

ON MILK-INDIGESTION IN YOUNG CHILDREN.

By EUSTACE SMITH, M.D., F.R.C.P.,

Physician to His Majesty the King of the Belgians; Physician to the East London Children's Hospital, and to the Victoria Park Hospital for Diseases of the Chest.

CHILDREN who are brought up, in the usual way, upon milk and milky foods may suddenly begin to exhibit symptoms of indigestion, which renders an immediate change in their diet indispensable, if serious consequences are to be avoided. In hand-fed babies, this unfortunate accident is common enough, and the mortality amongst such infants may be in a great measure attributed to it. The same thing may occur, however, in children who have been weaned at the usual age; and it is therefore sometimes met with in young children twelve or eighteen months old.

These symptoms are due, in the majority of cases, to an inability to digest cow's milk. Usually, the inability is merely a temporary infirmity, arising from some casual derangement of the stomach and bowels, which induces an acid change in the food. In such cases, milk quickly undergoes fermentation in the child's stomach, and an acid is formed which irritates the delicate mucous membrane, and increases the disturbance of the digestive organs. Severe symptoms are often the consequence of this indigestion; so that, unless prompt measures be taken to avert the danger, the child's life may be sacrificed. In other and less common cases, the fault is in the milk, which is too heavy for a child whose digestive organs are sound and healthy. Thus, infants who are weaned when very young, often find cow's milk to be beyond their powers of digestion; and, unless special precautions be taken to adapt it to their immature organs,* serious consequences may ensue. Other causes may make cow's milk appear to be indigestible. Thus, the child may be actually overfed, its meals being too large or too frequently repeated; or, again, the feeding apparatus may have been neglected, so that fresh milk put into a dirty, sour bottle may have begun to ferment before the child swallows it. These causes may, however, be put on one side. The kind of milk-indigestion now spoken of is that in which, for whatever reason, a perfectly pure fresh milk, given in suitable quantities, and with all possible precautions to make it digestible, is found to disagree. In such cases, the child begins very quickly to waste and to show all the signs of defective nutrition. The general symptoms may be divided into three classes, according as to whether the prominent feature is constipation, vomiting, or diarrhoea.

Cases where *constipation* is a marked symptom are generally found amongst young infants. The child is restless, and begins to be feverish at night. His tongue is coated with a thick white fur. He is evidently in a state of great discomfort: for his temper is peevish and fretful, his movements are uneasy and jerking, and he occasionally breaks out into piercing cries, drawing up his knees and twisting about his body under the influence of abdominal pain. At night, the griping is especially violent: the child scarcely sleeps at all; or, if he be quiet for a moment in uneasy sleep, he soon starts up again screaming with a fresh attack of pain. The motions are scanty and rare. The bowels sometimes remain confined for twenty-four hours or longer; and, when they are at last relieved, hard clay-coloured balls, stained with green mucus, are expelled with great effort and straining. These balls consist of masses of hard curd.

A full dose of castor-oil, which clears away the curd, allays the symptoms for a time; but usually, if the milk-diet be continued without any change, they return in a day or two, and the child is in the same distress as before. Violent convulsions may be induced by this cause, and the child's life be put in actual peril.

It is usually in cases of artificial feeding that these symptoms are found; but sometimes, although rarely, we see them in children who are nursed at the breast. When the indigestion is due to catarrh of the stomach, it is readily amenable to treatment. All that is necessary is to put a stop to the milk for a day or two, and to clear away undigested curd by a full dose of castor-oil. If, however, the fault be in the milk, and not in the digestive organs of the child, some change in the method of feeding is indispensable.

A curious instance of this difficulty in digesting curd in a child fed solely by the breast came under my notice some time ago. I was asked

* The chief obstacle to the digestion of cow's milk by young babies is the firmness of the clot formed by its coagulated curd. Mere dilution with water does not affect this property. Under the influence of the gastric juice, the casein runs together into a solid dense lump. To obviate this difficulty, we must either separate the particles of curd by adding barley-water or gelatine to the milk, so that the casein may be forced to coagulate in a multitude of little clots; or we must partially neutralise the gastric juice by the addition of lime-water.

