Equal volumes of reagents 1 and 2 are mixed to yield a substrate-buffer solution, pH 7.1, stable at room temperature for 30 days.

- (3) Trichloroacetic acid solution, 12%.
- (4) Trichloroacetic acid solution, 40%.
- (5) Sodium nitrite solution, 0.1%.
- (6) Sodium sulphamate solution, 0.5%.
- (7) N-(1-naphthyl) ethylenediamine dihydrochloride solution, 0.5 mg./ml. in 95% ethanol.

Method

1 ml. of a 1:50 (2%) dilution of serum in distilled water is added to 1 ml. of the substrate-buffer solution. A control is prepared by adding 1 ml. of distilled water to 1 ml. of substrate-buffer solution. The test and control are both incubated at 37° C. for two hours.

At the end of this time the reaction is stopped and the proteins are precipitated by the addition of 1 ml. of 12% trichloroacetic acid. After centrifuging, a 1-ml. aliquot of the supernatant is pipetted off and 0.2 ml. of 40% trichloroacetic acid is added, and mixed by gentle shaking. (The original method described for protein precipitation was found to be unsatisfactory in that it sometimes resulted in turbidity in the final solutions.)

1 ml. of 0.1% sodium nitrite solution is added. Leave for five minutes. Any excess nitrite is then destroyed by the addition of 0.8 ml. of 0.5% sodium sulphamate solution. This reaction is complete in three minutes.

2 ml. of N-(1-naphthyl) ethylenediamine dihydrochloride solution is then added. The maximum blue colour develops in 15 minutes, and after this the optical density (O.D.) is read against the control at 580 mμ.

The colour is stable for 24 hours at room temperature.

The O.D. reading is converted to terms of β-naphthylamine liberated by reference to a standard calibration curve prepared with β-naphthylamine. When an O.D. greater than 0.700 is obtained, the procedure is repeated using an incubation time of one hour only, and the result obtained is doubled.

Our thanks are due to Miss Johnson, of the Edgware General Hospital, Dr. H. Caplin, of the Connaught Hospital, and Dr. P. Mestitz, of the Middlesex Hospital, all of whom supplied sera from patients with carcinoma of the pancreas. Also to Mr. Cowan, records officer, Middlesex Hospital, and his staff, who helped us with the follow-up of patients examined; and to the staff of the Bland-Sutton Institute, who provided access to histology and necropsy reports. Mr. M. Thomas and Mr. H. Stevens gave valuable help in overcoming initial technical difficulties. Finally, we should like to thank Professor Sir Charles Dodds for his advice and encouragement.

REFERENCES

- Arst, H. E., Manning, R. T., and Delp, M. (1959). *Amer. J. med. Sci.*, **238**, 598.
- Goldberg, J. A., and Rutenburg, A. M. (1958). *Cancer*, **11**, 283.
- Green, M. N., Tsou, K. C., Bressler, R., and Seligman, A. M. (1955). *Arch. Biochem.*, **57**, 458.
- Nachlas, M. N., Crawford, D. T., and Seligman, A. M. (1957). *J. Histochem. Cytochem.*, **5**, 264.
- Rutenburg, A. M., Goldberg, J. A., and Pineda, E. P. (1958). *New Engl. J. Med.*, **259**, 469.

A World Health Organization Expert Committee on Mental Health, which has just ended a session in Geneva, decided that research on an international as well as a national scale is necessary if further advances are to be made in preventing mental illness. The Committee defined areas of priority for mental health research, placing high on the list researches into brain function, social attitudes, effect of cultural change, psychoses of the aged, effects of nutrition, and genetic factors. In its opinion the administration of mental health programmes should also be studied. (W.H.O./59.)

PSYCHOGENIC URINARY RETENTION AFTER PARTURITION, RESULTING IN HYDRONEPHROSIS

BY

S. J. KNOX, M.B., D.P.M.

Department of Mental Health, Queen's University, Belfast

Urinary retention in women may occur in association with a wide variety of disorders such as retroverted gravid uterus, haematocolpos, uterine fibroids, and ovarian or broad-ligament tumours. Occasionally it is the presenting symptom in multiple sclerosis. Again, it is a common feature of the immediate post-partum period when bladder tone is reduced and large quantities of retained urine can be tolerated without producing a strong desire to micturate. Bruising and oedema of the bladder neck, perineal lacerations, and sutures are also contributory factors, but normal micturition is usually re-established within a few days.

