The groups into which the cases of asthma fall and the corresponding results of treatment were indicated in my last paper. The formula published in the *BRITISH MEDICAL JOURNAL* (July 20th, 1918) has stood the test of time, and by means of it the asthma types in Group I, and many cases of migraine and epilepsy, have yielded, sometimes very quickly. In asthma the relief may last for years, especially in children, and possibly for a lifetime. The formula has also been successfully applied in cases of hay fever, in skin affections associated with asthma, and cyclic gastro-intestinal attacks. In the latter disorder, peptone taken by mouth may give relief, possibly in virtue of a direct action on the sensitized cells. The peptones recommended were Armour's No. 2 (5 per cent.), and Witte's (2 per cent.). The Witte peptone, however, contains too much primary proteose in relation to secondary (according to Dr. R. H. Plimmer, roughly as 1 to 2). The proportion in the Armour peptone is (same authority) as 1 to 7. Therefore, either a 5 per cent. solution of the No. 2 may be used, or else a 5 per cent. solution of a mixture which contains 3 parts of Witte's peptone and 5 parts of a peptone practically devoid of primary proteose, as may be physiologically suitable. The No. 2 peptone has been found very satisfactory for ordinary use, and can be used intramuscularly without causing irritation, but it varies in acidity and solubility. "Peptone siccum" (Armour) is a finer product, but requires the addition of some primary proteose (3 parts to 1 Witte's). When freshly prepared, the solutions are rather more active. To prepare the solution proceed as follows:

Dissolve the peptone or the mixed peptones as far as possible by agitation in hot (56° C.) normal saline. Take the reaction to litmus (usually acid), and add *very carefully* normal or semi-normal sodium hydrate or carbonate, until the solution is faintly yet distinctly alkaline to litmus. The peptone will now be dissolved, except for some insoluble residue. Make up to volume with normal saline, and place in a water bath at 56° C. for half an hour. Filter while hot through ordinary filter paper, and add to the filtrate 0.5 per cent. phenol. If bottled, sealed rubber caps or well-fitting glass stoppers or rubber stoppers should be used. Wait for three days and then smear a loopful of the fluid over an agar slant and incubate for sixteen hours at 37° C. If the result is negative the peptone may be passed for use.

The solution, as above prepared, may be used in a 5 per cent. strength intravenously (or in a 7.5 per cent. strength intramuscularly) in the following dosage: The initial dose is 0.3 c.cm. (5m), and is increased every third or fourth day (twice weekly) by 0.2 c.cm. until 1.3 c.cm. (20m) is reached at the sixth injection. Continue at this dosage for six more injections. Give intravenously as a rule in adults, very slowly delivered.

Now this formula was adjusted to the average case. It is impossible to tell what modifications may be required until the case is under treatment and the history and symptoms are before one. But in any event there are some guiding principles common to all. The aim is to avoid reaction at first while getting close to the reaction point or threshold. The best and most enduring results are obtained in cases which get well from non-reactive doses. The rule, therefore, should be observed of recording the temperature 5 to 6 hours after each injection. Should there be a rise of over 1° F., the subsequent dose is not to be increased. On the other hand, the dosage may be too small, and if after eight injections no satisfactory improvement is made, and if there has been no rise of temperature, a test dose should be given—that is, one which we know will give a mild or moderate reaction (100° to 101° F.). This mild reaction does no harm at this stage, and in some cases, especially if tedious, gentle reactions are beneficial towards the end of the treatment. A reliable indication of the correct dosage is frequently an improvement in the general health and in a sense of well-being. The adjustment of the dose to the particular case is very essential, and in view of the variable character of some kinds of peptone on the market I always have them physiologically tested before use.

Reference now may briefly be made to the resistant cases. They are sometimes very puzzling, as they may present no obvious differences to some of those which yield, but there is usually a stronger inheritance. Then there are the cases which are handicapped by deterrent or incurable accompaniments. Unless the asthma is practically continuous or there is much bronchitis and emphysema, or some permanent constitutional breakdown from infection or senility, much can be accomplished by various

modifications in the treatment, including the peptone itself, the dosage, the reaction, and the duration. Each case is largely a law unto itself, and though it is impossible to particularize, a few leading indications may be set out. As regards the peptone itself, that in use has been made exclusively from meat or blood fibrin. Lately I have been using, in addition, proteose-peptones* made from phospho-proteins, albumins, and certain vegetable seeds. In all of them the amino-acids possessing the benzene nucleus were well represented. As our food is largely vegetable, and as sensitization is more in evidence in this relation, it seemed feasible that vegetable peptone might find some new point of attack or open valence. For, although there is no *essential* difference between animal and vegetable proteins, yet they differ widely in structure and in their reactions to heat and reagents, and no doubt the earlier products of their hydrolysis also present well-marked differences. This peptone I have employed either alone or in combination with one of the animal kinds—compound peptone. These new peptones give promise of most valuable assistance.

