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IS THE APPPOSITION OF PERITONEUM TO PERITONEUM A SURGICAL ERROR?

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To put the question which heads this paper is almost to suggest a surgical heresy. "Peritoneum to peritoneum" is a surgical rule that is near being an axiom. Amongst surgeons few beliefs are more widely and more firmly held than this one, that the best healing in abdominal operations is by apposition of serous surfaces; therefore it behoves one who ventures to dispute this axiom to be sure of his ground and to tread warily.

Some years ago various accidental experiences combined to unsettle my belief in the axiom. During the past two years I have deliberately and intentionally, where possible, acted as if the axiom were an error, and the result of this experience has been to convince me that for all purposes where sound, speedy, permanent union is desired, the apposition of two intact serous surfaces is a surgical mistake.

To fully illustrate and support the principles I uphold would occupy much space and necessitate the relation of many cases; but perhaps my purpose will be sufficiently well served by indicating the lines of reasoning followed in arriving at this conclusion.

My first doubt of the principle of sero-serous apposition arose in connection with intestinal operations, and particularly with the means of providing intestinal drainage in cases of intestinal obstruction. Many of these operations had to be rapidly performed, and in some of them I dared to ignore the time-honoured habit of "shutting off the cavity" by suturing parietal peritoneum to bowel, and both to skin; often, indeed, I omitted to place sutures of any kind. The cavity was shut off just as well when the bowel was implanted on the raw surface. But later on, when it came to the closure of the fistula or anus, I found this direct implantation of bowel to incision had its disadvantages, for the adhesions were so firm, and so extensive, and so intimate, that it was not easy to separate them. The practical outcome of this has been that where I want temporary drainage with loose adhesions and mobile bowel—as in temporary enterostomy—I suture parietal peritoneum, bowel, and skin; but where I desire firm, permanent, and intimate adhesion, with no mobility of bowel on parietes—as in *celeo-colostomy*—I implant bowel directly on raw surface, and if this raw surface is small, as it is in thin subjects, I increase it by unfolding or peeling from the parietes more peritoneum, and turning its raw, not its serous, surface on to the bowel.

A few special or crucial incidents may be quoted. Some years ago I lost a case of *celeo-colostomy*, done in the usual way by sero-serous suturing, through the opened gut being dragged inside the abdominal cavity. I blamed an imperfect suturing of the parietal peritoneum to the gut and skin at the lower end of the wound, and expected that the *post-mortem* examination would show this to be the cause of the giving way. As it turned out, this was the only part that held firmly; everywhere else the adhesions had given way, wholly or partially; here they were strong and firm.

Three weeks after undergoing the operation of gastrostomy

a patient died of bursting into the lung of an abscess connected with cancer of the gullet. For an inch all round the gastric opening parietal peritoneum was glued to gastric peritoneum by adhesions which were dense and opaque, but easily detached. The line of the fistula, where a tube of gastric wall lay implanted on the raw incised surface, could not be detached at all. By mistake the specimen was put into the macerating tub. At the end of a week, when the specimen was found, the sero-serous adhesions had melted away, but the fibro-serous adhesions between the stomach and the parietes were as firm as ever; the stomach seemed to be absolutely incorporated with the parietes. The specimen (now mounted in spirit in the Bristol Medical School) continues to show the close intimacy of the union.

Further evidence in favour of the strength and durability of sero-fibrous adhesion is supplied by the occurrence and persistence of adhesions when surfaces are left after operation uncovered by peritoneum. Adhesions between bowel and raw surface (such as the stump of a pedicle) may, as we know, be strong enough to cause obstruction. A recent hospital case, where I had to reopen the abdomen for obstruction a week after removal of the appendages for myoma, was a striking example of this. The intestinal wall was positively incorporated with the surface of one of the ligated pedicles; it was quite impossible to tear them apart; it was necessary to cut away a piece of the stump to liberate the intestine. Such adhesions remain to give further trouble also.

