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CLINICAL LECTURE ON DIABETES AND ON CHOREA,

Delivered in King's College Hospital, London,

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(Reported by S. J. A. SALTER, Esq., M.R.C.S.)

Gentlemen,—In the last clinical lecture I delivered to you, I entered upon the subject of diabetes, only so far as its history and pathology: I come to-day to consider the *treatment* of this malady.

In the observations which I made upon the pathology of diabetes, I pointed out to you that the great question which yet remains for solution, is as to the source of the sugar,—whether the sugar produced is simply a conversion of saccharifiable parts of the food, or whether it be not in part also a product of secretion, or of the changes which occur in the secondary assimilative processes. Now, I would remark, that there is nothing far-fetched in the notion, that sugar may be secreted or developed in the secondary assimilative processes. During lactation sugar is secreted in considerable quantity by the mammary gland; and the sugar of milk resembles in its constitution that of diabetes. Moreover, the proportion *per cent.* of sugar in milk is, in general, I believe, much greater than that of sugar in the urine. I know of no accurate estimate of the quantity of milk secreted by the human female in twenty-four hours, but judging from the quantity which an infant can drink in that time, I should say it cannot be less than two or three pints, which would yield a considerable quantity of sugar.

For all practical purposes we may, in the present state of our knowledge, adopt with advantage the following view of the pathology of diabetes:—that it is primarily a disease of the mucous membrane of the stomach, whereby an abnormal diastase is formed, which readily converts into sugar such aliments as admit of that conversion; the mucous membrane probably likewise secretes sugar; the sugar thus formed passes into the blood, and is rapidly eliminated by the kidneys, causing at the same time the attraction to those organs of the elements of a large quantity of water. This theory essentially agrees with that put forward many years ago by our countryman Dr. Rollo, who was the first to point out theoretically as well as practically the importance of a diet, consisting mainly of animal food in this disease.

In describing to you the treatment of diabetes, I shall consider the subject under two principal heads,—namely, the treatment which consists of alteration and restriction of diet, and that which is effected by the use of certain drugs or other therapeutical agents. In the *first* place, from the fact that starchy matters are capable of being converted into sugar when submitted to the action of saliva, and of certain other organic matters, we are at once led to the opinion that the amylaceous food should be removed from the patient's diet as much as possible. Of the articles of food in ordinary use, bread and potatoes contain the largest quantity of starch; the latter should altogether be forbidden, as they consist almost wholly of starch, and contain very little of any other substance that is of service in nutrition; bread, however, contains gluten, a highly nutritive nitrogenous substance, and as patients cannot be wholly deprived of carbonaceous food, bread is the best to choose, on account of the gluten which is thus mixed with it.

It has been proposed to give gluten bread, which consists of the gluten of flour from which the starch has been carefully removed; but it is a dry, insipid, bread, and it is very difficult to induce patients to take it for any time, so that, however, upon theoretical grounds, it may appear desirable, it is practically of very little value.

You will find it, in general, a better plan to give your patients brown bread instead of white; and the coarser it is, and the more bran it contains, the better. Bread of this kind has with most persons a laxative effect, which is a great recommendation to it.

Sugar, and vegetables containing starch, should be altogether avoided; but those vegetables which do not contain starch, may be taken with much advantage, for by that means the diet is capable of being varied; thus great relief may be given, to the discomfort of which the patients complain when their food is too uniform. Such vegetables as celery, lettuce, greens, cauliflower, are those to which I refer. Fatty substances and butter, which from their non-nitrogenous character may possibly admit of conversion into sugar, should also be avoided.

But while we are depriving our patients of one sort of food, we should be careful that he is supplied with that which will not be injurious to him; he should take the protein compounds, albumen and fibrin, and also gelatine, in the form in which they are met with in different kinds of animal food. It is doubtful,

however, whether even these are not sometimes converted into sugar.

Bouchardat maintains that this never happens; but I incline much to the opinion, that even when the diet consists of nitrogenous food alone, some sugar will be developed, either in primary or secondary assimilation.

The quantity of food which these patients take should be large, on account of the great waste which is going on in their bodies; they should take meat, fish, or eggs, two or three times a day, or more frequently if necessary.

In making these observations as to the power which the stomach possibly has, in diabetes, of converting the protein compounds into sugar, it must be remembered that these substances are never eaten in a state of absolute purity. Meat and eggs contain oil and fat, which in composition are nearer that of sugar than of protein compounds, and which, according to some chemists, are transformable into sugar, and although they occur in but small quantity in these substances, still it is quite enough to throw some doubt and uncertainty over our observations.