In regard to the dosage, in some cases the sensitiveness to peptone is such that even small doses seem to augment the symptoms. The addition of a few drops of Lugol's iodine will obviate this, as the iodine enters into chemical union with a certain fraction of the peptone molecule, without otherwise affecting its value. It may be omitted as toleration becomes established. When, on the other hand, the peptone is well borne, it may be pushed, and though attacks occur for a time, the ultimate result may be quite satisfactory. It may be necessary to continue treatment for nearly three months, and during the latter period the peptone may be given at rather longer intervals and so as to produce some reaction, which, however, should always be mild. A strong reaction upsets the immunization by rendering subsequent smaller doses ineffective, at least for a considerable time. These are a few amongst other considerations which have to be borne in mind.

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THE DIAGNOSIS AND TREATMENT OF GASTROPTOSIS.

BY

JOHN F. HALL-EDWARDS, MAJOR (LATE R.A.M.C.),

L.R.C.P. EDIN., D.M.R. & E. CANTAB., F.R.S. EDIN.,

LATE MEDICAL OFFICER IN CHARGE X-RAY DEPARTMENT, GENERAL HOSPITAL, BIRMINGHAM.

DURING the last few years I have had ample opportunity of studying dropped and dilated stomachs; my experience has convinced me that the existence of gastroptosis is far more common than is usually supposed, and that it is frequently overlooked.

Until the introduction of the x-ray method of examination the condition could not be diagnosed with certainty by any method then at our command.

In the ordinary abdominal examination, which is usually made with the patient lying down, the condition might not be diagnosed, although present. Even with x-ray examination, unless the patient be standing during the examination it might easily be overlooked, for the stomach not infrequently drops to a remarkably low level when the patient assumes the upright position. As a matter of fact, it is only since the introduction of the opaque meal that we have been in a position to describe the true shape of the organ or the position which it normally occupies in the abdomen.

There can be little doubt that in the majority of cases of pure gastroptosis (that is to say of cases in which there is no radioscopic or clinical evidence of stenosis at the pylorus or in the duodenum) the condition starts at or

FIG. 1.—Rest for raising foot of bed. It can be adjusted to heights varying from 8 to 11 inches.

* For certain of these I am much indebted to Messrs. Allen and Hanburys.

about the age of puberty, when the stomach commences to change from the infantile shape to the tubal form, which is found in adult life, and I venture to suggest that when severe gastric symptoms manifest themselves about this age an x-ray examination of the stomach is essential, and that if proper treatment were adopted at this period a cure might be effected.

The early symptoms of gastropotosis are not sufficiently characteristic to allow of a clinical diagnosis being made without x-ray examination, and, as a rule, much valuable time is wasted in applying the routine methods of treating dyspepsia, which may or may not relieve some of the symptoms, but which are ineffective in bringing about a cure.

Most of the symptoms ascribed to movable and dropped kidney are due to gastropotosis and not to the position of the kidneys, notwithstanding the fact that it has been stated by writers on movable kidney that this latter condition is a common cause of dyspepsia, dilatation and ulceration of the stomach.

Dr. C. W. Suckling, in his book on movable kidney, states: "I have met with two cases of fatal mucous colitis, due to movable kidney. The kidneys are attached to the colon, and when one or both fall, the colon is kinked, constipation or diarrhoea, and in some cases mucous colitis, results, which may end in perforation of the bowels and death.

"I have seen two elderly women who had suffered from movable right kidney for many years die from vomiting and haematemesis caused by the kidney becoming fixed or impacted just under the right costal arch, and causing pyloric obstruction."

In every case in which dropped kidney can be diagnosed with certainty, gastropotosis in some degree will be found to be present, and it is a debatable question as to which condition started first. Writers on the subject of dropped kidney, being aware of the fact that the kidneys can be fixed by operation have over-estimated the importance of this procedure to the exclusion of other methods of treatment which may secure relief for the suffering patient.

Gastropotosis is not infrequently found in girls from 12 to 14 years of age; it is far more common in women than in men, and is in all probability in many cases due to the wearing of badly fitting corsets, and to the suspension of heavy skirts from the waist.