Sero-serous adhesions, on the other hand, tend to disappear; often they disappear very quickly. Another hospital case, in which I have performed no fewer than eight operations—four to relieve obstruction and four to close fistulae—gave abundant opportunities for observation of the growth and disappearance of peritonitic adhesions. The case was a complicated one, with enormous distension, and hernia through the foramen of Winslow. There was prolonged evisceration of intestines during evacuation of their contents. At the end of a month the abdomen was reopened for recurrence of symptoms, and numerous close peritonitic adhesions were discovered. A fistula was now established. Twice the fistula was closed, and the symptoms recurred on each closure. A further thorough exploration of the abdomen showed that the old adhesions had disappeared, with the exception of a few thin threads easily torn through. The bowel implanted on the raw parietal wound, however, was always firmly fixed—too firmly. Indeed, as I have said, where loose and temporary fixation is desired, as in temporary drainage of intestines for obstruction, sero-serous apposition I now believe to be better than sero-fibrous.

These examples show by comparison on the same patient that at the end of days or weeks the adhesions between intact serous surfaces is not so strong nor so intimate as between serous and raw surfaces.

At the end of three months the same holds good, and of this I had a disagreeable experience with two colleagues a few weeks ago. Three months previously on this patient I had done an operation for fixing the colon—*colopexy* it may be called—to the left inguinal parietes. The colon at the operation was fixed over an inch by three silkworm gut sutures carried through the parietes, and forming part of the parietal sutures; but the peritoneum was outfolded, and its raw surfaces laid on the gut. It was necessary to open the abdomen again, and we were startled to find how close and intimate had become the union of the colon to the parietes. The colon seemed to be buried in them, although muscles were not at all penetrated. It was as if the gut had acquired a new mesentery, firmer and stronger than the natural one.

These are examples of the union of serous to raw or incised surface, and perhaps they will serve their purpose as well as

a greater number of examples culled from the ordinary routine of practice. Wherever possible this routine is made to involve the implantation of one raw surface on peritoneum. Thus in hysterectomy by the extraperitoneal method the peritoneum is not attached by its serous surface to the serosa covering the pedicle, but the raw surface of the peritoneum is opened up and laid over the pedicle. In cholecystotomy the gall bladder is surrounded by the raw surface of the detached peritoneum not gathered in and sutured, but purposely opened up and spread out. It is easy enough, if it tends to remain open, to close the fistula without entering the general cavity. In colostomy by celiotomy immovable fixation of the gut on the parietes, preventing both indrawing and prolapse is best got by direct implantation of the gut on the parietal incision, supplemented, if necessary, by outfolding of the detached peritoneum. And in every case where I desire to get rapid and strong fixation of hollow viscus, cyst or abscess wall, pedicle or solid growth to the abdominal parietes, I always now apply not serous to serous surface, but either serous to raw surface or raw to raw. The parietal peritoneum is either turned out so that its raw surface lies in contact with the serosa to be attached, or the serosa of the organ is peeled off, or both are done.

The apposition of a raw to a serous surface has thus far only been spoken of as being more perfect in its results than serous to serous. Raw to raw surface, while in my experience better than serous to serous, is probably not quite so good as raw to serous. My adoption of the junction of raw surfaces has been in the first place to avoid opening of the abdomen, but my appreciation of it has gone beyond this. I was first led to adopt the apposition of raw to raw surfaces in the healing of intestinal fistula after operations for intestinal obstruction, and for resection of intestinal growths and areas of gangrene. As I am responsible for the introduction of intestinal evacuation and drainage in obstruction, I have naturally become responsible for the healing of a considerable number of cases of intestinal fistula and artificial anus. This I now manage by an extraperitoneal operation made possible by detaching the parietal peritoneum for some distance around the fistula. The parietal peritoneum, still adherent to gut, being detached, the bowel with the peritoneum can easily be delivered through an incision traversing the cutaneous and muscular layers, and the opening, large or small, in the gut is closed by apposition of raw surfaces. The union is as good and as rapid as when serous surfaces are united. The details of this operation do not concern us now; I quote it simply to show that, in enterorraphy, closure of a fistula, or even of the whole circumference of the gut, sero-serous apposition is not essential.

One prime advantage of sero-serous union is that it takes place very rapidly, that in a few hours it is water- and gas-tight. But such union is no more rapid than when peritoneum is apposed to a raw surface. If we bear in mind the histological forces at work, we can readily understand how this should be. The layer of lymph and young cells which lies between the serous surfaces has little cohesion, and, being shut off by a double layer of endothelium from vascularisation and from ingrowth of plasma cells, is long in being converted into true granulation tissue. Vascularisation is slow and fibrillation is slow, and while they are going on Nature is beginning to get rid of the exuded lymph. Such adhesions often disappear; if they remain they nearly always get thinned and elongated.

