THE MODERN TREATMENT OF HERNIA BY TRUSSES. *

BY

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THE operative treatment of hernia has become so widespread during this century that the mechanical retention of viscera within the abdomen is likely to become a lost art.

Undoubtedly hernia is amenable to successful treatment by operation in its early stages in suitable subjects, and the perfection to which such operations have been brought brings credit upon surgeons of many lands. But there will be for many years yet to come, and perhaps for the rest of time, quite a number of herniae, all of which are important because they constitute a danger to the sufferers, in which a truss may be the sole method of treatment. It has been my good fortune to gain experience of this type of instrument over a considerable number of years, and I make no apology for bringing before you in this British Medical Association Lecture some simple but practical points relating thereto.

It can be imagined with what consternation the first case of strangulated hernia was regarded by our ancestors. When it became recognized that the terrible condition, ending usually in death, was due to the gut passing into a pouch, all sorts of attempts began to be made to retain the intestine within the abdomen. There is in the Wellcome Historical Museum an Egyptian statuette wearing a truss, and it reminds me of some of the crude apparatus sold at exorbitant prices in the twentieth century, and I suspect it was as efficacious.

The variety of forms of trusses, even for one type of hernia, tends to prove that retention of prolapsed organs is not so easy a matter as some would think. The torture, literal torture, that some patients have suffered, and some still do suffer, from the improper instruments applied to their bodies is indicative of a want of knowledge of proper truss treatment.

ESSENTIALS OF A GOOD TRUSS.

What, then, are the essentials of a good truss? They are: (1) close fitting, (2) ability to act when occasion for its function arises, (3) comfort, (4) durability, (5) economy in cost.

Close Fitting.

It is obvious that a truss which does not fit closely to the body is likely to become shifted in the movements of the wearer and so to become worse than useless—to become, in fact, a false security. It is for this reason that a truss should be worn next the skin, and not with intervening clothing.

But a truss may fit so closely as to become a constricting circlet, and this is particularly so in those types in which there is an elastic band passing round the pelvis. I have seen instances where the band, having been worn low down and tightly across the buttocks, has caused actual interference with the functions of the sciatic nerve.

Close, but comfortable fitting, implies careful measurement for, and making and adjustment of, the apparatus. It requires some practice to measure even for a simple inguinal truss; it further requires considerable skill in the proper manufacture of the truss to the measure, and still more a good knowledge of anatomy for its right adjustment.

Let us take the question of measurement first, and for an inguinal hernia. The tape must not pass horizontally round the pelvis—a mistake very frequently made—but obliquely, because when applied the truss has to lie obliquely. Therefore the tape must be placed high up behind, at the base of the sacrum, just below the anterior superior spines at the sides, and at the level of the upper part of the symphysis pubis in front. It is extraordinary how few know where this latter point really is, so many placing it much lower down than it actually exists. No attention should be paid to any “ring,” partly because it is only confusing to do so, and partly because such

rings do not exist. The exit from the inguinal canal is still often called the “external abdominal ring,” which is altogether a misnomer, for it is not “external” but “superficial,” it is not “abdominal” but “inguinal,” and it is not a “ring,” which is a circle, but it is a “triangle.” So that a much more suitable, in fact the only correct, term for this exit is the “superficial inguinal aperture.” It may also in passing be pointed out that this aperture has nothing whatever to do with the incidence of inguinal hernia, and the passing of the tip of the finger of an examining medical practitioner is indefensible. When measuring for a single truss the actual measurement taken is the right one to forward to the truss maker.

If the patient requires a double truss, it will be well to add an inch to the actual measurement, as a double truss does not give at all.

Ability to Act when Occasion for its Function Arises.

No proper truss should exercise pressure which is irksome to the wearer, but it should be able to bring pressure to bear over the hernial aperture when any marked increased intra-abdominal pressure arises, such as that occurring in coughing, sneezing, and defaecating. In connexion with this property of a truss, it should be emphasized that of all types of truss the one with a metal spring passing at least three-quarters of the way round the pelvis has proved to be the most comfortable and efficient.