Writers on dropped kidney hold that gastropotosis is due to movable right kidney dragging on the duodenum and on the upper part of the ascending colon, to both of which it is attached. Hundreds of cases of dropped kidney have been treated by means of belts or operated upon without any relief of the symptoms, and in some instances the symptoms have become worse.

A lady consulted me a few months ago suffering with severe gastric disturbances, with very evil-smelling eructations. Both her kidneys had been stitched up some years back, and at the time of visiting me she was wearing a kidney belt. X-ray examination after a barium meal showed the greater curvature of the stomach in the pelvis, nearly 4 in. below a line drawn from one iliac crest to the other. She was rigidly dieting herself, but obtained no relief from her symptoms. I treated her in the way I shall describe later, and in three months' time she had

gained over a stone in weight and could attend to her duties with greater ease than had been possible to her during the past ten years. In this case the kidney belt was actually keeping the stomach down.

The normal stomach in the upright position is a long tube the shape of the letter J—it is placed almost entirely to the left of the middle line, and the greater curvature reaches to just above or below a line drawn from one iliac crest to the other. I use this line in all my

measurements rather than the umbilicus, which in many cases is exceedingly movable. The shape of even a normal stomach differs within certain well-recognized limits—should the normal stomach be over-filled, the increase in size is obtained by lateral expansion, and not by any noticeable amount of lengthening. It has been suggested that the shape of the stomach after an opaque meal does not represent the normal, but this statement can easily be proved by experiment to be incorrect.

Gastropotosis, as a rule, first manifests itself between the

ages of 14 and 30, although it may be found to be present in quite elderly people. As a rule the patients are thin, and complain of a variety of gastric disturbances. One of the most common symptoms complained of is flatulence, although x-ray examination on frequently shows only a very small amount of gas present; in some cases the descending colon is found to be much distended with gas.

Many of the sufferers complain of always being hungry, and occasionally

large quantities of food are taken notwithstanding that the patients are continually losing in weight. They sometimes complain of pain, but generally of discomfort in the epigastrium and frequently of distressing palpitation. The women are markedly neurotic, and as a rule are unable to perform their household or other duties properly. In some cases they complain of a dragging sensation, with pain low down in the pelvis. Chronic constipation most commonly accompanies the condition; but in a few cases, especially in those where the stomach is much dilated as well as dropped, diarrhoea is a distressing symptom.

Gastropotosis in men is rarely so marked as in women, although the symptoms may be as bad. The worst case

FIG. 2.—Front view.

FIG. 3.—Side view.

FIGS. 2 and 3.—Supporting belt for gastropotosis. This belt is so constructed that its upper part allows of free expansion of the abdomen, whilst the lower part and pad are fixed. The pad, which is kidney-shaped and backed by a metal plate, fits the lower part of the abdomen above the pubes. Pressure is applied to the pad by a transverse spring, the spring being brought into action by webbing straps which pass from the back of the belt horizontally. The belt is supplied with elastic sides, and is made to lace up at the back.

FIG. 4.—Drawn to scale from a radiograph taken immediately after partaking of an opaque meal, showing the greater curvature of the stomach in the pelvis.

FIG. 5.—Same case as Fig. 4. Shows dropped stomach held up by belt. The position of the pad on the lower part of the abdomen is shown.

I have ever seen in a man was in a well-known surgeon who was a martyr to dyspepsia for many years but who never suspected gastroptosis until he consulted me a few months before his death; in this case the greater curvature of the stomach was situated in the pelvis 4 in. below the iliac line.

My method of examination in cases of gastroptosis consists in taking a radiograph immediately after the meal has been administered, again in half an hour, and again in an hour and a half. Should the stomach then not be empty, I radiograph it for the fourth time two hours later. It is very rare, however, that this is necessary.

