no record of any case in which the patient had attained the age of 50 years. The following notes may, therefore, be of interest:

The patient, a rather feeble lady, aged 72, had suffered from chronic constipation and had had several attacks of extreme flatulence, during which she suffered a considerable amount of colicky pain, and the distension was such that the abdomen—abnormally flaccid as a rule—became so distended that the skin was shiny and the percussion note very hyper-resonant, and one might almost describe her at such times as a "living drum." In three attacks of this kind which I saw, an ordinary soft stomach tube was passed *per rectum*, with the result that enormous quantities of flatus escaped, all pain vanished, and the abdomen again became supple.

On the evening of March 29th she took a cascara tabloid, which failed to act until 9.15 P.M. on the following night. She then went to stool, having felt perfectly well all day, and after some minutes, although she did not strain in the least (on this she was emphatic), she felt that "something wrong" was happening, and found a lump protruding from the anus. The condition on examination was as follows: A mass some 8 inches long and about the same in circumference was protruding *per anum*; its long axis was curved, and between it and the sphincter the finger could be passed its full length without reaching the top of the *cul de sac*. The external surface of the mass was obviously everted mucous membrane of the large bowel. The pulse was of good quality, but rapid. There was no pain, but the patient wore an anxious expression.

I tried to reduce the mass by means of moderate taxis, in the hope that if it could be returned within the anal sphincter, injection might be sufficient to complete reduction of the intussusception. As taxis failed, I gave a hypodermic injection of morphine with atropine, and made arrangements for the performance of coliotomy.

The operation was begun 6½ hours after the appearance of the intussusception, and lasted about an hour. A lipoma about 4 inches in diameter being situate in the middle line between the umbilicus and pubes, the left semilunar line was chosen for the site of the incision, which was 6 inches in length. Directly the peritoneum was opened several distended coils of both large and small intestine shot out, and could not be kept back; they were kept in towels wrung out of a hot solution of lysol. The right hand was introduced, and with the uterus as guide, the position of the intussusception—which was composed entirely of large bowel—was ascertained.

Moderate traction on the bowel above the neck of the intussusception proved that the greatest obstacle to reduction was at the sphincter ani, which was accordingly divided. With the left hand externally, taxis was applied to the bowel simultaneously with traction on the neck by the right hand internally. This manœuvre took time, as great care had to be exercised so that the intussusception should be as little damaged as possible. Bit by bit, however, the mass was gradually passed back into the abdomen, an inch or so returning at a time with a little jerk. This want of smoothness in the return of the bowel I attributed to the unequal thickness of its substance in various parts.

As soon as the external mass had been reduced, the reduction of the last few inches was quite easy. The peritoneal surface of the now disinvaginated bowel was found to be shiny and of good colour, though congested. The coils, which had been kept in lysol towels, were returned into the abdomen, and the wound was closed with a row of 7 deep fishing-gut sutures, through all the layers of the parietes, and a superficial continuous suture of horse hair. Immediately before drawing together the deep sutures, a "tell-tale sponge" was passed down to the bottom of the pelvis. It returned practically unstained. It may be well to state that the word "sponge" is misleading, as during the whole operation nothing was used to do the work of swabs or sponges except a roll of sterile gauze about 4 inches wide, which was kept under the edge of one of the enveloping towels. The end of the gauze roll was used for "sponging" the wound, and also for keeping back the intestines. When any portion became soiled it was cut off and immediately thrown away. By this method, suggested first, I believe, by Dr. Peter Horrocks, all danger of leaving swabs or sponges in the abdominal cavity is avoided.

Convalescence was slow but uninterrupted, except for a small stitch abscess. The temperature, which for five days was subnormal, rose to 100.2° F. only on one occasion, and this was clearly attributable to the stitch abscess. The patient made a good recovery, and continues in her usual health.

It is a great pleasure to acknowledge the kindly help of Dr. Joyce (of Cranbrook), who saw the patient with me in consultation before and helped at the operation, and that of Dr. Colls, of Benenden, and Miss Fendick, who also rendered valuable assistance.

AFTER-CARE OF CASES WHICH HAVE BEEN OPERATED UPON FOR PERFORATION OF THE STOMACH.

