all cases the development of the carcinoma was slow even in cases of early onset.

X-Irradiation of the Ovaries

Interruption of ovarian function by x-irradiation in cancer of the breast was first used by de Courmelles in 1904. In this country Wintz (1926) was one of the pioneers in this treatment. Dresser (1936) reviewed the results in a series of 59 patients with metastases who received ovarian x-irradiation; 30 were premenopausal and 43% of these obtained benefit. Relief of pain and improvement in general health occurred, and a number showed regression of bone metastases; this benefit extended over periods up to three years. In the post-menopausal group no regression of metastases occurred, but symptomatic improvement was seen in 48.2%. Ritvo and Peterson (1944) state that the most satisfactory results are found in patients with osseous metastases; these lesions partially regress, and in some cases re-ossification occurs, with complete disappearance of the disease. The treatment does not prevent new metastases from appearing. Halberstaedter and Hochman found improvement in 56% of a series of 60 cases in all stages of the disease; bone metastases responded particularly well; cutaneous recurrences were affected to a less degree, and lymph-node deposits showed little response. Taylor (1939) concluded that an artificial menopause may be expected to result in temporary regressions or improvement in about one-third of the cases with recurrent and advanced cancer of the breast. Hunt (1940) reported regression of pulmonary metastases after ovarian irradiation.

Improvement after ovarian irradiation seems to be temporary and lasts for a period up to two years. It is known that some patients continue to menstruate and become pregnant afterwards; a case of twin pregnancy was reported by Kaplan (1927). When complete cessation of ovarian function is required bilateral oophorectomy must be performed.

Vicarious Secretion of Oestrogen.—There is evidence that ovarian irradiation and bilateral oophorectomy do not suppress oestrogen formation in the body. Significant amounts of oestrogen have been demonstrated in the urine of women who are over the accepted age of the menopause. Frank and co-workers (1934) demonstrated an oestrogenic cycle in the blood of a woman whose uterus and ovaries were removed, and Laroche and co-workers (1933) found oestrogen in the urine of 26 women after bilateral oophorectomy. The suggestion has been made that the vicarious secretion of oestrogen occurs from the adrenal and pituitary glands. Patients with advanced cancer of the breast treated by bilateral oophorectomy must be kept under periodic review and any oestrogen excretion in the urine is measured. If it is shown that oestrogenic function has restarted it can be combated by the administration of androgen.

Summary

The case record of a woman with advanced cancer of the breast is presented; the disease completely disappeared after bilateral oophorectomy. It was observed that the lumps increased in size immediately before menstruation began.

A survey of the literature on the subject is made and the value of the treatment shown.

Bilateral oophorectomy is better than x-irradiation of the ovaries.

Patients must be kept under periodic review and oestrogen excretion estimations made, so that if excretion occurs androgen can be given.

REFERENCES

- Adair, F. E. Treves, N., Farrow, J. H., and Scharnagel, I. M. (1945). *J. Amer. med. Ass.*, **128**, 161.
 Beatson, G. T. (1896). *Lancet*, **2**, 104.
 — (1902). *British Medical Journal*, **2**, 1300.
 Boyd, S. (1900). *Ibid.*, **2**, 1161.
 Clarke, W. Bruce (1905). *Lancet*, **1**, 228.
 Dargent, M. (1949). *British Medical Journal*, **2**, 54.
 De Courmelles, F. V. (1922). *Arch. électr. Méd.*, **32**, 264.
 Dresser, R. (1936). *Amer. J. Roentgenol.*, **35**, 384.
 Eccles, W. McAdam (1905). *Lancet*, **1**, 228.
 Frank, R. T., Goldberger, M. A., and Spielmann, F. (1934). *J. Amer. med. Ass.*, **103**, 393.
 Halberstaedter, L., and Hochman, A. (1946). *Ibid.*, **131**, 810.
 Herrell, W. E. (1937). *Amer. J. Cancer*, **29**, 659.
 Horsley, J. S. (1944). *Surgery*, **15**, 590.
 Hunt, H. B. (1940). *Radiology*, **34**, 235.
 Kaplan, I. I. (1927). *Amer. J. Obstet. Gynec.*, **14**, 40.
 Laroche, G., Simonnet, H., and Huet, J. A. (1933). *C. R. Soc. Biol., Paris*, **113**, 286.
 Lett, H. (1905). *Lancet*, **1**, 227.
 Morris, H. (1902). *British Medical Journal*, **2**, 1297.
 Ritvo, M., and Peterson, O. S. (1944). *Amer. Roentgenol.*, **51**, 220.
 Schinzinger (1889). *Verh. dtsch. Ges. Chir.*, **18**, 28.
 Snow, H. (1902). *British Medical Journal*, **2**, 1306.
 Thomson, A. (1902). *Ibid.*, **2**, 1538.
 Tork, F. (1914). *Ann. Surg.*, **60**, 476.
 Waring, H. J. (1928). *The Surgical Treatment of Malignant Disease*. Oxford Univ. Press, London.
 Wintz, H. (1926). *Brit. J. Radiol.*, **31**, 150.

