disease (in India) as always of faecal origin, should give the subject reconsideration.

In Virchow's fibrinous or diphtheritic form, or in gangrenous dysentery, the changes are more serious. The intestine is intensely congested, the lumen diminished, and the whole tube thickened. The contents consist of a thin reddish fluid, with some faecal matter. The mucous membrane is reddish or whitish, and is covered with discoloured patches, and the natural appearance of mucous membrane is lost. There is infiltration of fibrous exudation throughout the tissues, which may invade the whole gut, when gangrene and death result. Most cases, however, are probably combinations of the catarrhal and fibrinous, causing ulcer and thickening of the bowel. This causes the irregularly thickened state of the gut; and from such cases sloughs are thrown off and ulcers form. The site and extent of these ulcerations vary. The sigmoid flexure is a common site; the caecum in certain cases, and the rectum in others, are the principal seats of it. In some severe instances the whole gut is involved; but it may occur at different periods in different parts of the bowel. The condition of chronic dysentery into which these cases often pass is due to these structural changes in the bowel—*i.e.*, to thickening and imperfect cicatrization of the ulcers, and to the permanently injured state of the glandular structures.

Dysentery is always a subject of anxiety when it occurs during pregnancy. It is very prone to cause miscarriage or abortion, and the progress towards recovery is generally more rapid after the ovum is extruded. It is less amenable to treatment in the early stages in this state, and in either chronic dysentery or ordinary dysentery serious symptoms are more likely to supervene in the pregnant woman than in others.

It also frequently complicates the recovery after delivery, and assumes a very dangerous condition, though happily, even in this form, it is under the control of appropriate treatment.

Intestinal worms—*lumbrici*, *&c.*—are a frequent accompaniment of dysentery in Bengal, and their presence must tend to intensify the local irritation and to aggravate the disease.

The treatment of an attack of ordinary acute dysentery is to be conducted on the following plan. The patient should remain in bed or in the recumbent posture; if there be abdominal pain or tenderness on pressure, hot fomentations or turpentine stupes should be sedulously applied. A dose of twenty or thirty grains of ipecacuanha powder, according to age, strength, *&c.*, should be given to an adult at once in water, and the patient should endeavour to resist vomiting as long as possible—though for my part I am inclined to think the emesis does rather good than harm. It may be well to combine ten grains of carbonate of soda with the ipecacuanha, to neutralise acidity. It is recommended by some to give a dose of fifteen or twenty drops of laudanum before the ipecacuanha, and to apply a sinapism to the epigastrium, with the view of diminishing irritability of the stomach and of preventing sickness. He must abstain from all fluids except occasional mouthfuls of iced water or bits of ice to allay thirst, which is often intense. My own plan has generally been to repeat the dose of ipecacuanha in four or six hours—a second or third time, according to the effects; and especially if the first dose have been speedily rejected, as it often is. I have generally found that if this treatment be resorted to early in acute dysentery, it is most effective, and nothing else is needed. The pain diminishes, the tormina and tenesmus are alleviated, the restlessness is abated, the sense of fulness and desire to go to stool passes away, the skin becomes moist, and in all respects a general sense of relief is experienced. The motions become faeculent, and assume a peculiar yellow appearance, significant of the action of the remedy. If any irritability should remain, a dose of ten or fifteen grains of Dover's powder is beneficial; it gives ease, sleep, and aids in the restoration of the natural action of the bowels. Small doses of castor oil—half an ounce or less—are given occasionally, and by some are considered of importance. No doubt, if there be inaction of the bowels after ipecacuanha, or if it be necessary to aid in expelling mucus—for the irregular contraction of tenesmus is not always efficient in this respect—the castor oil is most desirable; or if there be indications of hepatic or portal congestion, sulphate of soda or magnesia would be better.

It is quite possible that there may be a recurrence of the acute symptoms; in which case the ipecacuanha must again be given, though it may now be in smaller doses of ten or fifteen grains—the recumbent posture and the carefully-regulated diet being rigidly observed, with fomentations, and ten grains of Dover's powder at night; or an injection of starch and thirty or forty drops of laudanum.

When the disease has advanced to ulceration, and when the chronic stage has been fully established, the ipecacuanha is no longer useful.

In my next lecture I shall describe the treatment of the subacute and chronic form of dysentery.

CLINICAL LECTURES ON SOME POINTS CONNECTED WITH THE TREATMENT OF WOUNDS.

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LECTURE I.—LIGATURES.

GENTLEMEN,—I beg to draw your attention this morning to some particulars in the immediate treatment of wounds, and to place them before you in a more formal and connected manner than is possible when putting them into practice in the operating theatre, or at the bed-side.