With this tendency to generate sugar in the stomach there seems to be an absence of power in the organ to digest it, and so it is absorbed unchanged into the circulation; or else so large a quantity is generated, that a large proportion of it eludes the influence of the digestive organs. In people in health, when sugar is taken into the stomach in moderate quantity, it is probably immediately disintegrated by the digestive process, either in the stomach or in the intestinal canal, and exist no longer as sugar. The question arises—are there any means by which the stomach or duodenum can be made to digest the sugar that is thus abnormally generated within its cavity? This point has been overlooked by Bouchardat and others. I know of no direct means by which this object can be immediately accomplished, but the powers of the stomach may certainly be improved by the use of appropriate medicines.

This brings us to consider that part of the treatment of diabetes which consists in the use of therapeutical agents, and of these I shall first notice those commonly called tonics. Both mineral and vegetable tonics may be employed with advantage. The mineral acids,—the sulphuric and muriatic, may be used. Gentian, quassia, and chirayita, are good vegetable tonics to employ in diabetes, but I have a decided preference for the latter. Chirayita is an Indian plant and has long been used in the east, under the same circumstances as we use the vegetable bitters in this country; it has the advantage of not producing the constipation, which other vegetable tonics so frequently do, and as constipation is a symptom very generally met with in diabetes, it is advisable not to employ any medicine which is likely to increase or confirm that condition.

Opium is a very important medicine in diabetes; its beneficial action is partly by its influence on the skin, producing diaphoresis, partly also from the soothing power it has over the nervous system, which is generally more or less irritable; it also allays the

craving of the stomach, so that the patients do not eat so much; and as the thirst is in proportion to the quantity eaten, it likewise becomes diminished when less food is taken. On the whole, perhaps the most favourable form in which opium may be given, is that of Dover's powder. But you will do well to be cautious in the use of this remedy, and to bear in mind Dr. Prout's suggestion, that by the prolonged use of opium, your patient may become an opium-eater, and be unable to exist without it.

Baths of different kinds are also useful in diabetes; they serve to keep the skin clean, and so to assist other diaphoretics. The hot-water bath, the cold bath, and the hot-air bath, are each recommended; and the latter has been particularly extolled by some physicians. It must, however, be kept in view that the hot-air bath is an agent of great power, and exerts a very depressing influence upon the system, after it has been several times repeated. What I have found to be the most useful mode of applying the bath is this:—to put the patient in the hot-air bath; when he comes out to dash cold water upon him, and then have him thoroughly rubbed with a rough towel until he is dry, and a glow of heat is produced; this being done he is instantly put to bed. The cold water thus used has a stimulating and invigorating effect, and which seems to counteract the depressing influence of the hot-air bath, without interfering with the amount of perspiration. One of our patients, Hardy, used the hot-air bath in this way, and derived so much benefit from it that, of his own accord, he persevered in its use for a considerable time. I may here remark, that I have found this mode of using the hot-air bath very beneficial in some forms of dropsy, with albuminous urine. Another method is to put the patient in a hot bath in the morning, and if it make him perspire too freely, then to put him in a cold one in the afternoon.

The solution of *pepsin*, in imitation of the gastric juice, is a remedy which was, I believe, first suggested by myself: it often assists digestion. I give it immediately before or after a meal, and although I have seen no direct influence that it exerts upon the amount of sugar generated, still it seems to improve the patients' powers of primary digestion; they are better nourished, and they tell you they are sensible it does them good, and on this account they beg for its continuance, but it undoubtedly exercises no direct influence on the generation of sugar. It is made by digesting the thick dark portion of the mucous membrane of the pig's stomach in distilled water, slightly acidulated with muriatic acid, at a temperature of 100°, for from twelve to twenty-four hours. The best test of its goodness is, its power of digesting meat and albumen, when kept at the same temperature for a few hours.

A remedy which will exercise a direct influence upon the peculiar state of the organs of primary digestion, which accompanies diabetes, is, as yet, a desideratum. Many other remedies, besides those I have mentioned, have been tried, and with some benefit; of these I may specify magnesia, ammonia, creosote; none of them, however, is entitled to be regarded as peculiarly efficacious in the disease. You will do well, however, to

keep them on your list of remedies, for in the treatment of a tedious and chronic malady, such as this, it is well to have the means of changing the remedy from time to time, and so to keep up your patient's hope.

As to the use of alcoholic stimulants, it may be said, that employed moderately, they exercise no unfavourable effect on diabetes, and you must be guided in your employment of them by the feelings of your patient, and the peculiar circumstances of each particular case.

