CLINICAL LECTURES ON THE TREATMENT OF OPERATION WOUNDS.

Delivered at St. Bartholomew's Hospital, London.

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I.—On Operating without Waste of Blood.

GENTLEMEN,—You are so accustomed to the recoveries which follow amputation and other operations, that it may be a surprise to some of you to hear it stated that there must be a considerable death-rate after operations, especially after amputating at the thigh and leg, and after the ligation of certain arteries. Now and again, no doubt, a patient must sink under a severe injury, or dies exhausted after an operation for the treatment of some chronic malady, but even in the face of such risks as these, there has been a death-rate in my wards after all operations, excluding herniæ, of but three per cent.; and for four and a half years there has not been one patient lost as a consequence of amputation, although during that time, under Sir James Paget or myself, thirty-five consecutive amputations have been treated in the same wards.

I notice that in one of the recently given Introductory Addresses it has been stated that the death-rate after amputations in the largest metropolitan hospitals is one in three; and, further, that there is reason for believing, for some operations, that the death-rate, instead of diminishing, is yearly becoming greater; and, further still, I see that in the same address it is thought necessary to ask—if hospital surgeons remain content in losing one-third to one-half of all amputations and nine-tenths of some. In support of these statements, the figures and the accusations against large hospitals which were introduced by the late Sir J. Y. Simpson are quoted; and it is intimated that in the aggregation of patients in such hospitals is to be found the cause of this great mortality.

Now, I have already written that Sir J. Y. Simpson's statements are misleading, and I think I have exposed some of their fallacies, but, if they are still to be used in argument as accepted facts, and are not discredited by other hospital surgeons, then I claim that we, at least, may be divorced from so-called large and metropolitan hospitals, for I say of this, which, of old hospitals, is the largest and most ancient, that no patients can recover better than do those who lie in its wards.

It is not, in my experience, in hospitalism, that the cause of a high death-rate after operations is to be sought. But on this occasion I do not intend, in any direct way, to investigate the causes of such a death-rate, or to excuse it, supposing it to exist; for I propose, rather, to try to explain to you how it is that the recoveries we obtain are to be accounted for, and I think you will readily see that the results are due to a number of influences which have each very carefully to be considered.

If, then, you would take pains to ensure that your operations shall do well, you must adopt a code with some such headings as the following:

1. Leave nothing to chance.
2. Scrupulously prepare your patient.
3. Carefully locate your patient.
4. Attend strictly to details of treatment at and after operation.

On three of these counts I shall now say little. The first commends itself—as it foreruns the others in my order, so it should always be uppermost in your thoughts. Those of you who have acted as my dressers know how important the second is held to be; how systematically each patient is examined, with the aid of the physician if a doubt exists as to the condition of any important organ; and how a record of pulse, of temperature, and of respiration is prepared before each operation to guide us in our estimate of the value to be set upon subsequent variations. But, further, in many apparently trifling details, the preparation of a patient has to be carefully considered, and in illustration of this let me ask you to remember that the child who was yesterday operated on for hare-lip had been, so to speak, trained by Mr. Champneys for subsequent treatment, having been accustomed for some day or two previously to the pressure and discomfort of the straps of plaster, which, as you saw, were needed after the operation to steady the two sides of the wound. The child fretted but little after the operation, because it

was already familiar with one, at least, and that probably the most irksome, of the necessary holdfasts.

Nor is the locating of a patient to be neglected. Never should you allow an important operation to be placed, for instance, between profusely suppurating wounds; beforehand the question of the bed which the patient is to occupy should be carefully decided on.

But I do not propose to-day to speak to you in detail upon these points, as it is my intention to pass rather to the consideration of the fourth of my headings—that which relates to the attention which must be given to details of treatment at and after operation.

These details may be considered thus:

1. To avoid waste of blood.
2. To ensure rest and ease.
3. To provide for warmth, cleanliness, and dryness.

And to-day the first of these shall have our attention.

It is not well to say off-hand that all loss of blood must be prevented, as is suggested by some advocates of Esmarch's treatment, for I take it that in amputating a limb after a severe injury, sustained by a healthy man, it is right to take away all the blood that the amputated part has claim to, and in such a case unless there have been severe hæmorrhage before the patient is operated upon, it would be undesirable to endeavour to remove from it the blood contained in the limb before amputating; but, with such an exception as this, all surgeons agree that the blood must be jealously husbanded, and certainly that there should be no waste of it. This is no new subject for consideration, and, consequently, in the lapse of time many suggestions have been made with the object of lessening blood-loss at operations.

By some surgeons, arteries have been tied before an amputation has been commenced, as, for instance, the common femoral artery, before amputating at the hip joint; and, quite lately, Dr. Podrazki has advocated (not that I approve of the proposal) tying the lingual arteries before attempting to remove the tongue (*Wiener Med. Wochenschrift*, December 14, 1872), so as to avoid risk from bleeding at the time of its abscission. In the same spirit, it has seemed to me desirable to divide the muscles of the soft palate some day or two before repairing the deformity from a cleft, so as to avoid that loss of blood which, if it be not embarrassing to the operator, is apt to be exhausting to the patient when occurring at the end of a somewhat tedious operation.

