Remarks

ON THE

USE OF ALKALIS IN PRACTICAL MEDICINE.

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Of the stock medicines in common use none are prescribed with greater frequency than the alkalis. As remedies for all kinds of dyspeptic troubles, for gout and rheumatism in their many manifestations, for urinary acidity and sandy deposits, and in the child for all forms of catarrhal derangements, we turn at once confidently to the alkaline salts. But valuable as these medicines can be in the treatment of disease they must be used with discretion, for, like other drugs, they are only of service when prescribed for appropriate conditions and on a definite plan. There are plain limits which it is important to recognize within which alone their operation can be expected to be useful, and outside of which their influence is calculated to be rather harmful than a source of benefit.

When taken before meals alkalis have first a local action. They neutralize to some extent the acidity of the gastric and intestinal contents, but are most to be valued for their curative influence upon catarrhal conditions of the mucous membrane. To be serviceable they must be prescribed only in moderate doses, and discontinued as soon as their administration has ceased to be obviously beneficial. In excessive quantity the effect of the remedy upon an empty stomach is to increase the secretion of acid. The stomach at once sets to work to neutralize the alkali, and if called upon day after day to make a similar effort, the continued strain cannot fail to be injurious and must increase the weakness of an already enfeebled organ. If the dose be pushed still further so as to overcome in a great measure the acidity of the gastric secretion, the consequent loss of digestive energy must aggravate the derangement and add to the discomfort which the remedy was intended to allay. When absorbed into the circulation the salts increase the alkalinity of the blood, modify its secretions, and if continued too long become a fruitful source of anaemia and languor. Carried out through the kidneys alkalis reduce or annul the acidity of the urine and are at first beneficial, but in immoderate dose or a too protracted course may give rise to cystitis or even vesical haemorrhage. In some exceptionally susceptible patients an alkali taken several times a day, even in ordinary dose, is capable of producing very undesirable consequences. A girl of 10, lately a patient in a London hospital, was found to suffer from cystitis whenever she began a course of potassium citrate. In this child a dose of 10 grains taken three times a day invariably caused the urine to become opalescent in a few hours and turbid and offensive before the end of the week. Fortunately such susceptibility is not common. It must, however, always be remembered, when prescribing alkalis with the object of influencing the renal secretion, that we may reduce the acidity of the urine without necessarily modifying the faulty condition of the system upon which the excess of acid depends.

Alkalis have a local action both upon the stomach and bowels. In catarrh of the stomach their influence for good is very decided; but this appears to be due not so much to their chemical action upon the gastric contents as to their undoubted influence in restoring the deranged mucous membrane to a normal condition. In certain morbid states of the stomach the secretion of gastric juice is exaggerated. This may be the consequence of mild irritation of the gastric mucous membrane, or of mental emotion, or a too sedentary occupation combined with insufficient exercise. The patients suffer greatly from weight or discomfort at the epigastrium and complain of sour eructations and often of vomiting. The power of alkalis to neutralize in any material degree this excessive secretion has been called in question by many notable observers—Trousseau amongst others—and the relief which these remedies undoubtedly bring is due probably to their local action upon the walls of the

stomach. The effect of alkalis is not, however, limited to this local action, for, when used with judgement, they seem to have the power of influencing the whole system for good and setting up a favourable change, which is not always a merely transitory improvement. We often have occasion to notice the prolonged benefit which follows a course of alkaline waters at one of the many spas both at home and abroad. Acting in this manner, the salts of the alkalis are not so much antacids as alteratives—that is, drugs which, given in modest dose for a period of weeks or months, are able, without producing any immediate or striking change, to correct a morbid condition of an organ or of the whole system, and set up an improvement which, if not permanent, is slow to pass away. But it must be kept in mind that to achieve this result the dose of the alkali must be studiously moderate. It is judicious, when using it thus for its more distant effects, whether upon the urine or elsewhere, to employ the citrate or acetate, for these salts, not being alkaline until they undergo a chemical change in the blood, do not tax the gastric energies or call upon that organ for an increased effort, to which at the time it may be unequal. Still, even with these remedies we must be careful to use them with judgement. Directly they begin to produce signs of anaemia, or earlier if possible, their use should be abandoned. We do no good in chronic ailments by impoverishing the blood, and whenever we prescribe drugs which may have such an effect it is essential to keep a careful eye upon the patient to see that the limits of safety are not overstepped.