I here terminate my remarks on diabetes. In another lecture on this subject, I will describe to you the results of the treatment of our patients Hardy and Bowles, who are now placed in a separate ward, under careful surveillance, for the purpose of being subjected to a strict animal diet.

CHOREA.

I shall occupy the remainder of this lecture, gentlemen, by offering to you a few remarks upon that remarkable disease of the nervous system—*chorea*, of which we have a very good example at present in the hospital. Amelia Reynolds is the patient to whom I refer; she was admitted into Augusta Ward, on November 2nd; the following is the account given of her in the case-book:—"She is 15 years of age, native of London, where she has always lived; last January, had inflammation of the lungs, and, soon after, sore-throat, from these she entirely recovered. States that six weeks ago her present complaint came on, with violent headache, deafness, vertigo, and almost entire loss of sight at times; at the same time she became restless, and lost the power of properly governing the movements of her limbs, especially on the left side. For this she applied to a medical man, who ordered six leeches to be applied to her temples, low diet, and change of air. From this time she became worse. She menstruated first about twelve months ago, but has not been unwell for the last eight months, though she has at times been troubled with pain in the loins and lower part of the belly." Such is the history of her case, and the following is the description of her present condition:—"She has incessant fidgetting movements, which are not properly directed by volition; they are confused, irregular, jerking, and, although apparently performed with considerable vigour, yet they are not co-ordinated. Articulation is affected, she speaks quickly and snappishly; when told to put out her tongue, she does it in the same jerking manner as she moves her other muscles, with a peculiar thrust, projecting nearly the whole organ. This peculiar action of the tongue is a constant and very characteristic symptom of chorea; it is an early symptom, by which I have been led to suspect the approach of an attack of chorea, before any other symptom had made its appearance. These movements go off during sleep, and return immediately on waking—a fact of singular interest. Mental excitement causes an increase of these jactitating motions, and so does any attempt to restrain them, as holding or tying the limbs down. There are now no symptoms affecting the organs of sense, but when the disease began there was vertigo, with headache.

The disease generally commences simply with

disordered general health, imperfect digestion, which causes an impaired condition of the blood; this state of things is followed by slight fidgetting only at first, or irregular movements of particular parts,—a hand, or leg, or the face,—which subsequently pass into those of confirmed chorea. In other instances, and these are very common, it may clearly be traced to some sudden fright which the patient has had, and this may bring it on in a person who has, or has not, been in a previously cachectic condition; but chorea coming on in an individual who was apparently in good health, and who has not been subject to fright, is extremely rare.

This disorder is peculiarly interesting, because it is strictly emotional in its character, and has its seat in those parts of the brain which preside over emotion. When a person, not suffering from chorea, is suddenly frightened, he is immediately impelled to make certain irregular jerking motions, which endure for a variable time, in proportion to the excitability of the subject; and these, while they last, are not at all unlike the movements of chorea. A peculiar feature in the movements of chorea is, that they are always more or less one-sided; they are not necessarily confined to one side, but are more remarkable on one side than on the other. Sometimes they are strictly limited to one side. Chorea may be conveniently divided into two kinds, according as the jactitations are *general* or *partial*; the former when all the limbs are affected, and the latter when it is confined to some of them only.

General chorea is an extremely dangerous disease; patients suffering from it are unable to stand; they are therefore obliged to keep in the recumbent posture, and as they lie in bed, shake and jerk, and throw themselves about, till they rub off the cuticle of those parts which come in contact with the bed, and at length they die from sheer exhaustion; they literally shake themselves to death; our patient, Amelia Reynolds, presents a *mild* example of general chorea.

Pathology.—What we know of the physiology of the encephalon, points to that organ as being the seat of the disturbed function in chorea; *post-mortem* investigation, however, displays no organic change. Various morbid conditions of the nervous centres have been found in some cases, but these are evidently only accidental combinations; thus, patches of bone on the arachnoid of the spinal cord and brain have been seen, cicatrices of the ovaries, and many other morbid appearances. None of these, however, are constant, nor have they any obvious relation to the parts whose functions are disturbed. Indeed, I believe it may be confidently stated, that chorea is a strictly functional disease, entirely independent of any organic lesion appreciable by our means of observation, and that it occurs in connection with depraved nutrition, just as we see various nervous symptoms arise in hysteria, as, for instance, paralysis, where the body is in a similarly ill-nourished condition. In cases of hysterical paralysis, the symptoms are most probably produced by the depraved or deficient nutrition, affecting principally some portion of the nervous system most intimately connected with the part paralysed.