The treatment I generally advise is as follows:

1. The foot of the bed should be raised from 8 in. to 12 in.; I generally find 9 in. is sufficient.
2. A special abdominal belt designed to hold the stomach up should be worn.
3. No fluid should be taken at meals.
4. Tonics, digestive ferments, alkalis, bismuth, etc., should be given by the mouth.
5. Purgatives, intestinal lubricants, or enemata should be administered.
6. Abdominal massage.
7. Swedish exercises designed to strengthen the abdominal walls.
8. Daily outdoor exercise.
9. Electrical treatment.
10. In severe cases the stomach should be washed out with antiseptics, or the patient trained to empty the stomach when a feeling of discomfort arises.

aged 27, who for years had suffered from gastric trouble and constipation. At the time she consulted me she was exceedingly thin, nervous, irritable, moody, imaginative, and shy. She was always hungry, was easily tired, was apathetic, showed a lack of interest in her work, complained of inability to sleep, and was continually taking medicines and consulting medical men without any relief of her symptoms. She had had the uterus curetted, with little or no beneficial result, and was wearing a special belt, which certainly did not fulfil the requirements. An x-ray examination showed the greater curvature of the stomach to be 4 in. below a line drawn from one iliac crest to the other. She was ordered a special belt and told to follow out treatment on the lines I have described. She commenced to improve immediately, and at the end of six weeks a radiographic examination showed that not only had the stomach greatly gained in tone, but that the greater curvature was more than 2 in. higher in the abdomen than on the previous examination. Her mental condition has greatly improved, and life had assumed an entirely new aspect to her. It was in her case that I was enabled experimentally to prove the effectiveness of the belt I had designed. On the occasion of the experiment she walked to my rooms, a distance of two miles, without her belt. I then administered the meal; the radiograph showed the stomach to be 3½ in. below the iliac line; she now lay upon a couch, with the legs raised 9 in., for a quarter of an hour, and applied the belt whilst lying down;

FIG. 6.—Case of badly dropped and dilated stomach.

FIG. 7.—Shows the partly emptied stomach eight hours after partaking of the barium meal. Same case as Fig. 6.

FIG. 8.—Shows the position occupied by the large intestine in a severe case of gastroptosis.

The foot of the bed can be raised by boxes or bricks; or better by a special adjustable device which has been made at my suggestion by Messrs. Salt and Son, Ltd.; it is made of hard wood with strong base, and has a suitable cup at top to hold castors (Fig. 1).

By far the most important item in the treatment is the special abdominal belt for holding the stomach up. I have previously mentioned that gastroptosis is almost invariably present in cases of dropped kidney, and I now wish to point out that the special belts designed to hold the kidneys up help to keep the stomach down. It is admitted by the advocates of nephropexy that the wearing of belts is very unsatisfactory, and that nothing short of operation is of much good. There can be no doubt that the chief reasons why the belts are a failure is the presence of gastroptosis; it will easily be understood from viewing the position of the stomach in the accompanying diagrams that a belt having pads in one or both flanks, especially if put on when the stomach is full, would have a tendency to keep it down rather than to raise it, and, as a matter of fact, might do more harm than good.

Bearing in mind the extreme thinness of most of the patients who suffer from gastroptosis, it must be obvious that a very well-fitting belt, provided with a pad which will raise the stomach, or at any rate keep it up after the belt has been put on in the recumbent position on the foot-raised bed, is essential. At my suggestion, Messrs. Salt and Son, Cherry Street, Birmingham, have designed a special belt which I have proved by actual experiment to be efficient (Figs. 2 and 3). To be effective, it must always be put on and adjusted in the manner described above, and should be taken off under the same conditions.

Figure 4 is drawn to scale from a radiograph of a nurse,

she then stood up, I took a radiograph from which the diagram (Figure 5) was made; it clearly shows the greater curvature of the stomach at or about its normal position. I may say that she still sleeps with the foot of her bed raised and has grown to like it.

In many cases of gastroptosis the stomach is not much dilated—it is simply lengthened, and the patient takes only normal quantities of food. In very severe and old-standing cases the organ may be much dilated. The worst case I have seen occurred in a young woman of 26, who complained of nightly vomiting of a considerable amount of semi-putrified food, which was highly acid and contained sarcinae. The shape and position of her stomach is shown in Fig. 6, the stomach was found to be only half empty eight hours later (Fig. 7). In this case the treatment gave considerable relief, and she was not sick for many months. Latterly, however, her symptoms have reappeared, and she is now undergoing treatment in hospital; this is the only case which may be called a failure, and as I have not seen her for many months, it is quite possible that complications have arisen.

In all cases of marked gastroptosis the large intestine will be found deep in the abdomen, and frequently the whole of it occupies the pelvis (see Fig. 8). It will be quite plain that the full stomach under these conditions, must press upon the transverse colon, causing constipation, and not infrequently distressing colitis.

When diarrhoea is a symptom it may be invariably taken for granted that a portion of the food does not leave the stomach until it has undergone fermentation. As a rule, both the constipation and the diarrhoea are greatly relieved by the treatment adopted for keeping the stomach in its normal position.