Nevertheless, in a substantial proportion of cases no organic cause can be found to explain the disturbance. Emmett, Hutchins, and McDonald (1950) studied 76 cases of urinary retention in women who had attended the Mayo Clinic, and in the majority were unable to demonstrate a definite causative factor. They examined microscopically tissue removed from the vesical neck during transurethral resection in each of these cases, and noted that fibrosis, inflammatory reaction, and glandular hyperplasia were not significant factors in the production of obstruction. They advocated transurethral resection of the bladder neck as the treatment of choice, and 81% of their patients had a favourable response.

In such cases where there is an incomplete understanding of the underlying mechanism in physical terms psychiatric evaluation would seem to be indicated. Many standard medical and surgical reference books comment briefly that urinary retention may occur as a hysterical symptom which usually responds to reassurance, although occasionally catheterization may be required. However, so far as can be ascertained there have been only two relevant psychiatric studies reported in the literature. Williams and Johnston (1956) demonstrated the primary importance of emotional factors in a 28-year-old woman suffering from recurrent retention. Psychotherapy resulted in elimination of the symptom. Chapman (1959) described a further case where the patient's symptom was related to sexual trauma, seduction, and rape by her stepfather. Psychotherapy was directed towards exploration of her hostility towards this relative, and it was noted that her episodes of retention occurred when her hostility threatened to become conscious. Again, psychotherapy led to the disappearance of the symptom.

This presentation outlines the psychological aspects of a further case where retention was on a hysterical basis. The term "hysteria" is employed here to denote a psychogenic condition where the symptoms presented by the patient are not motivated in full consciousness and are employed for the sake of some gain. Such an illness usually does not progress to the development of irreversible damage, although this may occasionally occur when protracted hysterical paralysis of a limb leads to muscular contractures. However, it must be almost unique for the patient to persist with a symptom

to such an extreme as to endanger life by the production of irreversible pathological change in a vital organ.

This case may be of interest in view of the paucity of similar studies in the literature, and particularly as psychogenic urinary retention resulted in a severe degree of renal impairment. Again, it may suggest that intractable cases of urinary retention, in the absence of any demonstrable organic cause, warrant psychiatric assessment before surgical procedures are embarked upon. However, as William and Johnston were careful to point out, "only research in a number of cases will justify the conclusion that emotional factors often can be of primary specific significance in the aetiology of cases heretofore baffling."

Case History

The patient, a 25-year-old housewife, had a forceps delivery on June 1, 1959, for delay in the second stage of labour, and gave birth to a living male child weighing 7 lb. (3.175 g.). Some hours later she was cautioned by a nurse that for a few days she might have some difficulty in micturition, and this proved to be the case. She was catheterized for several days and discharged home on the eighth day, although it is uncertain whether normal micturition had been re-established by this time.

She was readmitted two weeks later complaining of crampy lower abdominal pain, and was found to have a distended bladder containing 52 oz. (148 ml.) of urine. During the next few weeks she could pass only small amounts of urine, and was treated with periods of intermittent or continuous catheterization. It was postulated that the bladder had been damaged during delivery, and it was expected that tone would gradually be regained. Carbachol produced evacuation on one occasion, but was subsequently avoided as it made her nauseated and feel faint. Her physical condition deteriorated, she lost weight, and developed a normochromic normocytic anaemia and urinary infection. As cystoscopy produced negative findings she was transferred to a general hospital eight weeks later, with a view to investigating the possibility of an underlying neurological disorder.

No abnormal signs were noted on routine examination of the central nervous system, and x-ray examination showed that the chest and lumbar spine were normal. A lumbar myelogram was performed and the contrast medium passed normally from the lumbar to the cervical region, through the foramen magnum, and into the anterior basal cisterns, there being no evidence of any abnormality. Examination of the cerebrospinal fluid gave normal readings. Again, in view of her anaemia, which was not responding satisfactorily to oral iron preparations, a sample of marrow was aspirated from the sternum. This showed an active granulopoiesis with hypoplastic erythropoiesis. An intravenous pyelogram was performed on September 1. The right kidney showed poor excretion of the contrast medium and the upper calices were poorly defined, showing some dilatation. It was difficult to identify the middle and lower calices, but there appeared to be some contrast medium present in these. The left kidney showed a gross hydronephrosis and hydroureter, and the contrast medium had passed into the bladder, which appeared to be rather large. It was concluded that the appearances were consistent with a bilateral hydronephrosis probably due to an obstruction in the bladder.