On the other hand, the primary lymph coagulum between serous and fibrous surfaces forms just as quickly, and having more points of attachment amongst the opened fibres, it holds more strongly. As it taps open connective tissue and is surrounded by plasma cells vascularisation begins at once and goes on apace. At the end of two days sero-fibrous adhesions are stronger than sero-serous; at the end of a week sero-serous adhesions may still be peeled off with little bleeding; sero-fibrous can then scarcely be separated at all, and their separation causes free bleeding. If there is little to choose between the two as regards prevention of extravasation of fluids for the first few hours, the sero-fibrous has a decided advantage as time goes on. The lowly-organised, inert, and loosely coherent plug of lymph is easily disturbed and would be easily broken up in the presence of fluid. This we know to our cost; it is on the second or third day that

leakage takes place. A sero-fibrous junction that lasts for a day is practically safe for ever, for it goes on improving in strength and solidity.

The practical application of these principles is as wide as abdominal surgery, and includes not only results to be encouraged, but results to be avoided. Where it is desired to secure quick, strong, and permanent union, sero-fibrous apposition is better than sero-serous. Where the union sought need not be strong and is desired to be only temporary, sero-serous apposition may be adopted. Fibro-fibrous apposition, while perhaps as good as sero-serous, is not in my experience so good as sero-fibrous. Sinister results which we seek to avoid arise when we leave raw surfaces to which intestines may adhere and cause obstruction. To cover such a surface by peritoneum would, according to published statistics, save nearly 2 per cent. of the deaths after abdominal operations.

In ordinary work the carrying out of these principles involves some such practices as the following: Fibro-fibrous as against sero-serous apposition is carried out in the closure of the parietal wound; in operations for the cure of ventral and umbilical hernia; and in kolpo-hysterectomy. Closure of the parietal incision is made by apposition of the raw peritoneal flaps outfolded, and not of the intact serous surfaces intumed. This, it may incidentally be mentioned, by abolishing the inward dip of the united peritoneal flaps, helps to prevent ventral hernia. And ventral hernia, when it occurs, may efficiently be cured without entering the cavity at all by a union of the raw peritoneal membrane on its outer aspect in some line away from or crossing a further union of the retracted or displaced muscle. Similarly, though with more detail, is performed an operation for the radical cure of umbilical hernia which I devised and described some years ago, and is now in very general use. In kolpo-hysterectomy the peritoneum is turned away from the vagina, and union is got by apposition of the raw surfaces between the vagina and the cavity. In Cæsarean section I should suture the uterine wound, not by inturning of both peritoneal surfaces, but by out-turning both or one of the peritoneal coverings.

Sero-fibrous apposition or apposition of a peritoneal surface on the raw wound is carried out in such operations as gastrotomy, hysteropexy, enterostomy, colostomy, cholecystotomy, and the numerous operations which involve the drainage of cysts and abscesses. In these and allied operations I can speak with what confidence is begotten of personal experience. I should like to see the principles carried further into intestinal resection. Senn went some way towards sero-fibrous approximation when he suggested scratching of the apposed peritoneal surfaces. I should like to see it carried further either into actual denudation of one serous surface or actual outfolding of both serous surfaces so as to get a flange-stitch; or by removal of a ring of mucous membrane and enveloping the intact gut by the muscular and serous coats (Jessett Robinson). And this is one purpose of my writing now, to suggest further experiments in intestinal surgery to test the question whether sero-serous apposition with infolding is really the best method of joining divided bowel. A cautious application of accidental results has convinced me that, over the greater part of the field of abdominal surgery, sero-serous junction is not the best; extended experience must show whether the same rule holds good with regard to intestinal surgery. If the proof in this case goes against the general principle, I think it is more likely to be on mechanical than on pathological grounds.

HYPNOTISM IN HUNGARY.—The National Sanitary Council of Hungary has called the attention of the Minister of the Interior of that country to the dangers of the unrestricted use of hypnotism by unqualified persons. It is suggested that such experiments should be strictly confined to legally-qualified members of the medical profession, and should be permitted to them only on the following conditions: (1) That the consent of the person it is proposed to hypnotise, or, in the case of minors, that of their parents or guardians, should first be given; (2) that a third person should invariably be present at the sittings; (3) that the experiments should be conducted on the part of the practitioner under the full responsibility which the law of Hungary attaches to the practice of the healing art.