The curve of the spring is important, for if this is too marked it will make the pad exercise injurious pressure. The curve should be such as to cause the spring to give the pressure needed when an expulsive effort is trying to force the viscera into the sac. The tempering of the steel must be perfect if the best is to be obtained from the truss. It must be so good as to allow of the spring being opened out completely without snapping. In a single truss the end of the spring must be hammered thin—bevelled—so that it will give and adjust itself to the patient's body, and have no tendency to force its way through the leather covering at its termination. This is one of the best tests between a well-made and a poorly made instrument.

Comfort.

No truss which is uncomfortable can be considered satisfactory. It will certainly not be by the wearer, and it should not be by the prescriber. But comfort with efficiency is not always easy to secure. There is the personal equation of the patient, the skill of the manufacturer, and the materials from which the truss is made. An ideal truss is one which, while holding the viscera within the abdomen, causes the patient less discomfort than does either of his boots. Or, to put it in another way, one which is merely part of his clothing.

In a truss with a metal spring and pad there are two chief causes of complaint. One is the friction and the pressure of the spring over the parts behind on the back, and at the sides below the anterior superior iliac spines. In thin subjects it is sometimes difficult to secure complete comfort at first, but it is wonderful how soon, with patience and perseverance, discomfort disappears.

The other cause of trouble is the actual pressure of the pad or pads at the site of the hernial aperture or apertures. Much of this is due to faulty construction of the pad or a wrong direction of the curve of the spring. Both can be overcome by a little knowledge of the proper manufacture of a truss. For a long while now I have been using a honeycomb rubber facing to the pad beneath the chamois leather covering. This is a sponge, consisting of a multitude of air cells, and it not only exercises a soft pressure, but tends to mould itself to the body. The idea has not been patented, and is to be commended. The improper curve of the spring simply should not occur if the truss has been properly constructed. Further, comfort can be ensured by care of the skin, which has not as yet become accustomed to the unusual pressure upon it.

Close attention must be given by the wearer to keep the skin clean and dry. Ointments, vaseline, or cold cream must be rigidly forbidden, but a little friction with methylated spirit or eau-de-Cologne, night and morning, for the first few weeks tends to harden the skin and keep it fairly aseptic. In addition, a light powdering each morning, after the application of the spirit, with a powder

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consisting of one part of boric acid, one part of zinc oxide, and two parts of fine starch powder, is helpful to keep the skin dry where the pads press.

Tact, persuasion, and sometimes a little threatening, all have to be used in dealing with patients, particularly with those who, having been careless, have allowed their hernias to get out of control. It is wonderful how a comfortable and efficient truss conscientiously worn will diminish the size of the protrusion of the hernia; so much so that sometimes a patient will consider himself cured and unwisely discontinue with the truss, and then find that the hernia recurs.

Not very infrequently the application of a truss to an easily reducible but large hernia will render a subsequent operation more simple and more sure of satisfactory results.

Durability.

All the materials from which a truss is made must be good, and one made from cheap materials will wear out in a short time. Hence a good truss made by hand from the best materials cannot be a cheap article, but one for which a good price must be paid.

Well-tempered steel, made as far as possible rustless, reliable leather covering, and neat sewing all tend for long life of the appliance and satisfaction to the wearer. It is distressing to see the shoddy specimens sometimes sold even by respectable firms, and all practitioners should know a good truss from a bad one.

Economy in Cost.

From what has been said the real economy in cost is to have, in the first instance, a well-made, well-fitting, and durable truss. Then to secure a second one made of the same type as soon as it is proved that the original is satisfactory, and to counsel the patient to wear them alternately week by week. In this way each will last longer, and, should one happen to go wrong, there is the other already comfortable and ready to wear whilst repair or renewal is being carried out.

In the treatment of herniae by trusses close co-operation is required among all the three parties concerned—the patient, the practitioner, and the manufacturer. Personally I am certain that the patient should not go to the manufacturer, but the practitioner should measure for and adjust the instrument himself to his patient. This implies naturally a sound knowledge of the type of truss required, of the method of measurement, of the proper manufacture, and of anatomy for adjustment. It is for this reason that it is most desirable that all students should continue to be taught well the essentials concerning the modern treatment of herniae by trusses.