The patient continued to have retention of urine, requiring continuous catheterization, and on September 10 she had a suprapubic cystostomy. By this time there was a gross anaemia and emaciation was marked; her blood urea was 129 mg./100 ml. and she was acidotic, with a CO_2 -combining power of 17 mEq/litre. She was treated with appropriate electrolyte correction and had a good urinary output from the suprapubic tube. The urinary infection was treated initially with neomycin and then with "distaquaine G" and

nitrofurantoin. The blood urea fell over the next few days to 47 mg./100 ml. after a diuresis. However, urinary infection continued to be troublesome, and an almost continuous pyrexia persisted until October 2. During this period the blood urea fluctuated between 60 and 80 mg./100 ml., and supplements of sodium bicarbonate and potassium chloride were required. By October 9 pyrexia had recurred and the urine contained *Proteus* or coliforms from time to time, but always numerous pus cells. Within five days the patient was afebrile, having had chloramphenicol, but pyrexia recurred as soon as this was discontinued.

The suprapubic catheter was removed on October 12; a self-retaining catheter was inserted, released two-hourly, and a good urinary output was maintained. On October 16 the catheter was removed and she was able to pass 10 oz. (284 ml.) of urine, but the suprapubic wound continued to drain urine and a Foley catheter was inserted. On November 5 the bladder was explored surgically and the vesical neck appeared normal. The suprapubic fistula was closed, but further episodes of retention occurred when the self-retaining catheter was removed; blood urea rose to 100 mg./100 ml. and intermittent pyrexia developed. A low-protein diet, electrolyte correction, and fluid-balance management were required. Two weeks later it was possible to put her back on a normal diet, and she was given 3 pints (1.7 litres) of packed cells. Again her pyrexia subsided with chloramphenicol, but it recurred again as soon as this was withdrawn. The coliform organisms had become resistant to all antibiotics other than kanamycin and neomycin, and after a course of kanamycin she was apyrexial.

Psychiatric Evaluation

At this point the patient was referred for psychiatric evaluation, and was transferred to this department on December 1.

On admission she was grossly emaciated, weighing 5 st. 6½ lb. (34.7 kg.), her weight prior to the pregnancy being approximately 7 st. 5½ lb. (47 kg.). There were no other abnormal signs on physical examination, and particularly no hypertension or retinal changes. Blood urea was 46 mg./100 ml., and the self-retaining catheter was still required.

Detailed exploration of the psychogenic factors which seemed to be operating produced the following information.

The patient was an only child, and she described her father as an irritable and quick-tempered alcoholic who, when intoxicated, became violent, and on several occasions had injured his wife quite severely. He gave his family little financial support, and before entering her teens the patient was sewing and knitting for neighbours in order to earn enough to clothe and maintain herself at school. She could recall only a few isolated incidents when he showed a modicum of kindness, and her predominant recollections were of "brutality and fear." In contrast, the patient described her mother as a kindly and industrious person who, for many years, had tolerated her husband's behaviour, trying to excuse his conduct to the child. The patient would seem to have been rather dependent on her mother, and discussed how from childhood she has always dreaded their parting by death.

Three years ago her parents were legally separated, and about this time—that is, at the age of 20—the patient was married. Her mother has continued to live with her. She spontaneously suggested that her father's behaviour may have had a considerable part to play in the development of her sexual attitudes. The attitude which was evident in his relationship to the family group was extended in fantasy by the patient to involve his sexual relations with her mother. This was to the patient another form of assault in which her mother was an unwilling and helpless partner. This impression had not been corrected by any education, and information was accumulated from girls of her own age. In this setting sexual relations "became horrible and disgusting to me; I always knew it was something I couldn't do—it was the type of thing I would never ask anyone to

do." In spite of her parents' separation, her fantasies with regard to her father persisted. Thus she dreaded arriving home after being away for a few hours lest her father had returned in the interval and severely injured her mother.

Prior to the patient's own marriage she discussed their future sexual relationship with her husband, and claimed that they had reached a mutual agreement whereby intercourse would not occur until they decided to have a family. Accordingly, it took place for the first time about 18 months after marriage, and again one month later, when the patient became pregnant, after which it was avoided. On both occasions sexual intercourse was painful, unpleasant, and repugnant. Throughout pregnancy she remained well, and vomiting was not a problem. When further exploration of her sexual attitudes and fantasies was attempted she became, and remained, extremely reticent and evasive. In an attempt to verify her statements and expand the account available, her husband was interviewed by another member of the medical staff. He also was uncommunicative, but agreed that intercourse had occurred on only two occasions. He denied that his sexual relationship with his wife constituted a problem.

The patient's attitude to the child was explored, and there was evidence of rejection as expressed through compensatory overprotection, and this has been confirmed since her discharge from hospital. It has taken the conscious form in such ways as a fear that the child may become ill or that it may drown in its bath, and by being excessively cautious lest she should drop it.