By HASTINGS GILFORD, F.R.C.S. Eng.

Reading.

ON glancing through the records of those cases of gastric ulcer which have undergone treatment by operation during the last ten years one is struck with the fact that while every detail of the operation is entered into again and again with almost painful minuteness, very little is said on the important subjects of feeding and general treatment. It has, therefore, come to pass that while every step of the operation is carried out systematically and intelligently the same can hardly be said of the after-treatment. This is too often apparently based on mere routine, and has but little regard to the requirements of physiology. Perforations of the stomach should rank with strangulated herniæ and with bleeding as cases which any surgeon may at any time be called upon to undertake. It is, therefore, of importance that the principles of treatment should be clear in his mind, especially if he have had no experience of these accidents. It is not now necessary to say anything about those details of treatment which are applicable to abdominal injuries in general. All that we are concerned with are those special points which apply to the after-care of the particular cases with which we are now dealing. These are, in the main, questions of food, of the position occupied by the patient, and of aperients.

Food.

In regard to the nature of that which is to be put into the stomach it must be, almost of necessity, liquid; and either previously digested, or of such a character as to require no gastric digestion. We have to remember that in the normal condition the stomach serves both as a reservoir and as a digestive organ; and it must therefore be our object to supply such material as will pass straight through it, without bringing either of these functions into play. If the indications are favourable, nothing but water, or water containing some substance which is not food, should be given during the first 24 hours. If the operation has been severe, or if there is reason to suppose that the stomach will not tolerate liquids, it is best to inject a pint of warm water into the rectum to begin with. This may be done so soon as the patient has become conscious and may, if desirable, be repeated every four hours. The quantity must vary according to the tolerance shown by the patient and the degree of thirst. In the great majority of cases hot water may first be given by the mouth about four hours after the operation. To begin with only a teaspoonful at a time should be allowed, and care should be taken that it is really hot. Sometimes a little chloroform water is of use in allaying nausea, and now and again I have found dill water or peppermint water most acceptable. They tend to allay the irritability of the stomach and are also, of course, of some slight value as antiseptics. Nothing, perhaps, is more grateful to the patient at this time than a little t.e.a. This should contain neither sugar nor milk, and should be made by pouring water on tea leaves and immediately pouring it off again. It is, in reality, little more than sterilised water, flavoured and coloured with tea. It need hardly be said that, at first, fluids should be given in the smallest quantities and with the greatest caution. They should be stopped as soon as nausea is felt, and should not be given again until after the lapse of an hour or more, according to circumstances. When

it is found that no nausea or sickness is produced a little food may be introduced with advantage. In most cases I find that milk is chosen to begin with. Now, of all foods which are given to invalids, this is probably one of the worst. Many adults cannot take milk; it disagrees and causes vomiting. Moreover, it contains proteids and therefore undergoes digestion in the stomach. This objection holds good whether it is given alone, as buttermilk or koumiss, or is combined, as it often is, with lime water, with one of the aerated waters, or is aerated by means of a gasogene or sparklet. There is a further objection to aerated liquids. One sometimes wonders whether it is possible for the gas liberated from them to find its way between the edges of an unhealed ulcer into the peritoneal cavity. In one of my earlier cases a perforation occurred in a stomach which was affected with hour-glass contraction. For four weeks the ulcer refused to heal and a fistula existed through which many little observations could be made as to the functions of the stomach. It was then noticed that when air was blown into it by the mouth through a tube, the patient was only able to resist a very slight pressure and could not, in spite of all her efforts, prevent the air from gurgling up through the oesophagus. But though this seems to show that there is very little occasion to fear that the gas from aerated drinks can do harm, it is best to be on the safe side and to give no gas-laden fluids. It is possible that other patients may have more control over their gullets than this patient had. The objections to milk are sometimes partially overcome by peptonising it. But it has been shown that peptones are decidedly irritating. Unfortunately too, peptonised milk is not palatable, and it is of the utmost importance that only that food should be given which is acceptable to the stomach. While food should not be unpalatable, it must not, on the other hand, be too sapid or stimulating. There is an objection on this score to beef tea and other watery extracts of meat. Some of these are almost pure stimulants, for they contain practically no food, and are therefore hardly suitable in any case. If their stimulating action is required they are best given in rectal injections. Some of them contain small quantities of albumen, and are therefore calculated to excite the secretion of the gastric juice, not only by mere stimulation, but because they require digestion. Others contain irritating peptones. There is a similar objection to the use of alcoholic drinks, such as whisky and champagne, whose stimulating action entirely overshadows their nutrient value, whatever that may be. They should be considered rather as drugs than as foods. Perhaps the most undesirable of all substances which are given in the early days after gastric operations are combinations of alcoholic drinks with eggs, though they are advocated by some writers.