In chorea the whole nervous system appears to

participate in this disordered state of nutrition, but more especially those portions presiding over emotion, namely, the upper part of the medulla oblongata and the mesocephale, and this I believe constitutes the essence of the disease. I have pointed out to you the one-sided nature of this affection, and you have seen that in the case in the hospital we have just been considering, it is the *left* side that is chiefly affected; this unilateral character shows that it is a brain-disease and not one of the spinal cord, as some have supposed, for diseases of the spinal cord affect both sides alike.

The opportunities of making *post-mortem* examinations in cases of chorea are extremely few, for the natural tendency of the disease is to get well, and in a large proportion of the cases recovery will speedily take place, with merely good diet, pure air, cleanliness, and a little purgative medicine; and this, by the way, affords an additional proof that the malady is dependent on impaired nutrition, as all these means have a tendency to bring about a healthy nutrition, and to render it vigorous. Another proof of this may be derived from the morbid state of the urine which sometimes accompanies the disease; it is often of high specific gravity, and in other cases it contains a superabundance of phosphates; the specific gravity sometimes ranges from 1030 to 1038, even when the urine is in pretty good quantity. On the 11th of this month our patient, Amelia Reynolds, passed urine of specific gravity, 1038; on the 13th, 1033; on the 14th, 1022; and on the 17th, 1026.

Treatment.—By far the majority of cases are of a mild kind, and very amenable to treatment. In the first place, the patient should have plenty of nourishing food, especially animal food, and such as is easily digestible; pure open air is also necessary. Purgatives are very useful, and when you are first called to a case of chorea, it is a good plan to give purgatives for two or three days, so as thoroughly to clear out the alimentary canal, but the purgatives should be of a mild kind, and not such as have a tendency to lower the patient's strength, and be used simply to unload the alimentary canal, and to get the secretions into a healthy condition, and this very often will alone suffice to accomplish the cure. After this kind of purging has been used, a systematic course of tonics must be adopted, and they will almost infallibly destroy the disease; all the tonics are of nearly equal value, but sometimes it will be found that one will fail, and that upon giving it up and trying another, the patient speedily has relief. Some prefer metallic tonics, as, zinc, iron, or arsenic, but I prefer the vegetable tonics, and of these, quinine; and if there is much anemia and pallor, I would add to it some preparation of iron. I seldom give arsenic; it is a very powerful medicine, and may do much harm, while all that is wanted can be accomplished by other means; it may produce a state of system which will render the patient miserable for the rest of life; it should not be employed unnecessarily or unadvisably, and only in extreme cases, and where other tonics have been used in vain.

The cold bath is a very useful means to employ; it

must, however, be used with great caution, or it may even do harm; it must be remembered that the complaint is one of emotion, and that a too sudden plunge into cold water, or a too abundant affusion, may frighten the patient, and increase the disorder; but the general effect of bathing is a marked improvement in all the symptoms.

In obstinate cases, which resist all modes of treatment, the use of electricity, as developed from the electrical machine, has been found of the greatest benefit.

MEMOIR ON TURNING, AS AN ALTERNATIVE FOR CRANIOTOMY AND THE LONG FORCEPS, IN DEFORMITY OF THE BRIM OF THE PELVIS, &c. &c.*

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SECT. VII.—PHYSIOLOGICAL AND PATHOLOGICAL REASONS FOR THE LIFE OF THE CHILD NOT BEING NECESSARILY COMPROMISED UNDER THE PROPOSED PRACTICE.

It has been alleged that the preservation of the life of the infant is not compatible with its forcible extraction by turning through a contracted pelvic brim. It must perish, it has been argued, in consequence of the lesions it necessarily sustains, and especially—1st, in consequence of the injurious compression to which its head is subjected during the forced delivery; and, 2nd, in consequence of the required injurious traction upon its neck. Let us examine, in detail, each of these alleged necessary causes of death to the child under the practice in question.

1. IS THE COMPRESSION TO WHICH THE INFANT'S HEAD IS SUBJECTED INCOMPATIBLE WITH ITS SAFETY AND LIFE?

In the remarks which I offered under the last section, with regard to the question whether in turning in contracted pelves the degree of injury to which the child's head is subjected, is or is not compatible with its future safety and life, I confined the observations which I made, and the illustrative cases I adduced, to that form of cranial lesion in which the sides of the fetal skull are both compressed and indented. In some instances, however, even when the pelvis is much distorted, one of these states only, as the lateral compression alone, *without* the indentation of the cranium, is all that is required in order to reduce the head to the size necessary for its transit. On one occasion, a pelvis, the conjugate diameter of the brim of which was less than three inches, from projection of the promontory of the sacrum and disease of the symphysis pubis, I extracted a full-grown infant by turning; the head passing through in a flattened and compressed form, but