After 10 days in hospital, and of her own volition, she agreed to having the catheter removed, and from then until her discharge four weeks later her urinary output remained quite satisfactory, and at no time was there any evidence of retention of urine. She felt she could micturate with normal force, and never complained of bladder discomfort. In spite of this dramatic improvement she did not appear to gain an understanding of the true nature of her symptom, although accepting that it was not primarily on a physical basis. She remained quite inflexible in her attitude to further intercourse, even scorning advice regarding contraceptive techniques, holding that she had been advised by various doctors that, in view of the consequences of her first pregnancy, it would be inadvisable to have a further child. It then transpired that, coinciding with her improvement, she had secured her husband's agreement to have no further intercourse.

Physical Treatment

In association with psychotherapy, physical treatment was obviously indicated, and may here be outlined. In view of the considerable weight loss she had a three-weeks course in modified insulin therapy which was instituted and maintained cautiously in view of her very debilitated state. The maximum dose given was 10 units, and this, in combination with norethandrolone, resulted in an increase in weight of 22 lb. (10 kg.). Ferrous succinate did not produce any marked increase in her haemoglobin level, which was 69% on admission and 71% on discharge. She remained apyrexial, but pus cells persisted in her urine, and on several occasions *Proteus vulgaris* was cultured. The pyuria was unresponsive to antibiotics. Her electrolyte status remained satisfactory throughout her stay, and she did not require supplements. As normal micturition was re-established her blood urea fell and was maintained between 34 and 40 mg./100 ml. during the three weeks prior to her discharge, and menstruation occurred for the first time since the pregnancy.

Before she left hospital her renal function was assessed in order to determine the degree of impairment at that time and to establish a baseline for comparison in the future. (1) Glomerular filtration rate, 50 ml. a minute. (2) Specific gravity range test: there was a maximum concentration of 1015 and a minimum specific gravity of 1002. In addition, serum protein electrophoresis showed a total protein of 7.2 g./100 ml. The pattern showed a normal albumin level but a slight reduction in the globulin fraction. Total urinary protein was 0.28 g. in 24 hours.

Discussion

The initial formulation of the retention was that the symptom had meaning to the patient as the result of an injury in childbirth. Her choice of symptom may have been determined by a transient retention due to local trauma during labour or iatrogenically produced by a nurse's chance remark; probably both factors were operating. The retention came to represent the patient's protest against pregnancy and motherhood, and insurance against further intercourse and its consequences. Exclusively physical methods of treatment employed initially had perhaps reinforced her belief that the symptom had a physical explanation.

The psychiatric approach served to widen this belief, and in a series of interviews her sexual development from childhood to marriage was focused upon, while at the same time it was tacitly accepted that the catheter would be removed when she felt she could pass urine normally. An implicit understanding was built up between the patient and the therapist that her real problem was being attended to, and it was in this setting that she tolerated removal of the catheter while at the same time securing her husband's agreement that further intercourse would not occur.

The glomerular filtration rate demonstrated that the functional capacity of the kidneys had been reduced to less than 50% of normal, and there was evidence that a chronic pyelonephritis had developed. As such infection is notoriously difficult to eradicate, even when the underlying mechanical obstruction has been relieved, the prognosis from the physical standpoint must be guarded, and progress to chronic uraemia may occur. Specialist supervision of this problem was indicated, and has been undertaken.

The unsatisfactory adjustment made by the patient to her problems would not have been regarded as adequate in a case where retention was uncomplicated by renal damage. To have produced a completely satisfactory sexual adjustment in this instance did not seem to be such a desirable therapeutic goal as usual, in the light of the physical considerations. Of course, whether it would have been possible to bring about such an adjustment is open to doubt. The risk of more intensive psychotherapy was that instead of producing an abolition of retention, as was achieved, the patient may again have retreated to her symptom with further rapid deterioration in renal function.

Summary

A case of urinary retention in a young woman in whom emotional factors were found to be of primary importance is outlined, and the psychodynamics are discussed. When the patient arrived at an adjustment to her problems the symptom was eliminated. However, by then a severe degree of renal impairment had occurred and bilateral hydronephrosis had been established.

I am indebted to Professor J. G. Gibson, department of mental health, Queen's University, for permission to report this case, and for advice in the preparation of the paper. My thanks are also due to Dr. M. McGeown, department of medicine, Queen's University, for supervising the medical treatment.

REFERENCES

- Chapman, A. H. (1959). *Psychosom. Med.*, **21**, 119.
- Emmett, J. L., Hutchins, S. P. R., and McDonald, J. R. (1950). *J. Urol.*, **63**, 1031.
- Williams, G. E., and Johnston, A. M. (1956). *Psychosom. Med.*, **18**, 77.