ENURESIS IN CHILDREN

A REPORT OF 70 CASES

BY

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This report presents a series of seventy cases of enuresis in children treated for the most part by securing the patient's interest in his own complaint. The cases have been collected during the last seven years from various sources—namely, from the children's department of Guy's Hospital; during a short period as assistant school medical officer; from private practice; and from other hospital out-patient departments. The enuresis had in each instance been present since birth, but cases of enuresis in mentally deficient children have not been included.

Object and Technique of Treatment

The procedure was as follows. After taking a detailed history of the number of times involuntary micturition occurred, whether by day and night or by night only, of the size of the family, and of the presence of enuresis in other members, etc., a physical examination was made to exclude organic disease. In the absence of this the child was presented with a small calendar, to be kept by the bedside, on which the date of each dry night was to be recorded by the patient himself. A small reward was occasionally offered for success in the earlier cases, but was not continued, as it was found that praise and encouragement were sufficient. In the case of young children unable to read figures the co-operation of the parent was essential. Beyond spending the necessary time to interest the child in these measures and seeing the patient at regular intervals afterwards, no treatment was used and no medicines were prescribed.

This very elementary procedure is often all that is required, in the absence of organic disease, to put an end to an apparently intractable habit—and frequently a child who has never since birth slept through the night without involuntarily voiding urine can be completely cured in a short while by these means. The treatment is best carried out at a clinic, where all cases can attend at the same time and where the atmosphere of competition and enthusiasm that prevails in the waiting-room is an adjuvant to success. If, on the other hand, organic disease was found and considered to be a predisposing factor, appropriate measures were adopted first and the above procedure instituted later when necessary.

Case Reports

The first case is selected because it is typical.

CASE I

David B., aged 7. The youngest of four, with no history of enuresis in other members of the family. The parents are of respectable artisan class. He suffered from nocturnal enuresis since birth, with only occasional dry nights; no enuresis during the day. With calendar: first week, three dry nights; second week, five dry nights; next two weeks, ten dry nights; cure in four months. Remains cured five years later, except for a short period during an attack of measles.

The second is an instance of a successful result in a severe case.

CASE II

Daisy L., aged 9. The elder of a family of two; parents of labouring class. Father often out of work, but children comparatively well kept. No family history of enuresis. Patient suffered from nocturnal and diurnal enuresis from birth; had

frequently been scolded without effect—and was unwilling to talk about her habit. Interest easily aroused. Two calendars given, one for day and one for night. The mother, who co-operated well, undertook to see that the child passed urine voluntarily every two hours during the day and night for two weeks. During the first week five dry nights and days; during the second, five, and during the third four. During the next fortnight often went the whole night without having to be disturbed. Cure effected after three months. She has no enuresis now, six years later.

The third case was that of a girl of 15 with whom it was not anticipated that the simple method would succeed.

CASE III

Florence T., aged 15. The eldest of three; parents comparatively well-to-do. The mother had suffered from nocturnal and diurnal enuresis as a child. The patient had had nocturnal enuresis every night since birth, and had many times been under treatment. At the end of a fortnight there was a total of five dry nights—a thing which had never been known in the girl's life before. Cure was effected in five and a half months, and has remained permanent for a year.

The following case demonstrates the benefit of clinic treatment.

CASE IV

Kathleen F., aged 9. The second of four children of professional class parents. No family history of enuresis. Enuresis two or three times during the night and occasionally during the day since birth. The child was seen in private practice, and no improvement was made by the end of a month. The mother was not co-operating, and was indignant that the child was having no medicine. Consultations continued at a clinic where other children were being treated in the same manner. Cure was effected in three months and has remained permanent for three years.

Analysis of 70 Cases

The series consists of thirty-one boys and thirty-nine girls, ranging in age from 4 to 10 years, with one of 15 years. The age incidence rises gradually from 4, reaches a peak at 8 (twenty-two cases), and then falls off. In forty-three of the cases (61 per cent.) there was nocturnal enuresis only, whilst the remaining twenty-seven (38 per cent.) complained of both nocturnal and diurnal enuresis.