It may now be asked, if there are objections to these various articles of invalid diet, what can we find which shall best fulfil all the requirements? In my opinion one of the best of these foods is grape sugar. Grape sugar by itself is too nauseous, but combined with a flavour, such as that of raisins, it is nearly always palatable. I find in fact, that it is as a rule preferred to nearly all other forms of liquid diet, and patients will often by preference continue taking their "raisin-tea" long after they have become tired of milk and slops. It is made by pouring boiling water on to half its bulk of chopped raisins. This is stewed for about two hours and then filtered. The filtrate may be given either with water or without, and either hot or cold, according to the wishes of the patient. Though it doubtless contains other substances than grape sugar, these are apparently present in such small quantities that they may be neglected. Given at first in small doses and afterwards more freely, it is undoubtedly of value. When one remembers the important place which sugar takes among the foods¹ it seems strange that it should not be more utilised as an article of sick diet. This applies with peculiar force to grape sugar, seeing that it requires no digestion. It is probably of far more value than any of the variously named meat extracts which are now so much in favour.

Next to raisin-tea I have found a decoction of malt of service. This is made in a similar way, ground malt being substituted for raisins. It is, as a rule, not considered so palatable as the raisin-tea, though, where it is liked, it is useful as an alternative. If given too freely it may, I fancy,

cause a little diarrhoea. I have noticed that the bowels have become loose under such circumstances; it is possible, however, that this was a mere coincidence. After raisin and malt have been given for from one to three days, a mixture of cream and water is added to the list. This consists at first of one part of cream to twelve of water, but it is gradually made stronger until it is double this strength. Cream is chosen because it undergoes digestion in the small intestine; and, if given at first well diluted, is a fat which is very readily borne by the stomach.

The three preparations which have now been mentioned may be continued until the end of the first week or longer. But generally after the cream has been given for a day, I begin to mix it with some starchy food. This must contain no more than a trace of proteid. Arrowroot, corn flour, or pure starch, made into a thin gruel with cream and water and sweetened with grape sugar is a useful and palatable food. The patient, as a rule, improves on this diet, and there is no occasion to add to it until one is sure that the lesion in the stomach is safely sealed up. It is probable that fresh wounds of the stomach heal as quickly as do those of the face, but it is best not to assume that union is complete until the end of the first week.

The *post-mortem* examination of some of those cases which have died proves that healing does not always take place by first intention; part or the whole of an ulcer may remain open for days, and the only barrier to the escape of the contents of the stomach will then consist of the peritoneal adhesions on its external surface. These must, at first, be very weak, and were the movements of the stomach so vigorous as was at one time supposed, it would be most unsafe to give solid food until a fortnight or more after the perforation had been sewn up. But, fortunately, as I have seen in my case of gastric fistula, peristalsis is very feeble and is not likely to tear apart any adhesions after they have been formed a week. More danger is to be apprehended from vomiting; but, in this event also, the stomach is too passive and the pressure within it too slight for the act of vomiting to be attended with any great danger after the second or third day. At the end of a week, if the patient has done well, solid food may be commenced. This may consist of biscuit, such as "lunch," "captain," or "breakfast." These are crisp, and must be well chewed in order to be swallowed. They are, as a rule, more acceptable if spread with butter, and I have found that nothing is better liked or agrees better than the scrapings of the fat of cold salt breakfast pork, sandwiched between thin slices of "hovis" or ordinary bread. The fat of this part of the pig seems to differ from other fats in being tolerated even by those with whom fats generally disagree. After two or three days more have elapsed the diet may be still further varied, but, for another fortnight or more, it will be wise to select those foods which undergo intestinal rather than stomach digestion. In deciding the length of these different periods and the time for the commencement of solid foods, the aspect of the patient and the condition of the pulse in regard to frequency and character must be considered of far more importance than fever. At the same time repeated rises of temperatures and continued tenderness over the region of the stomach must be regarded as indications for caution in feeding. The appetite then becomes the safest criterion, for the patient, as a rule, requires no solid food until the symptoms subside or an abscess bursts.