In gastric derangements the bicarbonates of soda and potash are favourite remedies and are probably equally efficacious. They should be given in moderate quantities—10 to 20 grains are usually sufficient (for children 5 grains to 10), and it is well, as it adds to their curative value, to combine in each dose a few grains of sodium chloride. I have also found that the tincture of colchicum seeds, in very small doses (2 or 3 minims), is a useful stomachic which in cases of dyspepsia forms an addition to the draught of no little importance. When an alkali is thus prescribed purely for its local action upon the stomach, it should be taken before food, and it is advisable, at any rate after the first few days, to make up the mixture with a freshly-made bitter infusion instead of with water. If, however, the object of our prescription is merely to correct acidity, it should be taken two hours after food, and the bitter is best omitted, as its presence in the draught was held by Dr. Prout materially to reduce the neutralizing properties of the alkali.

If there be great irritability of the stomach, the alkaline draught should be made effervescent with citric acid added at the time of administration, and in such a case the inclusion in the prescription of a minute quantity of antimonial wine increases the sedative effect of the remedy. Thus, 20 grains of sodium bicarbonate with 5 of sodium chloride and one drop of antimonial wine in a bitter infusion may be made effervescent with 16 grains of citric acid. It is best to use a quantity of acid insufficient completely to neutralize the soda, so as to leave the draught slightly alkaline. It should be taken three times a day or oftener before food.

The caustic alkalis—the liquor potassae and liquor sodae—have a more decided sedative action upon the stomach than the bicarbonates; and the liquor potassae given in ten or fifteen drop doses with a few grains of potassium nitrate in a bitter infusion is a remedy of very definite value. The liquor potassae acts well also in combination with other stomachics. In cases of continued dyspepsia with obstinate constipation, sleeplessness, and abdominal pains, I have often found speedy relief and prolonged improvement to follow a draught containing twenty drops of liq. potassae with 1 oz. each of infusion of rhubarb and the compound infusion of gentian, taken regularly for a week or longer every morning before breakfast.

Long courses of alkalis are rarely of service in the management of ordinary flatulent dyspepsia, for although very useful in the early stages there always comes a time when their continued administration ceases to be beneficial. As has been said, their chief value consists in their power of reducing an acute or subacute catarrh of mucous membrane. When this has been done and the gastric lining is left flabby and relaxed, a different kind of medication is required. In the treatment of dyspepsia alkalis

rarely do good if the urine is habitually alkaline, or neutral, or only very slightly acid; also, when the tongue is of good colour and clean, or pale and flabby, with marks at the sides indented by the teeth, these remedies cease at once to be appropriate. The soda salts can be borne for a longer time than the corresponding salts of potash, for the latter are apt to have a depressing effect upon the heart, and may have to be discontinued for that reason. The same disadvantage is shared by all the potash salts, and whenever full doses of the chlorate have to be continued day after day, as in the treatment of ulcerative stomatitis in the child, sodium chlorate, which can be given in large doses without risk, should always be made use of.

In addition to the salts of potash and soda, the heavy carbonate of magnesia and the carbonate of lime are very useful. The former combined with powdered rhubarb is a familiar remedy in every well-ordered nursery, and is invaluable as a preliminary step in the treatment of stomach derangement in the child. For a mild diarrhoea it is better to combine the rhubarb with a few grains of aromatic chalk; for the latter, while in no way interfering with the aperient properties of the rhubarb, heightens its astringent effects. It may be remarked that a teaspoonful of treacle in the draught effectually disguises the nauseous taste of the remedy, and deprives it of its only disadvantage. For infants the dose may be mixed up into a stiff paste with two or three drops of the same sweetener, and smeared by the nurse's finger upon the back of the child's tongue. Given in this way the remedy is not unwelcome to the patient, and runs little risk of being expectorated.