Preliminary Remarks.—In order to place a wound in the condition most favourable for healing, all sources of irritation must be avoided or removed, whether they arise during the performance of an operation, or in the immediate treatment of the wound, whether in the substances employed or in the manner of using them. When a linear incision requires to be made, if it be accomplished by a single clean cut with a keen edged bistoury, it will produce less irritation than if it were made by half a dozen cuts attempted to be placed in the same line; because in the latter the tissues are more injured, the incised area is multiplied, and a ragged instead of a smooth section results. Hence, when an operation can be accomplished by a single incision instead of by half a dozen cuts, the irritation caused in making the wound is reduced to a minimum, and it is thereby rendered less liable to the production of pus. When the wound has been formed, the less it is handled or fingered the better. If its lips require to be drawn aside for any purpose, this ought to be done as gently and as lightly as is consistent with efficiency. Any over-straining or over-stretching ought to be avoided. When the operation is completed, refrain from introducing foreign matter into the wound. If it have been performed under the spray, there is no occasion for drenching an aseptic wound with carbolic preparations; and, above all, consider before using substances such as one to twenty watery solution, or chloride of zinc, forty grains to the ounce. Some cases there are where the use of such strong remedies is imperative, but the great majority of wounds do not require them; and when this obtains, their application does harm and retards the healing. The free use of Volkmann's spoons for cleaning out sinuses, and for the removal of foetid granulations, lessens the number of cases in which it is necessary to apply strong antiseptic solutions.

Elastic Webbing as a Tourniquet.—The next point is the arrest, or rather the prevention, of hæmorrhage, as in most cases bloodless operations are now performed, and the surgeon endeavours to occlude the open mouths of the blood-vessels prior to the removal of the restraining bandage. In rendering the limb bloodless, the bandage invariably used in my wards is the broad elastic webbing. It serves two purposes: first, to empty the limb of blood, when Lister's method of doing so is not employed; second, to act as a tourniquet. In the latter respect it is much safer than the elastic rod and catch, as with this rod the force is concentrated on a very small space, and is consequently apt to injure the tissues, more especially as the amount of pressure is difficult to regulate. In the broad elastic bandage the pressure is distributed over a considerable area, its amount being adjusted by the cumulative effect of several layers of the bandage, one over the other, so that the desired constriction can be more easily measured.

The Old Ligature.—We then endeavour to close the mouths of the blood-vessels before removing the elastic webbing. The choice of a ligature is important. Formerly threads of various substances, most often of silk, were used as ligatures, their ends being left long and hanging from the wound. The part being exposed to the air, these threads were apt to keep up a communication between the atmosphere and the interior of the wound. As they could only be removed safely after they had set up sufficient irritation to enable them to ulcerate their way through the coats of the artery, there generally was a discharge of pus which rapidly became purrid, and the long ligature established a conduit by which the putrescence penetrated to the very interior of the wound. Few things could be better devised to set up irritation, or better calculated to induce pyæmia. Following in the wake of the ideas which are now prevalent regarding short ligatures, some still use silk, properly carboliced, and cut off the ends of the ligature close to

the artery, in the hope that the noose may, as it sometimes does, become encapsuled, and thus produce little or no irritation. This, however, cannot be depended on, and generally leads to disappointment. The tissues often assume a detergent action from the irritation occasioned by the silk, ulceration is induced in the extremity of the vessel, ending in the slough of this part, and the emancipation of the piece of silk, which is washed out of the wound in the purulent discharge. Sometimes the wound heals, and the patient is dismissed cured (?), the silk being supposed to be encapsuled; but afterwards an abscess forms and continues to discharge, until the small knot of silk is thrown out of the tissues.

Carbolised Catgut Ligatures.—What was wanted was a substance which would be efficient as a ligature, and which would not produce irritation in the wound. The desideratum was obtained in an animal ligature which served its occluding mission, and then became absorbed. This Mr. Lister found in ligatures of carbolised gut. Animal ligatures of various kinds were long previously tried, were found wanting, and were abandoned. Lister, however, believed that if these ligatures were first rendered aseptic, they would answer their purpose, and ultimately become absorbed. This has been fully realised. The carbolised catgut ligature has been in use for a period of over ten years, and it has been of immense service. You see such ligatures applied daily in our wards, and for ordinary purposes nothing could answer better. With the exception of the main vessels in the shoulder and the hip, they are applied for the ligation of arteries in amputations in all other regions, and secondary hæmorrhage after their use is never seen. They are, of course, applied directly to the artery, and not so as to include a portion of tissue surrounding the vessel. It is my distinct impression that secondary hæmorrhage is not so often heard of since the introduction of such ligatures as it used to be under the use of silk. Many faults have been ascribed to carbolised catgut ligatures, but, with one exception, they are incomprehensible, as they never take place in my hands. The only deficiency which may be truly urged against them, when they are proposed as a ligature of a main trunk, or for the deligation of an artery in its continuity, is, that they are absorbed too soon. Carbolised gut softens, and yields in about forty-eight hours, and therefore in certain cases it may be necessary to use a ligature which would maintain its constricting force for a longer period. Mr. Lister has been endeavouring to secure such a ligature, and believes he has now succeeded; but hitherto he has not seen fit to publish his results.

