

MARASMUS.

BY

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THE term marasmus is usually accepted as meaning a chronic state of malnutrition of a severe grade and is associated in our minds with a definite clinical picture. If we are to obtain success in the treatment and, what is equally important, in the prophylaxis of this condition, it is necessary to make a critical analysis of its causes and of its evolution.

While our attention will be centred on the severest types, we must retain the conception of cases ranging in severity from those who simply show an insufficient gain or stationary weight with few systemic changes, to the most extreme form which is merely the end-result of repeated nutritional or constitutional disturbances.

CAUSES.

A careful study of the history of these infants is well worth while, for it will usually give some clear indication of the origin of this wasted state, and in practice we may regard the causative factors as falling into four groups:—

1. Improper feeding.
2. Infection—e.g., pyelitis, otitis media, toxæmias of the new-born. Syphilis and tuberculosis may produce this picture, and are mentioned in view of the importance of differentiating these from the more purely nutritional type.
3. Congenital weakness of disease—e.g., prematurity, congenital heart disease.
4. Defective hygiene.

It is obvious that any one of these factors may, to some extent at any rate, be in itself responsible for failure of nutrition. It is much more common, however, to find evidence of a combination of two or more of these. The majority of cases are the result of constitutional weakness, faulty feeding, and poor environment. It is these cases which constitute the "type" of marasmus, as described in books under this term, or as athrepsia, decomposition, infantile atrophy, in which there appears to be essentially a failure of assimilation of the food. I have, however, purposely refrained from such rigid classification in order to emphasise the necessity for a broad outlook, and for realising the part which unhygienic surroundings, feeble constitution, and infection may all play in the ordinary run of these cases in addition to the dietetic element. Since faulty feeding is at the root of the trouble a brief explanation of the nature of these faults will not be amiss. We may at once dismiss those cases that are wasted from

receiving too little food (inanition), as may result from difficulty in suction, from prolonged feeding with insufficient food, or from pyloric stenosis, and turn our attention to those who have been brought up on an improperly balanced diet. The general history of these cases is generally fairly uniform, in that, once they have left the breast, they cease to thrive and steadily lose weight, being given a succession of foods of all kinds in a vain attempt to stay the downhill course. Such infants may or may not have gone through a stage of acute dyspeptic symptoms (flatulence, colic, diarrhoea) before arriving at their present state. Without going into the detail of the exact nature of foods given we may state broadly that the common faults observed are: (1) overfeeding with fat and sugar, alone or in combination; (2) giving starch—e.g., barley-water—too early and in too great quantity; (3) additionally to the above, the food provided is often deficient in protein salts and vitamins which are necessary for proper nutrition. It is possible, too, that in some cases the "buffer" value of food may be a factor in development of malnutrition.

In some instances, as already suggested, the problem of feeding an already feeble child is complicated by the existence of an infection either in the intestine (enteral infection) or else by one elsewhere in the body (parenteral—e.g., otitis, pyelitis, lung infection), which may appear early or late on the scene.

CLINICAL PICTURE.

The clinical picture of marasmic infants is so characteristic that they almost form a "family" group. They wear an old and pinched look; their skin is wrinkled, toneless, and hangs in folds on the extremities. The body is so devoid of fat that the bony points stand out prominently and give the child an old mummified appearance. The abdomen is usually large and its walls are so thinned that outlines of the coils of intestine can be readily seen. The fontanelle is sunken and the eyes are large. Mentally they are very alert and sleep but little, though the bodily movements are slow and infrequent.

The remaining features of these infants may be put briefly:—

(a) The appetite is variable, but is usually very poor; occasionally they are ravenous. Too often, attempts to satisfy hunger result in vomiting.

(b) The temperature is subnormal (96° to 98° F.), an irregular course being the rule.

(c) The weight curve is, in the most severe cases, characteristic. On an insufficient diet it falls slowly and steadily. When attempt is made to satisfy the needs of the body on a more ample diet a steady fall in weight occurs again, but of a rapid kind, often with symptoms of fever, diarrhoea, &c.

(d) The pulse is slow and small. Examination of the blood shows it to be thin and pale, and a count reveals a low hæmoglobin content and a diminished number of red cells.

(e) A striking peculiarity is the rigidity of the muscles, especially of the legs, though in severe cases opisthotonos also develops. This element may be so marked as to cause confusion in diagnosis with posterior basic meningitis.