Family Records.—In only five of the cases (7 per cent.) was there a history of enuresis in one or other of the parents, while ten of the children (14 per cent.) had a brother or sister who suffered or had suffered from the complaint. Fifty-one, or almost three-quarters, of the children came from a family of three or more; ten came from families of two; and nine were only children. The ratio of hospital-class patients to private patients in the series was 2.3 to 1.

Associated Conditions.—Preliminary physical examination brought to light the following conditions: threadworms in twenty-five (35 per cent.); enlarged tonsils and adenoids in fifteen (21 per cent.); undescended testicle in two (2.8 per cent.); malnutrition in four (5.7 per cent.); *petit mal* in one (1.4 per cent.).

With regard to the tonsils and adenoids group it should be noted that in only three of the cases was enlargement so gross that they were referred for operation first. The remainder were treated beforehand, and only a few of these underwent tonsillectomy at a later date, partly because of refusal and partly because the surgeon considered it unnecessary. In two of the cases the enuresis cleared up in hospital following the tonsillectomy without further treatment.

Some attempt was made, from the parent's account and from observation, to classify the children into three temperamental groups—namely, *nervous* or excitable;

normal; and phlegmatic. It must be admitted, however, that the majority (70 per cent.) appeared to fall into the normal group—the nervous and phlegmatic totalling 15 per cent. each—and no great reliance is placed on these figures.

Results of Treatment.—Since it is difficult to ascertain at what stage cure may be assumed to be permanent, care has been taken to keep in touch with the majority of cases. For those not heard of for some time a follow-up has been undertaken as thoroughly as possible. Out of the whole group forty-two (60 per cent.) are known to have maintained their cure for periods ranging from eighteen months to six years; an additional seven (10 per cent.) are considered cured, but so far have only maintained their improvement for a few months; seven (10 per cent.) are not traced; and fourteen (20 per cent.) are failures. There are no "improved" cases. Either a child can be encouraged to stop his enuresis or he cannot, and the fact that he wets his bed only four nights out of seven instead of every night does not mean that he is very much better off, and the method must be regarded as having failed. In the accompanying table the results are tabulated.

Although two of the failures were in those with low intelligence quotients, no attempt was made in the group as a whole to correlate enuresis with intelligence. Addis (1936), however, has brought forward evidence to show that bladder control is not necessarily deficient when intelligence is low, and that enuretics have a smaller percentage of low intelligence quotients than non-enuretics. Addis also disagrees with Batty (1933), who considers faulty training, overcrowding, bad home conditions, and dirt to be among the chief factors in the production of enuresis. On this point it is not possible to arrive at any conclusion from the present series, as no systematic inspection of homes was undertaken. It is interesting to note, however, that a greater proportion of private patients were cured than hospital patients (76 per cent. as against 54 per cent.), and that there was a greater proportion of failures in the hospital class than in the private class (25 per cent. against 10 per cent.).

Enuresis has also been described as a pure conduct disorder (Hamill, 1929), but there were at least three cases in the present series which cleared up following treatment of definite associated defects alone, though how far the results were due to suggestion it is difficult to say.

70 Cases :	Cured : 42				Cured, but only maintained a few months as yet : 7				Not traced : 7				Failed : 14			
	Hospital Class 26		Private Patients 16		Hospital Class 6		Private Patients 1		Hospital Class 5		Private Patients 2		Hospital Class 12		Private Patients 2	
	Noc-turnal	Noc-turnal and Diurnal	Noc-turnal	Noc-turnal and Diurnal	Noc-turnal	Noc-turnal and Diurnal	Noc-turnal	Noc-turnal and Diurnal	Noc-turnal	Noc-turnal and Diurnal	Noc-turnal	Noc-turnal and Diurnal	Noc-turnal	Noc-turnal and Diurnal	Noc-turnal	Noc-turnal and Diurnal
No. of cases	17	9	12	4	6	0	1	0	2	3	0	2	5	7	0	2
Average duration of treatment	2½ months	4 months	3 months	4½ months	2½ months	—	3 months	—								
Threadworms found ..	7	3	5	3	—	—	1	—	—	—	—	1	1	2	—	2
Tonsils and adenoids enlarged	2	—	1	—	2	—	1	—	2	1	—	1	1	2	—	1
Undescended testicle ..	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—
Petit mal and malnutrition	1	—	—	—	—	—	—	—	2	1	—	—	—	1 <i>petit mal</i>	—	—