When our object is to neutralize acid in the caecum, the insoluble alkalis are to be made use of, for these are more likely to pass unaltered through the stomach and reach the lower bowel unchanged. The pains often complained of in the lower part of the bowel, caused by local distension with gas temporarily locked up by spasmodic contractions of the intestine, usually yield quickly to the insoluble magnesian salt. The remedy should be combined with a small dose of codeina ($\frac{1}{8}$ to $\frac{1}{4}$ grain) in a draught made stimulating with compound spirits of ammonia and aromatics. In aperient doses these salts produce more irritation of the bowel than is caused by the soluble sulphates of soda and magnesia, and this effect is found to increase by repetition. Trousseau long ago pointed out that when given on successive days the sulphates each time produced less and less effect, while in the case of the insoluble salts the aperient action was more and more marked with each fresh dose of the medicine, and soon led to the passage of mucus, often blood-stained, and evacuated with painful straining.

In addition to their value in derangements of digestion, alkalis are of especial service in the treatment of urinary acidity and the discharge of sand and gravel. It may be the fact, as has been inferred from experiments, that heightening the alkalescence of the blood does not augment its power of delaying or preventing the formation of gouty deposits, but there is no doubt that increasing the alkalescence of urine has a decided effect in preventing the deposition of uric acid from that secretion into the kidney and bladder. As Sir William Roberts has remarked, "it is chemically impossible for uric acid to be deposited from an alkaline urine," and it is a matter of common observation that a course of alkaline waters, such as that of Vichy, prevents the deposition of sand as long as its use is continued, and, in spite of experimental evidence I may add, seems to exercise a restraining influence upon acid formation for a considerable time afterwards. In an alkaline or weakly acid urine the uric acid is converted into a urate, and remains in solution at the temperature of the body. By such means it seems possible—although this has been denied—that small renal calculi may be reduced in size sufficiently to pass through the ureters and be discharged. To effect such a result, however, a long course of the remedy is required. As already stated, the neutral salts should be used for this purpose, especially the citrate of potash, for these salts may be taken in moderate dose for a long time without disadvantage. A favourite remedy for this condition in gouty persons is the carbonate or citrate of lithia, but this salt must be used with caution. Lithia is an alkali which is capable of exercising a poisonous action if given in large doses, and cannot, therefore, be used as an alkalizer of blood or

lymph, as the dose required for such a purpose might have dangerous consequences. It is said also to form an insoluble compound with the triple phosphate of soda and ammonia; and its solvent action upon uric acid, at any rate in the living organism, has been called in question.

The citrate of soda is utilized in the feeding of infants. One of the difficulties met with in fitting an infant with a satisfactory diet is the firm clot formed by the casein of cow's milk in the infant's stomach. This density of clot is explained by Sir A. Wright to be due to a combination of the caseinogen of the milk with calcium salts, and he has recommended the use of soda to replace the calcium in the combination, for the clot thus formed is comparatively loose and easy of digestion. Alkalizing the milk with bicarbonate of soda is an old practice, but it had this disadvantage, that the calcium when displaced was thrown down and lost to the system. By using the citrate of soda the alkali still joins with the caseinogen, displacing the calcium, while the citric acid unites with the latter base, forming a soluble salt which is absorbed into the circulation. The proportion recommended for ordinary use is 1 or 2 grains of the citrate to each ounce of the milk.

The bicarbonate of soda is an alkali which is often taken for a lengthened period in cases of dyspepsia. In a long course of this remedy each dose should be combined with a few grains of sodium chloride, for the latter salt has the property not only of aiding metabolism, but also of increasing the vitality and power of resistance of the red corpuscles. It also counteracts the tendency of the bicarbonate to form uric-acid concretions. But still, even with this safeguard, the protracted use of the carbonated salt is not to be recommended, for such a course must tend to weaken the digestive energy, and lead before long to anaemia and depression. It may, however, be sometimes considered advisable in cases of severe acid dyspepsia to give large doses of bicarbonate of soda for short periods of time on account of the beneficial immediate effects of the remedy. When there is great acidity of stomach towards the end of digestion from acid fermentation of food, 30 or 40 grains, or more, given in one dose about three hours after a meal, will often quickly allay the more distressing symptoms, especially if the draught be made stimulating with compound spirits of ammonia and aromatics. The painful cramps which often afflict the habitual dyspeptic, especially in the night, may be put a stop to by the same remedy taken at bedtime. Much larger doses than these have been recommended by some, and I myself have heard the late Dr. Piorry at the Charité Hospital in Paris recommend 3 to 10 grams (48 to 160 grains) of the bicarbonate to be taken three or four times a day in cases of pyrosis. Such inordinate dosage, however, is quite unnecessary, for this unpleasant symptom is rarely found to resist the action of a few grains (5 to 10) of the compound kino powder given several times a day, as recommended by Sir Thomas Watson. Since the introduction of the salicylate the bicarbonate of soda is now little used in the treatment of acute rheumatism. The two salts are, however, sometimes given together. When the salicylate is prescribed in large doses for the treatment of chorea, the addition of double the quantity of the bicarbonate of soda has been recommended by Dr. D. B. Lees for the purpose of counteracting any depressing effect of the salt, especially the dyspnoea which sometimes follows excessive doses of the drug. The chief objection to this practice is, of course, the profound anaemia which such medication is liable to induce.