NOCTURNAL ENURESIS: A SPECIAL APPROACH TO TREATMENT

BY

J. ROMANES DAVIDSON, M.D.

AND

ERNEST DOUGLASS, L.C.S.T.

(From the Orphan Homes of Scotland, Bridge of Weir)

In a large home for deprived children the problem of enuresis is of great importance and practical interest. After reading much of the literature on this subject one is left rather bewildered at the number of different methods that are claimed as effective and yet are in fact unreliable and unconfirmed by further workers. Mowrer and Mowrer (1938) claim that all of 30 cases treated became dry. We therefore decided to try their method, using the device which wakens the child as soon as the act of micturition begins. This device has proved very helpful indeed, not only as an effective remedy but also as an aid in the study of the child's reaction to treatment. By this method we have treated 20 cases; 15 are now dry and 5 greatly improved. It is strange that this work and its claim have scant recognition. Deacon (1939), using the same method on a small number of mental defectives, claimed a successful therapeutic result in six out of seven cases. Later, Seiger (1946) described his own modification of the apparatus, which is now marketed in America, particularly for habit-training in young children, but we are doubtful of the desirability of using the apparatus for this purpose.

Although the present study is confined mainly to the assessment of our success with this form of treatment, in no way do we wish to minimize the effect of an adequate physical and psychological investigation of each case and the importance of proper treatment of the child's personality difficulties; but in seeking some further aid to break its well-established habit and restore lack of confidence this method has a common-sense appeal.

The Apparatus

The device used is a modification of that described by Mowrer (1938). Their original pad, on which the child slept, consisted of two layers of bronze gauze, approxi-

mately 24 by 18 in. (60 by 46 cm.), separated by a piece of cotton material, the edges being carefully bound with cloth and the whole quilted together. A flex, one wire from each layer of gauze, is led by means of a plug connector to the bell-box. The box contains two $4\frac{1}{2}$ -volt

batteries, the nine volts being connected in series with the pad and the coil of a relay of 100 to 200 ohms resistance. The relay is made to operate two contacts—one completes a circuit of one battery and a suitable bell, the other contact is in series with a push-button release—and these two are in parallel with the pad; this acts as a holding contact. As soon as any current passes across the pad the relay closes the two contacts, one ringing the bell and the other causing the relay circuit to remain closed until the push-button releases it.

We now use an improved pad, consisting of two bare nickel wires (24 s.w.g.) $\frac{1}{8}$ in. (1.25 cm.) apart, stitched in a circular pattern to a rubber sheet 24 by 18 in. This is similar in design to that described by Seiger (1946); but we regard his pad as too small for older children, being only 4 by 6 in. (10 by 15 cm.).

Mode of Use

The pad is placed on the bed under or on the sheet with a small draw-sheet to cover it. A rubber mat may be put underneath on the mattress as an extra protection. The bed should be firm and not sag, as difficulties have occasionally been met with when the sag was sufficient to damage the pad.

The method should be explained to the child and care taken to show how it works; he should also be made to work it experimentally once or twice. He is then told that as soon as the bell rings he will get up, pull out the plug, press the button, and go to the toilet and empty his bladder. It is important to stress continually that he must get up as soon as the bell rings.

Two pads of the original design were given to each case, with the instruction to remove the wet one after coming back from the toilet, insert the dry one, and plug it in. Thus if there was to be a second wetting in the same night the bell would ring again. The new pad is merely wiped dry and used again. If a night attendant is available so much the better, as she can see that the child gets up promptly, though he must be allowed to turn off the bell himself. She can, however, assist with the proper drying of the pad.