Position of the Patient.

This ought to be regulated by physiological requirements and the position of the ulcer. The ordinary supine position is not a good one. It is, in the first place, not natural, for probably in nine cases out of ten the position which is chosen for sleeping is more or less on the right side. Dr. Louis Robinson has shown that this is the position which is instinctively assumed by the young of mankind and by the anthropoid apes. The pylorus is also at the right end of the stomach and fluids probably do not so readily pass through into the intestine in the supine and left lateral positions. Mr. Clinton Dent thinks that it is of importance that the head and shoulders should be well raised, and this, I believe, is by far the best attitude in most instances. In the case of ulcers on the posterior surface the patient should first be placed well over on to the right side, and should afterwards

assume the sitting-up position, or a compromise may be effected by raising the shoulders and turning the patient slightly over to the right. This position is good for all ulcers except those which are low down on the anterior wall, and it may then perhaps be best for the patient to be lying on his back. In the case of ulcers of the lesser curvature the higher the patient can sit up with comfort the better. But while one or other position may be of advantage in any particular instance it should never be continued until it becomes irksome. It must not be forgotten that while the passage of foods over an unhealed wound or ulcer cannot be desirable the same is not true of liquids other than foods. It may be of distinct advantage sometimes to turn the patient into such a position that what is swallowed shall pass over the wound. Plain hot water, peppermint water, or even well diluted carbolic solution (containing no more than 3 or 4 drops of phenol) may be given.

Aperients.

It is, of course, of the utmost importance that the natural flow of intestinal contents should begin as early as possible after an operation. Nothing, perhaps, requires more judgment than the use of aperients. Treatment after operations on the stomach differs from treatment after other abdominal operations in that sickness is even more to be dreaded and, therefore, must be the more carefully guarded against. In those instances of perforation in which the escape of gastric contents has been limited to the neighbourhood of the stomach, and peritonitis has become localised in the same area, it is best, to refrain if possible from irritating that organ by aperients. I suppose it is true that the higher up in the abdominal cavity the peritonitis exists, the more likely is vomiting to be an early and inveterate symptom.

In one of my cases the patient, I believe, lost her life owing to the injudicious use of magnesium sulphate. There had been obstinate constipation which could not be overcome by the use of injections; and wind was being pumped up freely by the mouth, though none escaped through the anus. Small quantities of decoctions of raisins and of malt were being given occasionally and were retained, though there was occasional nausea. The patient was weak and her expression anxious. The pulse was about 130 to the minute; but though the abdomen was distended, the lower part of it was free from pain or tenderness. It was the fourth day and she was so desperately ill that I feared that unless natural action of the bowels was secured she would soon die. I therefore ordered teaspoonful doses of white mixture to be repeated every quarter of an hour. After four doses had been given vomiting set in and continued until the patient's death about ten hours afterwards. At the *post-mortem* examination nothing further was found than septic areas round about the stomach wound. In this, as in other cases, the enemata consisted of four ounces of glycerine mixed with half-ounce of turpentine. These I begin, as a rule, twenty-four hours after operation, though the time varies according to the amount of distention and eructation of gas. Soap and water, with turpentine may also be given to the amount of a quart. Either of these may be repeated every four hours until decided relief is obtained.

In some cases of perforation the freedom of the stomach area from peritonitis and the involvement of the lower parts of the abdomen must lead to some modification in the course of treatment. Aperient enemata should be given at first, but if they are not successful and ileus is threatened it is imperative that we should make use of drugs. Of these magnesium sulphate and calomel are probably the best. After giving one dose of calomel followed by magnesium sulphate in frequently-repeated doses for four hours a large glycerine or soap-and-water injection should be given, and this course of treatment should be continued until the bowels act. If there is sickness it is sometimes a good plan to give a drachm or more of Epsom salts immediately after each attack of vomiting.