In suppression of urine the bicarbonate of soda given in 40-grain or 50-grain doses every four hours will sometimes quickly promote a return of the secretion, especially if the remedy be combined with a drachm of the spirits of nitrous ether; but the suppression of urine which is liable to occur at the end of an attack of enteric fever or scarlatina is most rapidly brought to an end by a copious enema of hot water (100° F.), which the patient should be directed to retain as long as possible.

The alkaline preparations are also useful in cases of acute bronchitis when secretion is viscid and thick and difficult to expel, for the salts of soda and potash have great influence in increasing the fluidity of the mucus and favouring expectoration. The bicarbonate of soda is usually made use of for this purpose, but is inferior in value to liq. potassae, which should always be preferred,

In cases of acute bronchitis with fever, dyspnoea, and failing acidity of urine, Dr. A. Haig recommends bicarbonate of soda to be given in sufficient doses to make the urine alkaline, and states that when this is done the temperature falls, and all the symptoms are quickly relieved. The quantity required is, however, large—20 to 60 grains for a child and 90 to 120 grains for an adult in the twenty-four hours. The remedy must not be given with ammonia, which lessens its neutralizing power, but may be combined with digitalis as a cardiac tonic.

I will not here refer to the action of those special salts of the alkalis—the bromides of sodium, potassium, and ammonium, the lactate, sulphite and hypophosphite of calcium, and other similar combinations whose influence depends not so much upon the base as upon the element with which the base is incorporated—the union creating a new body with very definite therapeutical endowments. These are ordered not for their general action as alkalis but for their specific influence as remedies for the relief of particular complaints. I may, however, refer in conclusion to another use for the bicarbonate of soda which should not be passed over without due recognition. Just as this salt is beneficial in catarrhal conditions of the mucous membrane for its local action, so it is found to have a healing influence when applied to sores and inflamed surfaces of the body as an external application. Alkaline baths are used largely in skin diseases for the relief of irritation; 2 to 10 oz. of the bicarbonate of soda dissolved in an ordinary warm bath has a welcome soothing effect in cases of eczema, psoriasis, urticaria, lichen, and prurigo. The value of the salt as a local application is best seen, however, in the case of ulcerated surfaces and phlegmonous inflammations. A solution of 15 or 20 grains to the ounce of water kept applied to an intractable ulcer will be found to exercise a surprising influence in promoting the healing of the sore. I have seen large superficial ulcers which had resisted all previous measures begin at once to heal under the use of this simple dressing.

In whitlow, after the escape of the pus by incision or otherwise, the bicarbonate of soda solution applied on lint under oiled silk causes the pain and suppuration to disappear with remarkable quickness. It is unnecessary to increase the strength of the solution, for the value of the application does not depend upon any antiseptic action of the salt; indeed, its activity is far greater than that of iodoform or other antiseptic. It is thought that the effect is due to its local influence in raising the alkalinity of the blood, which has been found by Brucker and others to be greatly reduced in cases of febrile reaction set up by bacteriological intoxications. The same treatment is equally useful in cases of burns, scalds, otorrhoea, leucorrhoea, etc., and the value of the solution as a douche to the pharynx in cases of tonsillitis and septic inflammations is recognized by every one. There is one other use for the bicarbonate which should not be omitted: The aching which often comes on suddenly in a decayed tooth from direct irritation of the dental nerve by acid secretions in the mouth can be quickly relieved by washing out the mouth with the solution. The alkali neutralizes the acid and at once puts a stop to the pain.