by a gentleman to go and see his child, a little boy of seven months old. I found that the child had been suffering for some weeks from severe abdominal pains. He was excessively peevish and fretful, and at night would wake up with a scream and twist about his body, evidently under the influence of severe griping pain. His bowels were very confined, and the motions consisted almost entirely of curd. He was taking nothing but the breast. Aperients had been found to relieve the child for a time, but the symptoms always returned when the effect of the purgative had passed away. Whenever the breast was stopped for a few days, he immediately improved, but relapsed as soon as suckling was resumed. The child was evidently suffering from his inability to digest the curd of his mother's milk; and it became a matter of the greatest importance to enable him to do so, otherwise he would have to be weaned and fed in a different way. The mother had herself, by taking saline and other medicines, and by making many modifications in her diet, under medical advice, endeavoured to alter the quality of her milk, but without success. Several methods of remedying the evil were tried. The intervals between the times of suckling were increased, so as to give a longer period for digestion; but this change had no effect whatever. Alternate meals of barley-water were then given from a feeding-bottle. By this means, the quantity of milk taken by the child in the course of the day was diminished, and the interval between the times of taking the breast was still further increased. No improvement, however, followed the alteration. The griping pains still continued; and the constant fretfulness of the child was most distressing to his mother. The plan was at last adopted of giving the child barley-water, from a bottle, immediately before he took the breast, in the hope that, by this means, the milk might be diluted directly it reached the stomach. This method succeeded perfectly; and the child had no further unpleasant symptoms. In this instance, the infant's stomach was in a perfectly healthy state. The fault lay in the mother's milk, which was too heavy for the child's powers of digestion. Should this happen in the case of a wet-nurse, the nurse must be changed, or the child be weaned and brought up by hand.

In the large majority of cases of milk-indigestion in infants reared at the breast, the fault is in the digestive organs of the child; an attack of gastric catarrh having rendered him for the time incapable of digesting his mother's milk. In these cases, the indigestion is a temporary failing, and is easily remedied by suitable treatment. Without judicious management, the derangement may be prolonged indefinitely; and it not unfrequently happens that the mother is ordered to wean her baby under the mistaken notion that her milk is unfit for its support.

In cases of gastric catarrh, where the complaint is acute and severe, *vomiting* is usually the most prominent symptom. Under such circumstances, milk becomes a positive poison; and no hope of alleviating the symptoms can be entertained while this diet is persisted with. A short time ago, I was asked to see an infant two months old, whom I found suffering from acute gastric catarrh, and in a state of great exhaustion. She had been brought up by hand, and was being fed upon milk and barley-water in equal proportions. This she vomited as soon as it had been swallowed, bringing it up curdled, and intensely acid. There was a sour smell from the breath, and, although the disease had only lasted a few days, the eyes were hollow, the face looked pinched, the fontanelle was deeply depressed, and she lay motionless on the nurse's lap with her eyes half closed. Her hands and feet were cold to the touch, and looked purple. For a day or two, her bowels had been much relaxed. She was taking small doses of lead and opium, to check the diarrhoea, but each dose was returned almost immediately. The child was ordered to be kept warm, and perfectly quiet. A weak mustard-poultice was applied for an hour to the epigastrium. The milk was stopped, and the child was fed with weak veal broth and thin barley-water, mixed together in equal proportions, and given cold, at intervals, with a teaspoon. A few drops of brandy were given occasionally, as seemed desirable. As a result of this treatment, the vomiting stopped at once, and the child, when seen three days afterwards, was found to be much improved. The breath had lost its sour smell; the face was no longer pinched; the eyes were not hollow; the fontanelle was not depressed; and, when asleep, the child closed her eyelids. The motions were still rather watery, although the number was natural. The medicine and diet were continued a few days longer, and the child was soon well. The most important part of the treatment in this case was the substitution of veal broth for milk. Directly the supply of fermentable matter was stopped, fermentation ceased, acid was no longer formed, and the digestive organs returned to a healthy condition. Here the derangement was acute. In the following case, the complaint was chronic, the inability to digest cow's milk having extended over a lengthened period.

A little girl ten months old, with four teeth, very thin and weakly-

looking, had been weaned at the age of eight months. Since that time, she had been unable to digest milk, vomiting it at once whenever it was given to her. For nearly two months, therefore, she had been fed on two dessertspoonfuls of farinaceous food, made with water into a thick cream, and given every two hours with a spoon. She refused to take it from a bottle. Twice a day the food was made with beef-tea instead of with water. After a meal, the child often vomited, but, when this happened, she was immediately fed again. The result of such a diet was to be expected. The child, although ten months old, was exceedingly weak, and could not sit up. She was becoming rapidly thinner. She slept very little, whining and crying the greater part of the night. She was said to show no signs of abdominal pain; but the bowels acted three times a day, and the motions were relaxed, and horribly offensive. The feet were almost always cold.