Although perforated gastric ulcer is the lesion to which the above remarks are especially directed, they will also apply to all injuries of the stomach and, in principle, to cases of unperforated gastric ulcer as well.

REFERENCE.

See paper by Dr. Vaughan Harley, BRITISH MEDICAL JOURNAL, November 23rd 1895, vol. ii, p. 1283.

AN IMPROVED INCISION IN LAPAROTOMY FOR THE PREVENTION OF POST-OPERATIVE HERNIA.

By ARTHUR H. BUCK, F.R.C.S. EDIN.,

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THERE can be no doubt that post-operative hernia is still far from uncommon. It does not, however, occur so frequently as was at one time the case. Formerly a hard-and-fast rule was followed that no muscle fibre should be involved. Latterly it has been the rule to separate muscles, whenever practicable, in the direction of their fibres. This is probably one of the reasons why hernia is now less common. But to carry out this rule involves, except in the case of the rectus abdominis, division of several strata of muscles in different directions. The union of such divisions produces scars, which cross one another in their several planes. One would, perhaps, expect that the cicatrices themselves would be scarcely perceptible, since, the muscles being cut longitudinally and not transversely, there is nothing to prevent close contact. This is not the case when circular ligatures are used to unite the approximate bundles of muscle fibre.

Quite recently, in dissecting out a scar, resulting from this method employed twelve months before, I had reason to notice how broad was the area of cicatricial tissue which had formed. (The case was one of appendicitis, the appendix not having been removed at the first operation.) The reason of this was first clearly brought to my mind by my friend Dr. Willoughby Furner. When parallel bundles of muscle fibres are united by tightly-drawn sutures, three or four to the inch, degeneration occurs of the individual highly-organised fibres involved. Absorption follows, and cicatricial tissue fills the gap.

Why, then, is post-operative hernia less common after division of muscles in their length? Because the resulting cicatrices are supported on one or both sides by uninjured muscle or aponeurosis. In the case of a division of the fibres of the rectus this support would be absent. In order to do as little damage as possible to delicate muscular and aponeurotic structures, mattress sutures with the finest silk and curved intestinal needles should be employed.

A second cause of the less frequent occurrence of post-operative hernia is the fact that we now recognise the importance of avoiding the division of the nerves supplying the muscles. To take the case of the rectus abdominis: The motor nerve supply is derived from the terminal branches of the abdominal intercostal and ilio-hypogastric nerves. These branches enter the muscle through the outer part of its sheath at intervals from above downwards. If an incision be made through the rectus, those fibres lying to the inner side of such incision will become paralysed and atrophied. If the incision through the linea semilunaris be used, the effect will be still more disastrous, since the whole thickness and breadth of muscle corresponding to the area of injury will be cut off from its motor and nutritive nerve supply. Paralysis and atrophy must ensue.

The whole questions of incisions in the abdominal parietes, with special reference to nerve supply, has been recently and ably discussed by Dr. Brindley Eads.¹

The conclusions I form are:

1. That division of aponeurosis without supporting muscle is bad, as is evidenced by the frequency of ventral hernia occurring after such a procedure.
2. That division of muscle in the direction of the fibres cannot be satisfactory if it entails division of motor nerve fibres.
3. Nor can such division be satisfactory unless supported by other uninjured muscle or aponeurosis.

A consideration of these points led me to adopt the method which I will now describe, to which none of the above objections apply:

1. *Incision through Skin, Superficial Fascia, and Fat.*—An incision is made of the required length down to the anterior layers of the sheath of the rectus, an inch more or less, according to the size of the patient, either to the right or left of the middle line, as may be desired.

2. *Division of Sheath (Anterior).*—The anterior layers of the sheath are divided with the point of the knife, an inch, more or less, from the inner edge of the muscle, upwards and downwards to the same extent as the skin incision. Care is taken not to injure the muscle fibres.