Although mercury salts in large amounts can cause a full-blown tubular necrosis, the effect of small amounts of mercurials, such as are in question here, is to produce an epithelial necrosis limited to the proximal tubule and not involving the basement membrane (Oliver *et al.*, 1951). The first patient had had a full course of mercurials while on a low-salt diet, so that iatrogenic sodium depletion is a possible additional cause of lowered renal blood flow; against this possibility is the absence of hyponatraemia in the early anuric stage, and the restoration of urine flow spontaneously, while on a sodium-free intake. Arterial desaturation may well aggravate the effects of renal ischaemia; but hypercapnia is probably not a critical factor, as it was absent in the first patient. We have not observed anuria in other forms of cardiac failure.

In the last few days of illness both patients had hyperkalaemia (7 mEq/l.); one had a definitely low plasma sodium (130 mEq/l.) and the other a low-normal value (138 mEq/l.). We have recently seen another patient with terminal cor pulmonale, but without anuria, whose plasma sodium was 130 mEq/l. and potassium 7.6 mEq/l. Anoxia and acidosis are recognized causes of a shift of potassium from cells to extracellular fluid; so that the obvious explanation of hyperkalaemia in terms of diminished renal output of potassium may be less important than internal shifts of potassium, and possibly also of sodium. This is a question which could only be settled by full balance-studies, which are not likely to be made. It is relevant, however, to mention that Moore *et al.* (1954), studying other types of acute renal failure, found that patients whose total exchangeable potassium was low quite often had a high plasma potassium; and one of us (D. A. K. B.) has seen a patient with corrosive sublimate poisoning whose plasma potassium fell from 8 to 3.5 mEq/l. in 24 hours, during which time metabolic acidosis had been corrected by infusion of 200 ml. of molar sodium lactate.

Acute renal failure occurring in such circumstances may well be regarded as almost the least of a patient's troubles; while it constitutes an additional therapeutic problem, the situation may sometimes be met by conservative treatment, which is more likely to succeed if the condition is promptly recognized. More important, perhaps, than the treatment of established renal failure is the recognition that it can occur in patients with lung disease, whose cor pulmonale has been complicated by a lowering of cardiac output, often associated with acute respiratory infection. These observations perhaps reinforce in some small degree the already strong case for the prompt and vigorous treatment of suspected acute respiratory infection in patients with bronchitis and emphysema; in this way, the dangerous situation of peripheral circulatory failure may be prevented or cut short.

Summary

Two patients with terminal respiratory failure had in addition acute oliguric renal failure; in one the urine flow returned before death, while the other died before this could happen. It is suggested that a terminal fall in cardiac output in patients with cor pulmonale may on occasion produce ischaemic tubular necrosis.

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MEPROBAMATE IN THE TREATMENT OF STUTTERING

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Speech defects are common, affecting 3–10% of children. Surveys such as those analysed by McAllister (1937) and Burt (1937) have shown an incidence of approximately 1% of stuttering in schoolchildren. The aetiology of stuttering is complex. Klingbeil (1939) quotes Charles Bell (1773–1842), professor of anatomy at Edinburgh, as attributing the condition to a choreiform affection of fluency of speech. Many have considered it a conflict for dominance between the cerebral hemispheres for control of the speech mechanism. Various other theories have been propounded.

Stuttering is an expressive disorder of communication the tendency to which is probably present from the beginning of development of speech. As the child grows in age a complexity of factors adds a reactionary overlay, a major factor being the disorder of speech itself. In the adult, methods of speech therapy are inseparable from psychotherapy to relieve anxiety and tension.

In view of the handicap which stuttering presents, the application of drugs which allay states of anxiety merits consideration. We decided to apply meprobamate in support of the accepted methods of speech therapy.

Clinical Results

Eighteen patients were selected for treatment. All were severely affected by stuttering and had been treated by speech therapy previously, with little improvement, at this

Results of Treatment

No.	Sex	Age	Occupation	Drug Dosage Tablets per Day	Response to Treatment
1	M	18	Van driver	3	No improvement
2	M	19	Draughtsman	3–6–8	Slight improvement
3	M	23	Compositor	3	Good
4	M	24	Joiner	3–6	"
5	F	24	Housewife	3	"
6	M	25	Butcher	3	Very good
7	M	26	Printer	3	"
8	M	26	Railway fireman	3–6	Good
9	F	28	Catering trade	3	"
10	M	28	Architect	3–4–6	"
11	M	29	Draughtsman	3	"
12	M	29	Engineer	3	Slight improvement
13	M	31	"	3–6	Good
14	M	34	Compositor	3	Very good
15	M	37	Post Office worker	3	" "
16	M	39	Wood-working machinist	3	" "
17	M	42	Technical manager	3	" "
18	M	50	Storeman	3	No improvement

Very good = Extent of improvement such that speech difficulty appears only during exceptional emotional tension. Good = Subjective and objective improvement permitting satisfactory employment as indicated, with intermittent speech hesitancy.

and other centres. Secondary tonic or secondary tonic-clonic stuttering was present in all cases. They all had defects in social adjustment.

The patients were seen at intervals of one week during active treatment and later at intervals of one month. The period of such supervision was eight months. Meprobamate was used in tablets of 400 mg.; one tablet three times a day was employed initially, and in some cases this dosage was increased according to effect. The results of treatment are summarized in the Table.