A more common help is found in the use of compresses. You saw that bleeding was controlled, in operating upon the hare-lip, of which I have already spoken, by fast-holding each side of the lip with a pair of forceps, adapted to the case, and you will constantly notice how thoroughly bleeding may be restrained during the removal of large tumours by an assistant who follows the knife with a piece of dry linen cloth or some similar appliance by which the surface of the wound is compressed until the vessels can be picked out and twisted. Indeed, in this way, with wounds of small size, as in those for ovariectomy, bleeding may be completely controlled until each vessel is taken up with torsion forceps; and here we may remember that another reason, besides our desire to avoid blood loss, induces us to be very careful against hæmorrhage in these cases: we want to prevent the blood from trickling into the sac of the peritoneum. It does harm there if it get there, that is if it be suffered to remain—as it should not be; so it is well to guard against the occurrence. The well-doing of that patient who suffered from a large renal abscess, which some of you may recollect I opened by incision through the peritoneum, is to be attributed to the care we took to prevent blood or discharge from finding its way into the serous sac; and, if you have the opportunity, as I presume you shortly will, of seeing an operation for gastrotomy on a man suffering from stricture of the œsophagus, whose case Dr. Andrew has asked me to see with him, you will observe how completely the wound through the abdominal wall will be dried before the sac of the peritoneum is incised on the way to lay open the cavity of the stomach.

What I advocate on a small scale, and by the help of torsion, M. Verneuil (*Gazette Médicale de Paris*) has proposed to do, using ligatures, for such large wounds as those made in amputations, for cutting slowly through the tissues he ties each artery and vein as it is divided. In part his object is to save blood, but he further advances a singular reason for the procedure, fancying that the pressure of a tourniquet is apt to give rise to changes in the veins, such as thrombosis. But no vein should ever be compressed by a tourniquet, as you will presently see; and I confess the treatment pursued by M. Verneuil scarcely commends itself to my mind.

In the same blood-saving way, Esmarch of Kiel (*Sammlung Klinischer Vorträge*, Volkman, September 1873; *London Medical Record*, October 20th and 29th) has practised bandaging the limb to be operated on by an elastic roller, so as to press out its blood, compressing the artery by an elastic band—an operation which is practically simplified by the ingenious contrivance of Mr. Cripps, and which

you here see—a simple elastic tube which can be coiled three or four times round the extremity, and is then rolled up the limb when worked by these handles. I do not know that there is absolute novelty in this proceeding. It attracted little attention when brought before the surgeons at Berlin, probably because others had had somewhat similar experiences, as I am told Mr. Clover in this country has had; but Billroth, to whom I am indebted for an obliging note on the subject, has warmly advocated it, trying it, amongst other cases, in an amputation at the hip, the final compressing band being carried round the perineal and gluteal regions, but, in this instance, without success (*Wiener Med. Wochenschrift*, July 19, 1873). The cases in which it seems best to answer, or in which the practice, advocated in Edinburgh, of raising the limb before operating, and, after the blood has run out, placing a tourniquet on the main artery, are such as operations upon carious bones of the foot, or cases of necrosis of the bones of the leg or arm. In one instance, Dr. Hermann Weber informs me, it was useful in this way—in cutting through an os calcis, the bone, pale from abstraction of its blood, was seen to be laden with tubercular deposit, and the operator, deciding that such bone had better be removed, converted the intended Pirogoff into a Syme amputation. You will notice that in using Mr. Cripps's apparatus it is desirable to pad the popliteal space, so as to ensure pressure upon the artery, as the elastic tubing coils along this portion of the limb.

As the catching term associated with it of "bloodless operations" is likely to lead to a very general use of this arrangement for lessening the loss of blood, you ought to have in mind that there are some conditions for which it is doubtful if its use is desirable. Cases where there is any suspicion of local vein-disease are, I think, of this class; so, too, are cases in which primary amputation is required for crushing of tissues, as in such the torn veins are closed with clots which might possibly be displaced by the compressing bandage, and so pass into the larger vessels, causing embolism; and so also are cases of gangrene, or cases of rapidly extending cellular inflammation; at least, I may say this, that I should not be disposed to use it in such cases, or to recommend its employment. There is, however, no reason to suppose that it engenders risk of after-sloughing of parts, as of the skin flaps of amputations. Billroth, in fourteen cases, had no such consequence to report, nor has any such been heard of in our own experience of its use. Billroth's expectation that the compression might prevent pain has, however, been tested by him and has failed, the patient suffering greatly during the operation. But in quite another direction as a compress in the immediate treatment of poisoned wounds, it is not improbable that it may be serviceable.

Well, gentlemen, such are some of the means you should employ to save all the blood you can from being lost to your patient during an operation. You may ligature vessels before your operation proper is begun; your assistant may check bleeding by the use of compresses, or you may twist each vessel as it is divided, whether it be artery or vein; you may, in great part, empty a limb of blood by elevating it, or, better still, by using Esmarch's elastic bandage; and beyond these means you have an effectual preventive of waste of blood in the finger of an assistant, or by using a tourniquet for compressing a main arterial trunk.

