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SOME NOTES ON THE TREATMENT OF EPILEPSY.

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WE have constantly under treatment at the Minnesota School for Feeble-Minded Children an average of about sixty cases of epilepsy.

While we have no stereotyped, universal form of treatment for all cases, but rather try to apply proper therapeutic measures suited to each individual case, yet our general plan of treatment consists in the careful regulation of the diet, observance of all hygienic precautions, and the daily administration of moderate doses of the bromides. Our formula for the *mixed bromides*, which we use to a considerable extent in the treatment of epilepsy, includes the bromides of potassium, sodium, ammonium, calcium, and lithium, combined in an aqueous solution in such a proportion that one-half fluidrachm of the solution is equivalent to twenty grains of the mixed bromides, and represents nine grains of potassium bromide, five grains of sodium bromide, four grains of ammonium bromide, and one grain each of calcium and lithium bromides. The average dose of the mixed bromides is fifteen grains three times daily, combined with a moderate dose of tincture of columbo and one or two drops of Fowler's solution, given, freely diluted with water, one half-hour before meals.

During the months of April and May (1892) we made some investigations concerning the effect of increased doses of bromides upon those patients who were subject to the greatest number and severer grade of spasms, aiming to give a tri-daily dose sufficiently large to stop the spasms, or at least reduce their number to the minimum, and at the same time not produce any alarming symptoms of bromism or seriously affect the general health of the patient.

We have also tried the effect of borax in several cases, notably some of nocturnal epilepsy.

It might here be remarked in passing that our routine treatment for the condition of status epilepticus consists in giving a preparatory enema of glycerin, followed by an injection into the rectum of about fifteen grains of chloral, with thirty grains of potassium bromide dissolved in about four ounces of water; and that this treatment (with variations as to size of dose) has been found successful, excepting in those cases where organic lesions of blood-vessels were supposed to exist.

The results, in certain cases, of our investigations with the increasing doses of bromides and with borax are given as follows:

CASE I. Ad. 476. E. D., æt. 19.—For six months previous to April 1st, had an average of sixty-five convulsions per month, or two and one-sixth per day. During that time he was taking thirty grains of mixed bromides regularly three times daily. April 1st the dose was increased to forty-five grains t. i. d., and April 2d to sixty grains t. i. d. The patient had no spasms for six days and six nights while taking sixty grains t. i. d.

April 7th the patient was quite stupid, with a tottering, unsteady gait, and the dose was reduced to fifty grains t. i. d.

On the night of April 8th the patient had eight spasms, and the next day was consigned to the general hospital with an attack of pulmonary congestion, which proved fatal within twenty-four hours. An autopsy, held under the supervision of Dr. A. C. Rogers, showed, so far as gross appearances were concerned, no morbid factor to account for the epilepsy.

In this case the six days during which the patient had no spasms while taking sixty grains of bromides t. i. d. was the longest period of immunity for fifteen months, though he had had five days' immunity several times while taking thirty grains t. i. d.

CASE II. Ad. 261. M. B., æt. 19.—Patient had an average of twenty-seven spasms per month for six months prior to April 1st. During the month of April the dose of mixed bromides was gradually increased from fifteen grains t. i. d. to forty grains t. i. d., and the patient had but nineteen convulsions during the month. There were in this case no marked symptoms of bromism, and the general health and mental activity of the patient appeared improved while he was taking the larger doses, and thereby suffering less from epileptic seizures. But upon the last day of April the patient had four spasms, and the first day of May was taken with an attack of pneumonia, which proved fatal within a week.

(In this connection it should be mentioned that pneumonia was quite prevalent at the time, and two cases should be cited,—those of Ad. 440, C. B., æt. 12, and Ad. 113, F. H., æt. 18,—both confirmed epileptics, both taking only moderate doses of bromides, and both dying of pneumonia, one on the 22d of April and the other on the 11th of May, after very brief illnesses. In all of these four cases of pneumonia the patients suffered very profound shock and were deeply prostrated from the onset of the disease.)