Gastric and intestinal disorders in children often date from the time of weaning: partly because at this time they are apt to be largely overfed with farinaceous foods (and it may be remarked that the phrase "food for infants", with which many farinaceous powders are labelled, has been the cause of very widespread mortality); partly because the change from human to cow's milk is often made abruptly, and with little care to make the new diet a digestible one. The heavy curd of cow's milk is often difficult of digestion, even by children ten or twelve months old, who have been accustomed only to the breast; and, unless measures be adopted to hinder the firm clotting of the casein, serious dangers may arise. Whatever may have been the cause of the disturbance in the case above narrated, a catarrh of the stomach had been set up which made the child incapable of digesting cow's milk; and the diet adopted as a substitute was one admirably devised for keeping up the derangement. Such a case, which is far from being an uncommon one, is readily treated, however severe may be the vomiting, by restricting the diet to equal parts of weak veal broth and thin barley-water, given cold in small quantities at a time; by warmth to the belly and extremities; by perfect quiet; and by suitable remedies. The best sedative is liquor arsenicalis—half a drop for the dose—given with a few grains of bicarbonate of soda in some aromatic water. After a few days of such treatment, the power of digesting milk usually returns. But at first it should be given sparingly, freely diluted with barley-water, and only once or twice in the day.

Looseness of the bowels is a common consequence of milk-indigestion. The stools are not at first watery: for a time, the motions are semi-solid, and have the colour and consistence of soft putty. They may have a faint sour unpleasant smell, but are not necessarily very offensive. Occasionally, the stools are streaked with green mucus, and sometimes with blood, on account of the straining exercised during their expulsion. This condition of the bowels is accompanied by gradual loss of flesh. The child becomes at first flabby, then obviously wasted. If proper treatment be not resorted to, the case becomes one of obstinate chronic diarrhoea, or else the child, in its weakly state, falls an easy victim to some intercurrent disease.

Such cases in the early stage—before a regular diarrhoea is established—are often spoken of as cases of "inactive liver"; the white stools being supposed to be merely the result of insufficient biliary secretion. Chologogues are, however, in such cases quite useless. A dose of grey powder produces, perhaps, one dark stool, but afterwards the motions are of the same character as before. They are white, because they consist of curd mixed with the farinaceous matter, which is usually given in large quantities at the same time; and their character can only be improved by a complete change of diet. When a chronic diarrhoea is regularly established, the cases are often called "consumption of the bowels". It is needless to say that they have no relation at all to "consumption", but are a purely functional derangement—a chronic catarrh of the bowels, excited and maintained by undigested food. The *post mortem* appearances, except for the wasting of all the tissues, differ very little from those of health; but, in long-standing cases, we may find ulceration of the bowels. There is, however, no sign of grey tubercle.

Some years ago, I saw in the country a little girl, aged 14 months, who had been losing flesh gradually for two months. Her friends were in a state of great anxiety about her, as her father had died of consumption. The disease had begun with feverish symptoms and relaxed bowels, and the motions had never since been healthy. During the greater part of her illness, she had been fed with milk and sago—the latter in large quantities; but, for a fortnight before my visit, she had taken nothing but pure milk, fresh from the cow. This change in the diet had, however, produced no alteration in the symptoms. I found the child very flabby and pale, although, to the eye, not very thin. Her face, when quiet, was placid-looking. She perspired freely about the head and neck. Her fontanelle was of medium size, and not depressed. She had no teeth, and the gums were not at all full. The tongue was

rather dry and drab-coloured, with a little fur at the back. The abdomen was soft and rather full—not at all tender. The liver and spleen were of natural size, and no enlarged mesenteric glands could be felt. The child had not yet begun to walk when her illness began. Her joints were inclined to be large. The skin generally was harsh, but there was no loss of elasticity. Temperature in rectum 98°. She had a cough, and a little dry and coarse bubbling rhonchus was heard about the back. The bowels were open four times a-day. The motions were large, of the colour of putty and consistence of soft paste, without offensive smell. The child appeared to have no pain, and, although rather fretful, was not very troublesome.