With regard to the fourteen failures, two of them were in backward children having an intelligence quotient of less than 90 (Binet and Simon, Herring revision); two patients did not return after the first consultation; and in two of the cases the parents failed to co-operate. One suffered from *petit mal* and did not improve with this method until luminal was added. He then remained dry except when he was having frequent attacks of minor epilepsy. A further two cases, heavily infected with threadworms, cleared up when these were successfully treated; and one commenced to improve under this regime only when large tonsils and adenoids had been removed. The remainder, four in number, were completely unaltered.

Discussion

With regard to the aetiology of enuresis many hypotheses have been put forward, including heredity, nervousness, peripheral irritation, as from threadworms, associated abnormalities such as enlarged tonsils and adenoids, epilepsy, etc. In this series none of these defects seemed to be entirely responsible, in that many of the cases cleared up before attention was paid to them. In a few of them, however, they did appear to be a factor of importance.

Again, psycho-analytic studies of enuresis have revealed a connexion between it and the emotional life of the patient, in that it is the expression of unconscious erotic fantasies, or fantasies of persecution, love, and hate; though whether this view is generally accepted among psychologists I do not know.

With regard to the different treatments advocated for enuresis they are too numerous to summarize here. They include belladonna, atropine, ephedrine, pituitrin, camphor, re-education, and suggestion by means of injection of inert substances. Goldman and Malavazos (1936) have utilized hormone therapy. Stocks (1936) reports a series of twenty-eight cases, in which thirteen were cured and others improved by calcium. But any idea that a specific drug effect may lead to cessation must be considerably modified by the work of Friedell (1927), who cured 87 per cent. of functional enuretics by subcutaneous injections of sterile water, and by Usher (1931), who has used similar treatment successfully.

Whatever may be the psychological significance of enuresis, therefore, and however important the coexistent physical defects in initiating or maintaining it, it seems reasonable to regard the failure to outgrow the habit at the normal age as a neural motor reaction in response

to many different environmental situations and bodily states, whether emotional, physical, or a mixture of the two; and to assume that in no two cases is it due to an identical combination of factors. At all events it is quite possible to persuade most of the children to change the habit by simple encouragement or by other suggestive means; nor is the task very laborious.

Summary

1. A series of seventy cases of enuresis in mentally normal children is described, with the procedure by which they were treated.

2. The results of treatment are analysed and show at least 60 per cent. of cures maintained over a length of time by the one method, and additional cures by other methods to suit the individual case.

3. Theories of aetiology and different methods of treatment are briefly discussed.

4. Most of the cases may be cured by simple procedures based on encouragement or suggestion.

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BIBLIOGRAPHY

- Addis, R. S. (1936). *Proc. roy. Soc. Med.*, **29**, 1515.
 Batty, R. J. (1933). *Enuresis*, London.
 Friedell, A. (1927). *Amer. J. Dis. Child.*, **33**, 717.
 Goldman, L. M., and Malavazos, A. (1936). *Urol. cutan. Rev.*, **30**, 729.
 Hamill, R. C. (1929). *J. Amer. med. Ass.*, **93**, 254.
 Stocks, A. V. (1936). *Med. Officer*, **56**, 87.
 Usher, S. J. (1931). *Canad. med. Ass. J.*, **24**, 665.

ACUTE LYMPHOCYTIC MENINGITIS

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Acute lymphocytic meningitis is a specific disease which has been systematically described only in recent years. It is characterized by symptoms of meningitis, often preceded by upper respiratory tract infection, certain distinctive findings in the cerebro-spinal fluid, and a benign course usually ending in complete recovery.