CASE III. Ad. 322. F. G., æt. 23.—Patient had an average of eighty-eight spasms per month, or two and one-half per day, for six months previous to April 1st, while taking about eight grains mixed bromides three times daily. From the 1st until the 16th of April the dose was gradually increased to forty grains t. i. d., and during that time the number of spasms per day underwent proportionate decrease. From April 16th to April 23d, while taking forty grains t. i. d., the patient had but one spasm, but at the end of that time was suffering considerably from bromism, and on April 23d one dose of the bromides was omitted, and the patient had two spasms that day.

April 24th patient was still somewhat stupid and dizzy, but the forty grains t. i. d. were continued until April 30th, the patient having but one spasm in the mean time. The patient had but fifty-four spasms in April, and only five of these during the latter half of the month while taking the maximum dose. May 1st the patient presented the appearance of extreme bromism, and was threatened with an attack of pulmonary congestion, making it necessary to send him to the general hospital, omit the bromides entirely, and substitute one-twentieth of a grain of strychnine sulph. t. i. d. Under this treatment the patient rapidly rallied from the bromism and impending pneumonia, and remained free from spasms for eleven days. May 11th he had one spasm, and the strychnine was immediately dropped and the patient put upon twenty grains mixed bromides t. i. d. This dose was gradually increased until May 28th, when the patient was taking one hundred grains in the twenty-four hours. From April 28th until May 11th the patient had no spasm, and he had but fourteen during the remainder of the month of May; had these very light, and maintained good general health.

CASE IV. Ad. 408. M. C., æt. 22.—Patient had an average of forty-nine spasms per month, or about two per day, for six months previous to April 1st, while taking ten grains mixed bromides t. i. d. During the month of April the dose was gradually increased from ten grains t. i. d. to forty grains t. i. d., and the patient had thirty-one spasms during the month.

However, during the latter part of the month she had the seizures less frequently and much lighter; the convulsive action being modified, and confined mainly to the muscles of the head and face. Her general health was at the same time much improved. The patient took forty grains mixed bromides t. i. d. during the month of May, and had *but one spasm* during that time, and appeared to suffer no inconvenience from the bromide. Her teacher in school, however, reported her as having failed mentally during that time, there being an increasing slowness of mental action and perception.

CASE V. Ad. 298. G. D., æt. 21.—Patient had an average of sixteen spasms per month for six months previous to April 1st while taking fifteen grains mixed bromides t. i. d. The dose was increased during the month of April from fifteen grains t. i. d. to thirty grains t. i. d., and the patient had in all thirty-one spasms.

During the month of May the patient took thirty grains three times daily, had but three spasms, and her general health seemed improved.

CASE VI. Ad. 55. E. D., æt. 22.—Had an average of twenty-one spasms per month for six months previous to April 1st, while taking about eight grains mixed bromides t. i. d.

During the month of April the dose was increased to twenty-two and one-half grains t. i. d., and the patient had twenty-three spasms.

During the month of May the patient took thirty grains mixed bromides t. i. d., and had but eleven spasms. This was a very "low-grade" child, making it hard to discern any change in her physical or mental condition; but apparently her general health did not suffer because of the larger doses of bromides.

CASE VII. Ad. 159. H. C., æt. 20.—Had an average of nineteen spasms per month for three months while taking ten grains mixed bromides t. i. d.

Had an average of eleven spasms per month for three months while taking sixteen grains mixed bromides t. i. d. From March 29th to April 15th the dose was increased from sixteen grains t. i. d. to thirty grains t. i. d., and during that time the patient had eleven spasms. From April 15th to June 1st the patient took thirty grains mixed bromides three times daily, and had during that time but three spasms. His general health seemed improved, though there was an increasing dulness and slowness of mental activity.

CASE VIII. Ad. 237. H. S., æt. 23.—Had an average of forty-two spasms per month for six months previous to April 1st, while taking fifteen grains mixed bromides t. i. d. In his case most of the seizures were at night. Trial was made of the effect of an additional dose of fifteen grains of bromides at bedtime, which seemed to increase rather than diminish the number of nocturnal seizures. April 20th the patient was put upon fifteen grains of mixed bromides twice daily, and twenty grains borax night and morning; and quite soon thereafter the number, but more particularly the severity, of the spasms was diminished, and the patient's general health seemed to improve. The patient had one hundred and five nocturnal and twelve diurnal spasms in April, and but fourteen nocturnal and eight diurnal spasms in May.