It will be seen that a very good result was obtained in six patients (33%), a good result in eight (44%), and little or no improvement in four (22%). The dosage used is shown in the Table. For most patients one tablet thrice daily was adequate.

Control tablets of identical appearance and similar taste were used in the management of eight patients. Two claimed some subjective response, but the other six said they were ineffective, although they were questioned and examined in a group having active drug treatment. Following active drug therapy it was possible to substitute control tablets with continued benefit to a variable extent. No useful result followed institution of meprobamate dosage in the absence of speech therapy.

Case Reports

The response obtained is illustrated in the following case histories.

Case 10.—An architect aged 28 had stuttered since being frightened by a dog when he was 3 years old. His stutter was of the secondary tonic type. He had good insight into his speech difficulty and quickly learned to control his blocks in "bland" speech situations where he was subjected to little tension. The nature of his work caused him anxiety in many situations requiring the giving of precise information. The resultant tension made his attempts to exert control over his blocks ineffective and he stuttered very badly. He was given three meprobamate tablets a day. The effect was minimal, and daily dosage was increased to four and then six tablets. Drowsiness appeared in the late afternoon, so the dose was reduced to four tablets a day. He then gained in speech confidence because of diminution in tension enabling control of his blocks. At the time of writing he was using the tablets only when required in difficult speech situations. He felt no impairment of the concentration required for his work on the optimum dose of four tablets a day.

Case 2.—A draughtsman aged 19 had had a stutter since he was a child. It was now of the secondary tonic type, and was characterized by very severe tension in the speech musculature during a block, so that his tongue protruded and the corners of his mouth were depressed. He was much concerned about his stutter and tried to use the methods of control which he had been taught. Most of his attempts were abortive because of the extreme tension present. The effective dosage of meprobamate was six tablets a day, upon which he felt generally relaxed, but the specific tension in his speech muscles was not much attenuated. He was better able to use control, but results were so equivocal that the meprobamate was discontinued.

Case 6.—A butcher aged 25 had a secondary tonic stutter. He felt a particular focus of tension in his chest when having a block. The stutter was a great handicap at his work in a butcher's shop, as when busy he was often unable to speak because of extreme tension. Speech therapy proved helpful, but he was still unable to cope with the ordeal of dealing with his blocks when trying to talk to customers. He was given three meprobamate tablets a day, and felt a marked improvement in his ability to stay relaxed under all speech conditions. His control of blocks steadily improved. This was accompanied by an increase in self-confidence. Eventually he was able to dispense with the tablets and still maintain a marked speech improvement.

Discussion

Meprobamate has been used widely in the treatment of anxiety and nervous tension. Turvey (1956) has reported that 60% of psychoneurotic and other patients with tension and tremors derive benefit from a dosage of four to six tablets a day. Electromyographic studies by Dickel *et al.* (1956) have shown a relaxation which was still more pronounced in patients with severe neuromuscular hyperactivity. Gillette (1956) has examined this relaxant action in a wide range of musculo-skeletal and neurological disorders, and

comments upon the greater value of skilled observation than attempts at control measures in assessment. In agreement with this, we have examined a carefully selected series of patients who had enjoyed minimal improvement during previous treatment; the assay of their progress has been based upon clinical experience to a greater extent than upon attempted strict control.

Stuttering is characterized by clonic and tonic interruptions in the breath stream, in a state of neuromuscular tension. Progression into adult life is accompanied by distortion of the personality, and few adults suffering from this condition are free from hypersensitivity regarding their disability. The extent to which it prejudices their employment and social status cannot be minimized.

Treatment of the adult stutterer is often disappointing and is usually protracted. A further limitation is the shortage of qualified speech therapists. The report of the Advisory Council on Education in Scotland (1951) on establishment for speech therapy is still to be implemented, and facilities are limited at most hospitals. A drug which facilitates speech therapy and shortens the duration of treatment is therefore of special value. Meprobamate has been found very useful for this purpose. No toxic effects were observed among our patients. The Council on Drugs of the American Medical Association (1957) has commented upon an incidence of toxic reactions, mainly involving individual hypersensitivity, but it still appears to be a comparatively safe drug to use. The object in using a drug of this type is to interrupt the vicious circle of tension, speech inhibition, and consequent anxiety. By accomplishing this, patients become more accessible to speech therapy, and a better result can be obtained in suitable cases than by the application of normal methods over a longer period. The importance of the psychological factor is demonstrated by the possibility of maintaining a proportion of the patients upon a placebo once the useful action of the drug has been demonstrated. It is a practical procedure to permit the individual patient to adjust his dosage according to circumstances as they arise, using the drug in certain instances for a protracted period in small intermittent dosage at discretion, thereby avoiding relapse.

Summary

Stuttering is a common condition and occasions severe handicap. Facilities for speech therapy are limited. Meprobamate is useful in relaxing the state of tension which provokes and perpetuates the condition. It has been found to be of value in restoring speech confidence, facilitating treatment, and shortening the period of speech therapy required.

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The late Sir James Walton, F.R.C.S. (1881–1955), was an expert on precious metals and gems, and at the time of his death was president of the National Association of Goldsmiths and chairman of the Gemmological Association. These bodies have now jointly established the Sir James Walton Memorial Library, one of the most comprehensive private libraries on jewellery, gemmology, gold and silverware, and horology. A brief description of it is published in the *Journal of Gemmology*, 1958, 6, 223.