(f) The stools vary much. They may be loose or constipated or normal to inspection. It is essential to realise that the stools are of secondary importance in diagnosis and treatment, and that it is often dangerous to keep on imposing periods of starvation, by reason of temporary changes in their character, even for the worse, due to alteration of diet.

COMPLICATIONS.

Finally these infants are subject to various complications. Oedema is one of the most frequent, and attention is often called to its presence in the first place by an unexpected gain in weight. It starts in the legs and often becomes generalised. They are particularly prone to infection of all kinds—e.g., in the skin, mouth, and lungs. Otitis media is of common occurrence and is less a complication than a feature of the disease. Pyelitis is also frequent. Purpuric eruptions on the skin are seen in severe cases and are of bad omen. Marantic thrombosis of cerebral sinuses is sometimes observed post mortem, though clinical recognition of this is difficult.

PROGNOSIS.

The prognosis in the extreme cases is not hopeful, most of them succumbing to broncho-pneumonia or acute intestinal indigestion. Some die suddenly of syncope or apnœa. In general, the chance of recovery depends on (a) the extent to which the body-weight has been reduced; (b) the age of the patient—the younger the age the greater the mortality; (c) the nature of the dietetic treatment, human milk in many cases affording the only hope of saving life; (d) the powers of resisting infection.

TREATMENT.

This is a difficult matter. The marasmic child has been depleted of its stored supply of fat and glycogen, and its tissues generally have been starved, while the digestive secretions have become impaired. We are faced, then, with the problem of feeding a child whose caloric needs are greater than those of a normal child, yet who is unable either to digest even a food of average strength or to tolerate a large bulk. Hence to attain success we must, by some means, supply a concentrated food, of small bulk and of proper balance as regards ingredients, which is at the same time easily digestible. That no one food has any specific virtue is demonstrated by the fact that so many varieties of food have been advocated for these infants and none of them proved uniformly successful. In considering dietetic measures, I do not propose to describe in detail all the foods that have been tried but merely to lay down what, in my view, seem to be the principles that should underlie the choice of a suitable diet.

Firstly, breast-milk is, of course, theoretically the best food, and an attempt should always be made to procure this. Unfortunately in practice even this fails in many cases. Nevertheless this should be the first choice. When available, care must be taken to feed with small amounts at first.

In artificial feeding we encounter the danger of prolonged starvation on the one hand and that of over-feeding on the other, and it needs the very nicest adjustment of the ingredients and quantity of food if we are to prevent the baby lapsing into the desperate condition which either of these two mistakes may occasion.

In the choice of food we may accept the following principles: (1) That fat is poorly digested and therefore best kept low if prescribed in ordinary mixtures. (2) That it is desirable to feed with as much carbohydrate as possible. If the tolerance for sugar is diminished in addition to that for fat, it makes the case a very difficult one to deal with. (3) That protein is better digested than the other food elements, and it has therefore been customary to rely on a high protein diet in these cases.

In applying these principles various combinations may be employed—e.g. (a) skimmed milk (fresh or dry), and sugar added as dextrimaltose alone or this in combination with lactose or cane-sugar. (b) Whey with added Benger or Savory and Moore's food, slowly replacing the whey by milk. (c) If it is thought advisable at a later stage to try some fat in the mixture, fresh milk and water mixtures, equal parts, or half-cream Cow and Gate Dried Milk with added dextrimaltose, may be prescribed. Of late years attempts have been made to try and improve the methods of feeding these children by giving a more ample diet and including more fat, for it is known that the marasmic child requires in reality as much fat and protein per pound of body-weight as does the normal child, and in addition an extra amount of carbohydrate to make up caloric value. I think it may be said that some good has come out of these researches, and the following statements epitomise the most valuable suggestions for framing an increased diet: (a) Prolonged cooking of milk (at least one hour) seems to increase its digestibility. (b) A mixture of carbohydrates, even containing flour, is better digested than one simple carbohydrate. (Cooked starch and sugar has been used with success. (c) Acidification of milk improves its digestibility. Addition of cultures of lactic acid or commercial lactic acid has been tried with success, and has allowed of feeding with concentrated whole milk mixtures which would not be tolerated without such addition in these feeble subjects.

Examples of diets including these principles are:—

1. Protein milk, with added dextrimaltose (Mead's or Mellin's food).
2. Butter-flour mixtures. These are prepared by heating butter over a flame, adding wheat flour and heating till browned, then mixing with sugar and water to a desired solution. This solution is

then diluted with milk and water. The average composition of this preparation is fat 5.8, carbohydrates 9, protein 2.2.