CASE IX. Ad. 299. C. G., æt. 22.—Patient had been taking ten grains mixed bromides three times daily. Had during a period of six months three diurnal and thirty-six nocturnal spasms.

April 10th, began giving thirty grains borax at night in addition to the daily dose of bromides. The patient had nine nocturnal spasms in April and eleven in May. In this case the borax seemed of no value.

CONCLUSIONS.

While the time of observation was too short and the number of cases taken to observe were too few to admit of any positive conclusions, yet we are led to *infer* from the results obtained:

I. That by increasing the dose of bromides to the point of an epileptic's toleration the number and severity of his spasms may be diminished.

II. That when the dose of the bromides which is necessary to reduce the number of spasms to the minimum is not sufficiently large to cause any marked symptoms of bromism, the general health of the patient will (by reason of his immunity from spasms) be improved, and, in some cases, his mental power will be increased; but that where very large doses of bromides are required to stop the spasms, the patient's general health is likely to suffer, and, more particularly, his mental activity be considerably lessened.

III. That the condition of bromism puts the patient in a position less resistant to attacks of certain intercurrent diseases, and more liable to succumb to them when attacked.

On the other hand, excessive attacks of epilepsy also make the patient liable to attacks of these intercurrent diseases, and render him more unable than a non-epileptic to contend with them.

IV. That, upon the whole, best results are secured in most cases by giving epileptic patients moderate doses of bromides, sufficient to modify and limit the epileptic seizures without being large enough to interfere notably with the patient's general health or mental action.

DISCUSSION ON DR. WILSON'S PAPER (EPILEPSY).

DR. W. B. FISH.—Dr. Wilson refers to rectal enemata and their efficacy. The general opinion has been that hypodermic injections of morphia and atropia have seemed more effective in arresting the convulsions. There may be some question as to the ability of the mucous membrane to absorb rectal injections, whereas if the remedy be injected into the circulation, there is usually no question about its absorption. In my experience, so far, it has proved better than anything else. I am very much interested in epilepsy, and I know that Dr. Knight can give us some information on this subject.

DR. GEO. H. KNIGHT.—The more I go into this subject of epilepsy the less I think I know. I have never used the remedy spoken of in Dr. Wilson's paper. I have been successful with the hypodermic injection of morphia and atropia, and with that hypodermic injection I have used as a heart tonic, where there was organic trouble, equal parts of strychnia and caffeine with good results. Where there has been no organic lesion, I have confined myself entirely to digitalis; of course, this is referring to the cases of status epilepticus. I am glad to have heard this paper of Dr. Wilson's, and I hope he will continue his study. I have tried faithfully, or did years ago, the mixed bromides. I have discarded them entirely. I use but one bromide. I find it gives better results, and one can, if necessary, use larger doses of the single bromide than of the mixed. This whole subject of the treatment of epilepsy seems to me to be entirely an experimental one. I have yet to find two cases of epilepsy that can be treated exactly alike. As illustrative of that I can cite two cases which have come under my observation,—one for two and the other for three years. The first was the case of a little girl who was brought to me, a child six years old. It was a true type of epilepsy with a very complete history. She was placed on not over five grains of bromide of sodium four times a day, with tincture of valerian.

The result was good, and it has continued good for three years. About a year later a boy was brought to me, and it seemed to me that the case in all respects was similar to that of the little girl. I put him on five grains of bromide of sodium with valerian or gentian as a vehicle. The next day the boy had about fifteen spasms; the next day about twenty, and I changed the medicine. I got nothing satisfactory, and I kept changing. I tried all the different bromides alone, but none in combination. Finally I came back to the original bromide of sodium, five grains in an *alkaline* solution, and I got the desired effect. The girl since she came under the influence of the medicine has not in two years had a spasm.

