days. The kidneys closely resembled those of patients "succumbing to sulphonamide intoxication," but there was no clinical evidence of renal failure or sulphonamide intoxication during life.

Summary

A case of renal colic and anuria due to acetazolamide is reported.

The condition resembles sulphonamide crystalluria and responds to treatment for that condition.

In no case have sulphonamide crystals been detected, nor has an expected phosphaturia been confirmed.

Further investigation on the urine of patients taking acetazolamide are being carried out and will be necessary to explain the mechanism of this rare but serious complication.

I wish to thank Dr. N. E. G. Richardson for her help in the pathological investigation and Mr. C. R. Davenport and Mr. J. R. Wilson for their help.

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Medical Memoranda

Value of Penthienate Methobromide in Lienteric Diarrhoea and Encopresis in Childhood

Penthienate methobromide ("monodral"), like other anticholinergic drugs, depresses the motility and secretion of the stomach and reduces the motor activity of the intestine. Its therapeutic value in the treatment of peptic ulcer and dyspepsia is accepted, but its value in the treatment of disorders of the small intestine and colon remains unproved. Nevertheless, Ingegno (1954) considers that penthienate can control diarrhoea in patients with an "irritable" or "spastic" colon. I have, however, been unable to find any reference to its use in cases oflienteric diarrhoea and faecal incontinence in childhood. For this reason I record the effect of the drug upon 28 children between 4 and 12 years of age who were suffering from one or both of these complaints.

MATERIAL AND METHOD

Of the 28 patients selected, 12 suffered fromlienteric diarrhoea and 16 from faecal incontinence. The patients were seen in a hospital out-patient department, so that the diagnosis of the conditions was largely dependent upon the history and physical examination of each child. Urinalysis, radiological examination, E.S.R., and Mantoux tests were performed where they were considered necessary. Cases of incontinence due to indigestion or chronic constipation were excluded from the series. Twelve of the cases with encopresis probably also suffered fromlienteric diarrhoea. To subdivide the group accurately would not be easy, nor would it serve any useful purpose.

Histories obtained from the 12 patients withlienteric diarrhoea showed that the condition had been present for periods varying from two months to three and a half years, and that nine of them had some degree of abdominal pain or discomfort from time to time. In the 16 cases of bowel incontinence the duration of symptoms varied from two months to five years, and 12 of them had diarrhoea and six had attacks of abdominal pain. Ten patients had urinary incontinence as well as faecal incontinence. In four of the 28 children, food, such as soup and fruit, could aggravate their condition. Five other patients were similarly affected by mental strain. In two cases the symptoms may have been partially due to difficulties in training, because one child was mentally retarded and the other was deaf. These factors, however, did not prevent penthienate from having some beneficial effect.

All the patients were treated in the hospital out-patient department. They were advised to take their usual diet, but the fluid intake of the 10 patients with both urinary and faecal incontinence was restricted. In each case penthienate was prescribed, a 5-mg. capsule to be taken two or three times a day after food. Treatment was continued for at least two months.

RESULTS

Of the 12 children withlienteric diarrhoea, 11 became asymptomatic. The patient who failed to respond to the specific treatment was admitted to hospital, where he immediately recovered with no medicine, presumably because of the change in his environment and mode of living. Of the 16 patients who were treated for encopresis, eight obtained relief, and eight partial relief of their complaint. Twelve of these patients also had diarrhoea, and this subsided completely in seven cases and diminished in severity in the remaining five. It is apparent that penthienate therapy benefited almost all of the 28 patients, the results being exceptionally good in those suffering fromlienteric diarrhoea only and in half of those patients suffering from faecal incontinence. All but one case obtained some relief of their diarrhoea, and in some cases it was complete.

The influence of penthienate on abdominal pain, which was present in 15 out of the 28 patients, varied: in 10 out of the 15 the pain either disappeared or diminished, and in 5 the frequency and severity of the pain either continued