The tourniquet is invaluable, if only it be properly applied; for, indeed, its application is by no means so simple a matter as, at first sight, it may appear to be. Speaking now of its scientific use, not of the rough appliances which, on an emergency, a surgeon may find himself justified in using, I would say that it should be employed only, or with rare exceptions, for the compression of the common femoral or external iliac (for these vessels, so far as tourniquet pressure is concerned, are needlessly distinguished by separate names), and for that of the abdominal aorta, and even for the first of these compression made with the finger is infinitely preferable. For all operations about the upper extremity the artery should be secured by the finger of an assistant; at least such is my practice; for, in such cases, a tourniquet is with difficulty applied so as to avoid pressure on veins and nerves, on veins more especially. Now, suppose you have to control the femoral as it turns over the pelvis, you take this Italian tourniquet and secure the large flat pad firmly by placing it beneath the tuberosity of the ischium; if the lesser pad be then lowered by the screw, it will fall with very little manœuvring over the femoral artery. You have no business to press this vessel as it passes through Scarpa's triangle, first, because, from lack of counter-resistance, you will find it difficult to control its pulsation; and, secondly and chiefly, because pressure here will also compress the vein or veins which lie beneath the artery, and this would occasion great waste of blood when the chief venous trunks come to be divided; you must then direct your compress so as to push the common femoral up against the bone as the vessel comes out from the pelvis; or, if you direct your pressure downward, it must be made over the external iliac

as it reaches the bone surface. But you must attend to yet another point: the pad of the tourniquet is always larger than suffices to cover the area of the artery; so you take a piece of lint, and fold it so as to make a compress the size of your index finger, and an inch or more in length, and you place this over the exact course of the artery. This is not so good as finger pressure, but it is the next best thing to it; and, when the moment comes for controlling the vessel, you will do so without affecting the flow of blood through the adjacent vein, and will consequently have done the best towards preventing undue loss of blood. And this precaution holds good yet more clearly for tourniquet pressure on the abdominal aorta, which is the vessel you control for amputations high up in the thigh, and for amputations at the hip joint. On two occasions on which I have applied the tourniquet for amputation at the hip, there has been scarcely any blood shed. You have to recollect the position of the vessel and that of the vena cava ascendens. On the front of the abdomen, the umbilicus gives a landmark, immediately below which the pressure is to be made, so as to fall upon the artery just above the origin of the iliac vessels. Higher than this it is not safe to go; there you come to the large branches given off to the intestinal canal; there lie the duodenum and the pancreas, and there, too, is the great network of nerves, with their ganglia, which are distributed to the viscera, and I have known hurt from pressure upon these structures; and in one case, in which the tourniquet was applied for some time for the treatment of an aneurism, some of the structures I have referred to were irreparably damaged. The line of pressure, too, should incline to the left side; you may thus command the artery, and you will avoid the vein. If you do not keep clear of the vena cava, there will be a gush of blood, when the operator divides the vessels of the thigh, from the entire iliac system of veins, which will be with difficulty restrained whilst the operation, including the securing of the vessels, is being completed.

By considering the requirements of each case, you may be sure you will be able, by some one or other of the means now referred to, to perform any operation with little loss of blood—certainly without waste of it; and, if your patient is to convalesce well and speedily, this is one detail not to be lost sight of. The stopping of bleeding, however, has yet further to be thought of; you have to secure a wound against recurrent bleeding, and you have to make sure that there shall be no secondary hæmorrhage. Here comes in the question of how bleeding may be stopped so as to ensure for a wound subsequent rest and ease.

ON THE PREVENTION OF UTERINE INFLAMMATION.*

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I SHOULD think it waste of time to discuss that the most frequent cause of uterine inflammation is to be found in parturition and in abortion; the more so, as this professional conviction tallies with the patient's generally referring a serious attack of metritis to "a bad getting up" or to a bad miscarriage.

1. What are the symptoms of a bad getting up and of a bad miscarriage?
2. What are those organic lesions of a bad getting up, that lead to uterine inflammation?
3. How to prevent a natural function becoming a frequent source of metritis?

Such are the questions that I propose to briefly examine.

1. *What are the symptoms of a bad getting up?* General debility, showing itself in various ways, notwithstanding a fair amount of rest, food, and stimulants; an inability to stand or walk a few steps without feeling ready to drop; a sensation of bearing down and of uneasiness, rather than of pain, in the pelvis; the persistence of an abundant vaginal discharge, particularly if it be bloody or muco-purulent, three or four weeks after parturition, when the lochial discharge ought to have ceased. When such a disturbance of health arises in the midst of other circumstances or without known cause, it excites alarm, and is carefully investigated, but, because it has been clearly caused by parturition, the case is often inadequately attended to by the medical attendant. Change of air and tonics are the only things he recommends. The vaginal discharges are not inquired into; they are set down as leucorrhœa; and he does not even examine to ascertain, whether perchance the symptoms may not be caused by the inability of the womb to get

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