There are the two cases; nothing to distinguish between them, one taking the same bromide without an alkaline solution and getting a good result, the other taking it with an alkaline solution. So the whole treatment of epilepsy is experimental and individual. You have to keep trying each individual case until you get something that suits. I hope, therefore, that Dr. Wilson will make further reports to us. If we can keep complete histories of these different cases of epilepsy in our institutions, the time must come when we shall have data of benefit to this class of our feeble-minded.

DR. S. J. FORT.—I have had occasion to treat several cases that had the faculty of falling into the condition of status epilepticus very readily. In one case, since dead, I used the hydrobromate of coneine, the one-hundredth of a grain, hypodermically, but it failed to have any effect. According to the books it should have quieted him, but it failed, and I had to resort to an enema of chloral and bromide of potassium. I tried it again in another case sent to me from Texas. The boy's father was a physician. About once in six months the boy would fall into this condition. The father begged me not to give him any bromides whatever, claiming that the physiological effects were bad in the end; that he thought it deadened his sensibilities and apparently caused him to go back mentally. He suggested that I keep a bottle of chloroform by me and use that when necessary. I tried the bromide of coneine, but it failed utterly with him. The chloroform did operate well. I think in the treatment of epilepsy, in chronic cases, there should be strict supervision of the diet. I have been making some researches for six months in that line. I have the patients weighed every month on accurate scales, and I regulate the diet according to the weight. If they take on more weight, then the diet is reduced. If they are going back in weight, then the diet is increased. I have also compelled all the epileptics who are able to take regular exercise, running and walking. I happen to have a

circle built about the house, and that has been turned into a race-track, and they are kept at it every morning and every evening when it is too hot to exercise in the middle of the day. They improve under this treatment. The skin is kept more active, and the intestinal action is increased. That is a necessary point in treating chronic cases. The system of dieting of epileptic patients, especially of the younger children, ought to be very thoroughly studied, and here individual treatment is specially needed. Every child is a law unto himself as to how and what he should eat.

They should have their meals at regular intervals, and never anything between meals, and especially very little to eat at supper. Dr. Hurd, of the Johns Hopkins hospital, suggests that they should have but two meals a day. I do not know whether that could be managed in a private institution.

DR. WILMARTH.—This paper adds more proof to the palliative influence of bromides. There is but one evil that I fear, that in young cases it may cover up the actual disease. I do hope the day will come when we can study this disease at an earlier stage, when we can take early cases. I wish the alterative treatment might be used and these new remedies be employed in early childhood.

DR. GEO. A. BROWN.—Our experience at Barre is about like that of Dr. Knight. The cases that come to us are almost all adults, and have had all kinds of treatment when they come, and we do not have such a good chance to experiment and determine the value of different kinds of treatment. We use bromides and think a great deal of regular diet and regular exercise.

DR. KNIGHT.—I have discarded this matter of diet, and allow my epileptic children to eat anything they like, in moderation. They do hard physical work. I would just as soon have them eat pork as anything else. I experimented thoroughly, and I cannot see that it makes much difference as to the variety of food. There is this thing which I wish to speak about. I think it is an error we are all liable to fall into; that is, the treatment of all cases of epilepsy with bromides. While I believe that the bromide is the sheet-anchor in the treatment of this disease, yet there are cases which should never have an ounce of bromide,—cases which while they are, or seem to be, true types of epilepsy, yet are not so at the first. There are cases of epilepsy which are called such, where the seizures come from affections of the eye. I have seen a number of them, and have advised them to go to an oculist for operation. While I believe that many are so relieved, I do not believe that operation on the eyes will cure any case of epilepsy. But so far as

any percentage of these cases of eye-trouble is curable by operation, just so far it is done. Of course, for these cases you may use all the bromide you please, and it will do no good.

Then there are cases which I classify as chronic, which I could not do anything for with bromides, where the proper use of an alterative will give you the result you are striving for. I speak of this to emphasize the fact that the treatment of epilepsy in every case must be an experimental and individual treatment.