The modern study of the aetiology of the disease began when Armstrong and Lillie (1934), during the St. Louis epidemic of encephalitis in 1933, isolated from a fatal case in a negro a virus which was pathogenic for monkeys and mice. They found that this virus differed in many respects from the virus of encephalitis on which they were working at the time. Later Armstrong and Dickens (1935) showed this virus to be identical with one recovered from a series of cases of acute lymphocytic meningitis. Bengtson and Wooley (1936) reported successful cultivation of the virus on the chorio-allantoic membrane and brain of the developing chick. They make the interesting observation that inoculated chicks hatched out were definitely subnormal in many features. Findlay, Alcock, and Stern (1936) isolated a virus from a mouse which had developed symptoms of nervous disease. This virus they showed to be identical with Armstrong's virus, and they further established the identity of the American lymphocytic meningitis with the European type. They were able to demonstrate the presence of antibodies in the blood of a Dublin patient previously reported by Collis (1936), and they give a full account of their studies on two cases in England which they investigated themselves.

They also found antibodies in the blood of a certain proportion of wild mice, which suggests that these rodents may form the natural reservoir of the infection. The present position, then, is that lymphocytic meningitis is known to be widely distributed in Europe and North America. Recently Allen and Spencer (1935) have reported six cases from New Zealand. I cannot find any record of cases reported from the Tropics, but I propose to describe later on a series of patients who showed all the symptoms of lymphocytic meningitis. This makes it probable that the distribution of the disease is universal.

Pathology

Armstrong and Lillie found that intracerebral inoculation of the virus was usually fatal for mice. The mice die in convulsions after six to eight days. In monkeys the condition is characterized by drowsiness and apathy, and recovery is the rule. Findlay, Alcock, and Stern found an intense basal meningitis in their experimental animals. The infiltration extended on to the posterior surface of the upper part of the cord. There was extensive round-celled infiltration in the lining membrane of the whole ventricular system. Armstrong and Lillie found oedema and infiltration of the choroid plexus in two-thirds of their specimens. The name "chorio-meningitis," which is often used to describe the disease, is based on this finding. The lesions are confined for the most part to the meninges and choroid plexus, and there is very little perivascular infiltration in the brain tissue.

Symptoms

The clinical symptoms of the disease are hardly sufficient to distinguish it from other forms of meningitis and meningismus. It begins often as a "cold," sometimes with coryza. Even in the early stages there may be generalized aching. Headache can be intense. One of our cases had a peculiar combination of drowsiness and insomnia. The temperature is raised, usually running between 100° and 103° F. Kernig's sign is present in practically all cases.

Armstrong and Dickens say there is usually no paralysis and "no definite neurological signs." Allen and Spencer, however, found an occasional extensor plantar reflex in their cases. In one of our cases there were extensor plantar reflexes, weakness of the legs, and retention of urine. Findlay, Alcock, and Stern record paraplegia, paraesthesia, and cranial nerve palsy in their cases, both of which had retention of urine. The cerebro-spinal fluid shows characteristic changes. The cells are increased, and findings of 50 to 2,000 per c.mm. are recorded (Armstrong and Dickens). Lymphocytes may constitute up to 100 per cent. of the cells, and are rarely below 90 per cent. Sugar, chlorides, and urea are normal. No bacteria are found.

Diagnosis

In the Tropics there are special difficulties about the diagnosis of such cases. Apart from diseases like dengue, influenza, and spirochaetosis icterohaemorrhagica, which may simulate the condition clinically, there are three comparatively common diseases which give similar cerebro-spinal fluid findings. I refer to tuberculous meningitis, syphilitic meningitis, and lead encephalopathy. The important though not the only factors in excluding tubercle are the absence of bacilli, the normal chloride content of the fluid, and the benign outcome of the disease. In the case of syphilis we sometimes have to rely on the Wassermann or other serological reaction. How far these tests are reliable in an individual case it is often