In this case, there was evidently a certain amount of rickets present, shown by the profuse sweating of the head; the tendency to enlargement of the joints; the absence of teeth (at fourteen months); and the weakness of the lower extremities. The temperature, which was only 98° in the rectum (at about 3 o'clock P.M.), was almost sufficient by itself to exclude the notion of tuberculosis; but, besides this, the absence of any pinched look in the face, and the elasticity of the skin—for in tuberculosis the loss of elasticity of the skin is a marked symptom—enabled me to allay the chief anxiety of the mother. The case was evidently one of the class I am describing. The child, owing to a little intestinal catarrh, had a very limited power of digesting milk. The treatment was therefore obvious. Milk was almost entirely excluded from the diet, and the child was fed instead with whey and cream, veal-broth and barley-water, yolk of egg, and "Mellin's food" dissolved in barley-water. She took at first an alkaline solution of iron, with half a drop of liquor arsenicalis, in each dose. This was afterwards changed to quinine, dissolved in iron wine, and cod-liver oil; and it was not long before the child was convalescent.

In all cases of functional derangement in children, the tendency is to recovery, if nature be allowed her way. This is especially true of derangements affecting the alimentary canal. If the irritant, whatever it may be, which is the cause of the disturbance be removed, the organs quickly resume the normal exercise of their functions. Unfortunately, well-meant efforts to relieve the distress are often themselves the cause of its continuance. The child is weakly and wasting, therefore he requires nourishment; but the utmost care must be exercised in selecting the kind of food to be given. To continue the supply of fermentable material, when the stomach and bowels are already filled with the products of fermentation, is a certain way of hindering the child's restoration to health. If, on the contrary, we cut off the supply of fermentable matter, unless the strength be too much reduced, recovery follows as a natural consequence. In such cases, milk and the ordinary farinaceous foods must for a time be withdrawn from the diet. The best substitutes are those which have been mentioned—viz., weak veal-broth and barley-water, in equal proportions; cream and whey—a dessertspoonful to four ounces; yolk of egg (beaten up, in the case of infants, with whey or veal-broth); and Mellin's food for infants, dissolved in barley-water, or in equal parts of this and whey. Veal-broth or chicken-broth is better than beef-tea, for the latter is often irritating to the digestive organs of young children, especially if there be any diarrhoea.

Sometimes, when cow's milk cannot be digested, ass's or goat's milk is more successful; and, sometimes, a child, much reduced by digestive disturbance dependent upon an unsuitable dietary, at once recovers when put again to the breast. More often, however, milk of any kind seems to act as an irritant poison; and no hope of relief can be entertained until it is excluded from the diet.

QUEEN'S COLLEGE, CORK.—The following have been awarded prizes at the sessional examinations:—Fourth Year: *Practice of Medicine*: Havelock H. Charles and Daniel Lynch (equal); Patrick F. Grimes and D. M. Saunders (equal).—*Medical Jurisprudence*: Havelock H. Charles, Patrick F. Grimes, F. Dilworth. Third Year: *Physiology*: T. J. Crowley, William E. Hadden, Frederick E. Adams.—*Anatomy*: T. J. Crowley, William E. Hadden, George A. Rountree.—*Surgery*: T. J. Crowley, William E. Hadden.—*Midwifery*: T. J. Crowley, William E. Hadden (equal), Frederick E. Adams. Second Year: *Physiology*: William Barter, J. H. Swanton, Samuel F. Freyer.—*Anatomy*: J. H. Swanton, William Barter, John Bolster, Samuel F. Freyer.—*Materia Medica*: B. Mangan, William O'Keefe (equal); Richard E. Kelly.—*Practical Chemistry*: Benjamin Hosford, Daniel Lynch, Samuel F. Freyer, Wm. Barter, Richard E. Kelly, James Musgrave. The exhibition in Practical Surgery has been awarded to Havelock H. Charles.

ST. THOMAS'S HOSPITAL.—The following appointments have been made. *Assistant House-Physicians*: Senior, C. A. Ballance, L.R.C.P., M.R.C.S., L.S.A.; Junior, M. P. M. Collier, M.R.C.S., L.S.A. *Assistant House-Surgeon*, S. W. Sutton, L.R.C.P., M.R.C.S. *Resident Accoucheur*, W. F. Haslam, M.R.C.S., L.S.A.