WE have to congratulate Dr. C. A. Mercier on a somewhat rare honour, the winning of the Swiney Prize. This, so far as the medical profession is concerned, is awarded only once in ten years. The prize itself is a quinquennial award, but goes alternately to members of the legal and medical professions. There is no competition for it, nor do candidates submit their names to the adjudicators. These are the Council of the Society of Arts, and the Royal College of Physicians, who adjudge the prize to whomever in their opinion has made the most valuable contribution to jurisprudence, either medical or legal, during the previous ten years. The prize, which is a sum of 100 guineas and a cup of the same value, was established in 1844 by the late Dr. Swiney, who died in that year, bequeathing £5,000 to the Society of Arts for the purpose indicated. The cup stands about 24 in. high, and is an exceedingly fine piece of silversmith work, the design from which it is quinquennially reproduced having been prepared by the late Mr. David MacIse, R.A. The work of Dr. Mercier, which the adjudicators seem to have had specially in view, was his book entitled *Criminal Responsibility*.

An Address

ON THE

REMEDIAL USE OF ALCOHOL.

DELIVERED BEFORE THE BORDER COUNTIES BRANCH OF THE BRITISH MEDICAL ASSOCIATION,

By JAMES MACDONALD, M.A., M.D.,

CARLISLE; PRESIDENT OF THE BRANCH.

IN bringing the subject of alcohol as a remedial agent before your notice a few introductory words of explanation may be offered as to the reasons which have induced me to select this topic for my Presidential address. For the literature with regard to it is generous in quantity; the theme has been worn threadbare by much previous discussion. It is hardly necessary for me to point out to you that for many years alcohol has occupied a prominent place in the medical man's pharmacopoeia. But recently a powerful crusade has been organized against its use, and the leaders in the movement boldly declare that it either possesses no therapeutic efficacy at all, or that its remedial effects could be equally well produced by other drugs. This is the fact that has mainly determined me to take up the subject of alcohol on the present occasion. In the words that I shall have the honour of addressing to you my principal object will be to point out the position of alcohol in the treatment of disease and the uses to which it may safely be applied, where it undoubtedly acts efficaciously, and where its exhibition may be advantageously withheld. In addition I shall endeavour to give some particulars bearing on its later history.

The use of alcohol in the treatment of disease goes back to remote times. Up to a comparatively recent date it was given more or less empirically. With the growth of physiology a scientific element was introduced into the rationale of its administration. A cursory review of the physiological position with regard to alcohol forms, therefore, a natural basis for the present address. What, shortly, is the influence of alcohol in moderate doses upon the heart and blood vessels, the nervous system, and metabolism?

With regard to the precise action of alcohol on cardiac muscle, opinion varies. Drs. Loeb and Bachem in Germany and Dr. R. E. Dixon in this country assert that in small doses it is capable of directly increasing the activity of heart muscle. On the other hand, it is held that this contention has still to be proved.

It is generally agreed that dilatation of superficial blood vessels follows the use of alcohol through the influence of the drug on the vasomotor nerves. In this way the action of the heart is relieved and its efficiency is increased; but when the question of the blood pressure is considered a difference of opinion arises. Physiologists of various countries insist that the pressure is maintained, owing either to a constriction of the vessels in the interior of the body or to an increase in the output from the heart. Other views on this subject of the blood pressure are held by some clinical observers. The medical evidence recently given by Dr. Ralph Stockman before the Whisky Commission has an interesting bearing upon this point. He conducted a series of experiments on himself and on three other medical men with pot-still whisky, patent-still whisky, brandy, and diluted pure alcohols. In the first place, he found that the results produced on the circulation by whisky and brandy were due to their alcoholic contents and not to the residues or distillates—in other words, the action was essentially that of alcohol. Coming to the point under consideration, he stated in evidence that alcohol, taken under conditions of perfect quietude, did not influence the pulse-rate or blood pressure. Under large doses of the drug the blood pressure falls.

Upon the brain and nervous system alcohol does not act as a stimulant. It has, on the other hand, a depressant effect. And it is this sedative, benumbing action of which the physician makes use. "No one," says Schmiedeberg, "will expect any special advantage from a stimulation of the sensations and of the mental functions in disease. We aim rather, as much as possible, at protecting from every form of excitement those areas which are usually in a state of increased sensitiveness, and consequently