In a survey made in October, 1948, 98 children in our home who were over the age of 6 years were reported as suffering from bed-wetting. This age was chosen because in such an institution the incidence would be great, and it was on purpose set a little high, to limit the number to be dealt with in the first instance. Of these 98 children 28 were girls, in a total of 298 over the age of 6 (9.4%); 70 were boys, in a total of 458 over the age of 6 (15.3%). The approximate ratio of two girls to three boys is the same as that reported by Sheldon (1944) in 5,000 children in residential homes. Among the total number of cases

reported there were many in which enuresis was very infrequent, but 25 (6 girls and 19 boys) wet every night or at least six nights out of seven.

All the children were carefully examined and the oldest and chronic cases treated first. Various methods were used—persuasion, suggestion under relaxation, ephedrine, methyl-ephedrine, amphetamine, and at times a placebo. All the children kept a record card, which we believe is in itself of therapeutic value. Any form of reward was avoided, and the only reward aimed at was a dry bed.

Details of the various forms of treatment and their results will be published later, the object of this communication being to present the results of the cases treated with the special apparatus. If a case was making no response to other forms of therapy or appeared to be one with the habit firmly established, it was treated by means of the conditioning bell. All cases thus treated were wetting every night, or almost every night, and in all of them the habit had been present for a long period.

Results

The accompanying Table shows details of the results obtained in the first 20 cases treated. The ages varied from 5 to 30. Ten patients have been dry constantly for nine

Case No.	Sex	Age	Nights per Week Wet before Treatment	Months on Apparatus	Months since Treatment Ceased	Result
1	M	13	7	3	13	Dry
2	M	13	7	1½	13	"
3	M	8	7	3 and 1*	9	"
4	M	9	7	1	12	"
5	F	12	7	1½	11	"
6	F	10	7	1½	11	"
7	M	15	4	4	10	Wet approx. 1/14
8	M	11	7	4 and 1*	9	Wet approx. 2-3/7
9	M	8	6	2½	9	Dry
10	M	5	7	6	8	"
11	M	10	7	10	1	Wet 1/28
12	M	6	7	1 and 1*	6	Dry
13	M	9	4	6	3	Wet 1/7
14	M	8	7	6	6	Dry
15	F	11	7	1½	5	"
16	M	12	5	6	4	Wet approx. 1/14
17	M	30	7	5	11	Dry
18	M	15	7	2	13	"
19	M	9	4	1	13	"
20	M	23	7	1	4	"

* Required two treatments.

months or more, and in nine of these the condition had been present for several years and wetting had occurred almost every night before treatment; a further five have been dry from four to eight months. In all of these 15 cases the dry habit has been maintained. In the remaining five cases improvement to the extent of six dry nights a week or more has occurred, but in one there has been some relapse. Three cases required a second treatment.

Discussion

It is now generally accepted that one theory of causation will never satisfactorily explain all cases of enuresis. In some the causative factors seem to be lack of, or faulty, training during infancy; in others organic factors are involved; in yet others an emotional disturbance plays a predominant part; while in many it is a combination of these factors.

Strauss (1944) points out that it is possible to divide functional enuretics into primary and secondary groups, and the treatment of each group is a different problem. We consider all our cases to be secondary enuretics. This differentiation is of importance in deciding the most suitable treatment. It seems obvious that by the time the greater

proportion of cases come for treatment they are in the secondary stage, and in such the original causative factors may no longer be operative. The condition is in fact a self-perpetuating one. The course of development from the primary to the secondary stage is complex, but as the child becomes aware that his symptoms produce unpleasant penalties he becomes anxious and uncertain, and a vicious circle of anxiety develops. The enuresis is no longer a response but a stimulus—a stimulus to both child and parent, or foster parent, creating in its wake still further anxiety and enuresis. If the causative factor is no longer operative there is every justification in using what might be criticized as symptomatic treatment. Only by preventing or minimizing a wet bed can the vicious circle be broken, and this conditioning apparatus seems to achieve the desired result. By such means not only is the child's anxiety allayed but, more important still perhaps, the parent's anxiety is also quickly reduced.

Suggestion plays a prominent part in the cure of many cases of enuresis, a factor often forgotten by the advocates of painful surgical procedures. Such suggestion may take the form of a pill or the purposeful use of suggestion under hypnosis as recommended by Strauss (1944). The effect, however, is much the same; the child is urged, either directly or indirectly, to believe that he will be dry in future, and sometimes this is indeed the case. The conditioning bell also has a suggestive effect. This is evidenced by some of our patients who were dry from almost the day the apparatus was installed. At least, from the time the apparatus is installed the patient feels secure in the knowledge that, if he does void, he is sure to wake up in time to prevent a very wet bed. In treating our cases by means of this apparatus we have taken full account of this factor, and have not hesitated to reinforce treatment by strong suggestion and reassurance. The child falls asleep knowing, in fact feeling, the pad is there.