DR. WILMARTH.—I believe it will some time be proved that epilepsy is the result of nervous irritation. Eye-strain often causes constant headache, for instance. But until we can locate the seat of the irritation, bromides must be our sheet-anchor. Epilepsy, I believe, will come to be looked at less as a disease and more as a symptom, possibly a cause of disease.

DR. JOHN PRINCE, of Springfield, Illinois.—We meet a good many cases with eye-strain. My brother is an oculist, and he has treated a number by operation and the results have been satisfactory. In the treatment of chronic cases I know of nothing but the bromides that will succeed in ameliorating the symptoms. Dr. Wilmarth has recently written a paper on the prognosis of epilepsy, in which he says a certain per cent. can be cured. My ideas have been different. I have been hopeless of the outcome of the treatment of epilepsy. There is another cause of epilepsy which has not been mentioned to-day, and that is phimosia. In children it frequently is the case that an operation may be corrective, especially when the cause is irritation, as in the case of eye-strain.

DR. A. C. ROGERS.—Every case must be a study by itself, as Dr. Knight has said. But I do not see how he can ignore the question of diet, since the spasms may be produced by reflex action from indigestion.

DR. KNIGHT.—By saying that I do not diet the children, I mean I do not restrict them in variety. I do not keep away certain articles of food. There is, for example, an old idea that nitrogenous food is harmful, but I give it. But I do not let a child over-eat.

DR. ROGERS.—I study to find the diet which is best adapted to particular children. I propose to have our physician, Dr. Wilson, study each one of the possible sources of reflex action, and we have the promise of the services of one of our best oculists for the examination of the eyes of all our epileptics. We shall probably find some among our fifty or more epileptics in which treatment of the eye may assist in curing the spasms. There are a number of sources of irritation, each of which should be examined. With regard to the use of chloral and of morphia, I tried at Glenwood for a period the use of morphia, but not with atropia. In *status epilepticus* chloral has been of benefit in all our cases, except

three, in which every evidence that could be had, except from an autopsy, showed that there was an acute lesion of some sort in the brain. One passed from convulsion to convulsion, until he had passed through eleven hundred and sixty in thirty-six hours. The other two cases were similar. In all other cases the chloral and bromide remedies were very prompt in their action. I want to ask Dr. Knight if he has used lithium bromide. I consider that the essential ingredient of the mixed bromides. The lithium seems to prevent acne.

DR. KNIGHT.—Would not an alkaline preparation prevent it?

DR. ROGERS.—Not in every case. The idea is to give the bromide upon an alkaline stomach, and so it is given before meals. But sometimes the contents of the stomach evidently should be acid when the medicine is administered.

DR. A. H. BEATON.—This discussion is interesting to me, as we have a great many epileptics in our institution, perhaps twenty per cent. My experience has been that very little good has resulted from treatment, and I heartily agree with Dr. Fort as to the necessity for work and diet. Our inmates who are able work from morning until late at night, and the seizures are less frequent as a result. But I hold that epileptics should be placed in institutions provided especially for them. I do not think it is possible for a medical superintendent to give the epileptics proper study and care to get at the root of the difficulty. Those who need hospital treatment should be sent to the hospital, and the feeble-minded should be sent to institutions to be educated.

DR. FISH.—I do not think that any of us are particularly anxious to care for epileptics, but there are some ethical considerations involved. There undoubtedly exists in every case of epilepsy mental deterioration. The tendency is that way. But I do not see any objection to taking care of epileptics in an institution for feeble-minded upon the colony plan, where you have, as here at Elwyn, people specially devoted to the care of epileptics. In this plan you give the epileptics the advantages during their lucid intervals of school-training, and an opportunity to enjoy the varied life of a large institution. I see no reason why, with competent medical assistants, their treatment cannot be carried on as well in separate buildings and hospitals connected with the general institution, either for the feeble-minded or for the insane. If epileptics are herded off by themselves in an institution where they have no opportunity to take part with the home life of a progressive institution, they would be deprived of a great deal. In justice to the epileptics, we should give them, so far as possible, the advantages afforded by an establishment founded on the lines of the colony asylum or general institution.