3. Acid milks. The simplest method is to prescribe, in the first place, skimmed milk with added lactic acid and dextrimaltose. The lactic acid should be inserted drop by drop, stirring vigorously, until one drachm has been added to a pint of milk. Gradually whole milk will replace the skimmed variety, and it is surprising how well this is often tolerated, even with the continued addition of dextrimaltose.

Such are some of the methods in vogue for dieting these children, and while in milder cases simple modification of feeds, especially in relation to fat, will be sufficient, in the severe cases treatment is so difficult that any form of feeding that promises success, as do some of these to which we have referred, is worthy of a trial.

Apart from the dietetic needs, the general care of these infants is important. They must be kept warm and every possible means adopted to improve their circulation, by hot bottles, massage, daily hot baths (often advantageously with mustard), and by

ensuring that they are moved frequently. They need individual nursing attention more than any other type of sick child, and it is highly important to guard them from infection of all kinds.

In some cases transfusion of 30 to 60 c.cm. of blood, repeated three or four times, does good. It may tide the child over a dangerous period till the appetite returns and the powers of assimilation have improved.

CONCLUSION.

In conclusion, I think that the chief lessons which we may learn from a study of this subject, when considered from the aspect of prophylaxis are, firstly, the prime importance of breast-feeding, especially for premature and feeble babies; secondly, the need of recognising failures of digestion at an early stage and of correcting improperly balanced diets; thirdly, the value of good hygiene, with its tendency to promote healthy nutrition and to lessen the liability to infection. If these dicta were more commonly borne in mind, the number of babies who decline into the deplorable state of marasmus would be considerably less.

EDITORIAL NOTES

WE commend to our readers the lecture by Colonel FREMANTLE printed in the present issue. Good health is a pleasant and happy condition for the individual, but, as the author insists, good health in the mass is necessary for the community. It is only of late years that this has been appreciated; indeed, many now hardly seem aware of this truth. Sir WILLIAM PROUT made a similar plea in his Presidential Address delivered last November before the Tropical Diseases Section of the Royal Society of Medicine.

He told us that during a recent year in one West African colony the European officials collectively spent 6115 days on the sick list. What a terrible loss of efficiency, and on mere business grounds how important for the State to improve, in that colony, the conditions which should lead to better general health. His address is full of similar examples, but happily he is able to give instances in which, by appropriate sanitary measures, devastating diseases have been stamped out almost entirely. But the battle is not yet won in any country, and doctors should remind politicians, in season and out of season, that efficiency depends upon health. A large sick population is, in one way and another, as expensive for the State as armies in a war.

Sir WILLIAM PROUT makes the following quotation from a report, issued in 1921-22, by Lord IRWIN, the present Viceroy of India, who was then Under Secretary of State for the Colonies. He says:—

“The essential preliminary of development must, as I have shown, be a vigorous tackling of the problem of improving the health and sanitary conditions in the colony The high mortality is preventable, and is

mainly due to the unsatisfactory sanitary conditions under which the population lives On these vital matters public opinion, without which all Government and municipal efforts must be greatly hampered, is uneducated and uninformed. An extraordinary apathy prevails towards proposals for improving conditions I place the improvement of public health . . . first in order of priority in matters in which the Government can help.”

It is comforting to recollect that in the present Minister of Health we possess one who, like his father as Colonial Secretary before him, thinks on these things.

It may be of interest to mention that as a result of the propaganda efforts now being made by the Fellowship of Medicine gratifying results are accruing. Last February a poster displaying the activities of the Fellowship of Medicine, a memorandum briefly outlining its aim and objects and method of procedure, accompanied by a list of the special courses for 1926, were sent to the Deans of the universities, hospitals, and other medical institutions in the United Kingdom, abroad, and overseas, who, it was thought, might be interested in post-graduate education in London. Several of the Deans of the universities and hospitals in Canada and the United States have replied already stating that they will be pleased to make known the work of the Fellowship. There has, of course, not yet been time to hear from the Dominions of Australia, New Zealand, and South Africa, and other countries such as South America, China, &c.

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In addition, advertisements are now appearing in the *Australian Medical Journal*, *Canadian Medical Journal*, *Indian Medical Gazette*, and *South African Medical Record*, and already the results of this new activity are becoming evident, as applications are being received daily at headquarters from intending