[The lecture was followed by a demonstration of trusses and their application to a living man.]

THE MECHANISM OF BLACKWATER FEVER AND CERTAIN ALLIED CONDITIONS.

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BLACKWATER FEVER is without doubt the most important and serious disease affecting Europeans in tropical countries; not even yellow fever can compare with it as regards mortality. It is difficult to overestimate the retarding influence of this infection on the development of our tropical possessions. Apart from the regrettable loss of men who are just beginning to render valuable services to their country, there is the depressing effect on the surviving European population in endemic areas. The fever is regarded with great dread by the laity, and is a cause of grave anxiety to medical practitioners where it exists.

The etiological theory which we now present is believed to be entirely new, but the evidence which we have obtained would seem to warrant our belief that it is correct.

DISTINCTIVE BIOLOGICAL FEATURES OF *P. falciparum*.

It is to-day generally agreed that blackwater fever arises mainly in the course of prolonged infection with *Plasmodium falciparum*. As there is no evidence that the malignant tertian parasite produces a toxin which differs from that of the other malaria parasites, we must seek for the explanation of this association between blackwater fever and *P. falciparum* in some biological factor other than toxin production.

The outstanding differences between *P. falciparum* and the other malaria parasites are that the former sporulates not in the peripheral blood but in the internal organs, and that the cells containing the sporulating forms adhere to each other and to the vessel walls. These phenomena were observed in the early work on the malaria parasites, and have been constantly recognized. Marchiafava and Bignami,¹ in 1894, said of malignant tertian malaria, "Malignancy coincides with an exceptionally abundant quantity of parasitic forms, a quantity much more abundant—where the cases terminate fatally—in the blood of the viscera than in the blood of the finger." Christophers and Bentley² noted that it was in infections by the malignant parasite that the organs were found to be most actively engaged in holding up the infective red cells, the very perniciousness of infections by this parasite being suggestively associated with such an action. Three observations serve to explain this tendency of the malignant tertian parasite to accumulate in the internal organs. Marchiafava and Bignami³ drew attention to the fact that corpuscles infected with malignant parasites, especially of the adult form, have lost their elasticity, and consequently resist the change of shape necessary for their passage through the capillaries, an observation which was again made by Bass.⁴ Next Thomson and Thomson⁵ recorded and illustrated marked clumping of the infected red cells in culture during all stages of sporulation of *P. falciparum*, whereas no tendency to clumping occurred in cultures of *P. vivax*. The two observations so far mentioned would account for the accumulation of the sporulating forms of *P. falciparum* in the capillaries of any part of the body, but not necessarily in the internal organs. Their predilection for the internal organs was explained by Bass, who showed that they lodge in those capillaries where the current is weakest or where slight obstruction is produced by the protrusion of endothelial cells inward. The commonest and most important site of this massing of infected cells is the spleen, though the bone marrow and other organs may be similarly affected. We may allude here to the massive infections found by Clarke⁶ in the placentas of parturient women, even in cases where the peripheral blood was free from parasites, a finding which was confirmed by Blacklock and Gordon.⁷

We are convinced that the association between blackwater fever and *P. falciparum* must depend on these distinctive biological characters of this parasite; we hope also to make it clear that as a result of these very characters of the parasite the condition known clinically as blackwater fever has fundamental affinities with several other forms of haemoglobinuria and haemoglobinaemia.

DEFICIENT OXYGENATION IN THE HAEMOGLOBINURIAS AND HAEMOGLOBINAEMIAS.

We have selected for comparison with blackwater fever a group of haemoglobinurias and haemoglobinaemias which seem at first sight to have little relationship to each other, but which on closer investigation reveal notable features in common. The group includes: haemoglobinuria in pernicious anaemia complicated by venous thrombosis; haemoglobinuria in Raynaud's disease; haemoglobinaemia in dogs as a result of exercise; haemoglobinuria in man from marching; and myoglobinuria in horses. One feature common to all these conditions is the existence in them of a state which results in deficient oxygenation, either local or general; the manner in which this state is brought about may be considered under the various diseases.