Personality difficulties are often a prominent feature of enuretic individuals, but we are in some doubt whether such traits are not the effect rather than the cause in a good many cases. A surprisingly high proportion showed positive personality changes after acquiring the dry habit. Some patients were noticeably assertive, whereas previously they had been shy or introspective. In no case, however, did this over-compensation continue for longer than a week or two, and in no case was it by any means pathological. Children previously labelled dull even appeared brighter and more co-operative in their homes and school. We know that some enuretics are problem children, and that the enuresis is merely a symptom of general maladjustment, but we feel that in a good many cases personality difficulties are the effect rather than the cause of the enuresis. A few, especially during the early stages of treatment, refused to co-operate and did their best to sabotage our efforts. In this way the conditioning bell is also of value in quickly differentiating between those who are anxious to break the habit and those in whom the enuresis may be a positive "enjoyable outlet."

Four cases in the series were treated in their own homes, two being adults, and the response was such that seven consecutive dry nights were quickly achieved. Mowrer and Mowrer (1938) recommend the giving of fluids on going to bed, and then withdrawal of fluid and bell when a further consecutive seven dry nights have been obtained. This technique we found unsatisfactory. The giving of fluids reproduced the enuresis, and this had an adverse psychological effect. We now wait until the child has been dry for three consecutive weeks, then remove the apparatus, and in most cases this causes no relapse.

Summary

A method of treating nocturnal enuresis by means of an alarm that wakens the patient on the act of micturition was originally described by Mowrer and Mowrer. The results of treatment with this method in 20 cases are given.

The method is recommended as a helpful aid in the treatment of this condition.

We wish to thank Messrs. Henry Wiggin and Co., Birmingham, for supplying various forms of wire for our initial experiments. The apparatus was made in our own workshops.

REFERENCES

- Deacon, J. R. (1939). *Proc. Amer. Ass. ment. Defic.*, **63**, 133.
 Mowrer, O. H. (1938). *Amer. J. Psychol.*, **51**, 163.
 — and Mowrer, W. M. (1938). *Amer. J. Orthopsychiat.*, **8**, 436.
 Seiger, H. W. (1946). *J. Pediat.*, **28**, 733.
 Sheldon, W. (1944). *Proc. R. Soc. Med.*, **37**, 348.
 Strauss, E. B. (1944). *Ibid.*, **37**, 349.

ANAESTHESIA FOR CAESAREAN OPERATION

BY

H. T. DAVENPORT, M.B., Ch.B., D.A.

Anaesthetics Registrar, Liverpool Maternity Hospital

AND

F. J. PRIME, M.D.

Lecturer, Department of Anaesthesia, University of Liverpool

The general reduction in infant and maternal mortality and morbidity has coincided with an increase in the frequency with which caesarean operation has been undertaken. It is estimated that about 6% of all deliveries in hospital are effected by caesarean section. The favourable results of the lower-segment type of operation (Marshall and Cox, 1949) brought about by the improvements in surgical technique make it desirable to examine the problems of anaesthesia for this operation. Few papers have been presented in which the operative results have been correlated with the anaesthetic technique used, though many techniques have been described. With this in mind, a study of anaesthetics preferred by surgeons at the Liverpool Maternity Hospital has been undertaken and the advantages of their present choice reviewed. Since these techniques are not in universal use this publication may be of interest to both anaesthetist and surgeon.

The accompanying Chart shows diagrammatically the relative number of times each anaesthetic technique was employed for all the caesarean operations undertaken during the past 20 years; for convenience the time has been divided into four-year periods, and the fifth column represents the first half of 1949. The early predominance of general inhalation is apparent, but its unpopularity is indicated by the decline in the number of cases in which it was used when alternative methods became available. It will be noted that spinal block had a popularity that was brief owing to the general (Maxson, 1938) and particular (Greenhill, 1948) risks involved. Local infiltration was accepted as the most favourable technique as regards outcome, though its use during the war years was limited by difficulty in obtaining supplies. Most noticeable is the general acceptance of the advantages of the curare sequence, introduced during the past two years. For all practical purposes the last two techniques are the only ones now in use in this hospital.