Chromicised Catgut Ligatures.—With a view of obtaining a ligature which would serve this end I made, during the past few years, a series of experiments with catgut prepared in chromic acid and glycerine; and without going into detail concerning these investigations, it is sufficient to say, that ligatures were obtained which admirably serve the purpose for which they were intended. They are prepared by making, first a watery solution of chromic acid, one to five; then one part of this solution is added to twenty of glycerine. This forms a dark greenish compound, in which the hanks of catgut are inserted and retained for seven or eight months, the bottle containing them being occasionally shaken. At the end of this time the catgut acquires a semi-translucency, and has a dark colour like preserved ginger. It is then ready for use, and is stored in a solution of carbolic acid and glycerine (one to ten). The size of the catgut which is of most use in the ligation of large arteries (excluding such as the innominate) is the medium, and this size has been very frequently tested since 1877. In the shape of deep sutures, this gut has been, and, as you see, is daily being used in the wards. In this way we are enabled to ascertain its behaviour while in contact with the living tissues.

The Behaviour of Chromicised Catgut in the Tissues.—Three very important questions arise regarding the efficacy of any ligature. First, does it produce irritation in the tissues? Second, how long does it act efficiently as a ligature? and, third, when does it become absorbed?

Does it Produce Irritation?—Regarding the first inquiry, you will be able to verify the fact from personal observations, that this chromicised catgut does not produce irritation, as there is none about the parts of the wounds into which the deep sutures are inserted. Take for example, that case of amputation above the knee in Ward 29, occurring in a man about 40 years of age, the recipient of a severe railway accident, whereby his right lower limb was shattered. Lister's modification of Carden's operation was performed. Three chromicised deep sutures were introduced. At the second dressing, which you saw yesterday, a fortnight after the operation, there was not a drop of pus either on the dressing or from the wound; a little light-coloured serum exuded on pressure from the decalcified drainage-tubes. There was no redness or irritation in the vicinity of the chromicised stitches, which were absorbed some time between the second and the end of the third week. Another test is to place the ligature round a vessel in its continuity; and if the wound heal without production of pus, and abscesses be not afterwards

formed, it may be concluded that the ligature has not produced irritation. This has been done in a number of cases, out of which the following may be quoted. A ligature of chromicised gut was placed on the common carotid of a man about middle age, affected with aneurism at the bifurcation of the carotid artery. The wound healed without that production of pus. The patient was kept under observation for six weeks; the aneurism disappeared. He was then dismissed, but reported himself six months afterwards. There was no trace of the old swelling, and he stated that the wound never re-opened. There was no abscess at any time, and the ligature was never heard of. Another patient, about 40 years of age, had a chromicised catgut ligature applied to the femoral artery at the apex of Scarpa's triangle, for popliteal aneurism. The wound healed without production of pus. The patient was kept under constant observation for some months, and he reported himself a year afterwards. There was no re-opening of the wound, the ligature was never seen again, and the aneurism was cured. In a case of strangulated hernia, besides the constricted gut, a large portion of omentum was found in the sac. The omentum was gangrenous. Four chromicised catgut ligatures were inserted so as to occlude the vessels on the proximal side of the mortified part, which was then removed. The ligatures were never again seen, the wound healing as an antiseptic wound does. The patient reported himself some months after in perfect health, which he had enjoyed since dismissal. Many other cases might be adduced, in which the ligatures have been enclosed, and have not been heard of; but these are sufficient to illustrate the fact that they do not produce irritation in the tissues.

The Length of Time during which it Resists the Action of the Tissues: Period when it is Absorbed.—The second question is to ascertain the length of time during which the ligature will maintain its hold in the tissues before being softened. With a view of determining this point, the catgut has been used as a deep stitch in thirty-one instances. The earliest time in which it was found softened was nine days; the longest nineteen; the average fourteen. The softening was measured by its yielding to traction applied to both ends of the catgut, so that the ligature, though softened, still maintained its grasp at the end of fourteen days. In another series of cases, the stitch was left until the external portion dropped off, the internal having become absorbed. It was found that this process was completed between the fifteenth and the twenty-fourth day, the average being about the twentieth day. It will be seen that there is a considerable difference between the completion of the processes in various cases, this depending on the vital activity of the tissues into which the ligatures are inserted. No opportunity has hitherto been afforded of examining, after death, the intimate relation of these chromicised stitches to the tissues. We may assume that their ultimate behaviour is similar to that of carbolised catgut, with the exception, that the phenomena attending absorption are retarded.

Uses of Chromicised Catgut.—This quality of durability makes the catgut peculiarly fitted for other uses than the ligation of large vessels in their continuity, such as the approximation of the pillars of the ring for the radical cure of hernia. Mr. Wood, whose operation I have several times successfully performed, criticises the approximation of the ring by carbolised catgut, urging, with considerable point, that this can scarcely be a reliable procedure, seeing that the carbolised catgut gives way in two or three days, and that firm union of the pillars of the ring can scarcely be expected to be accomplished in that short space of time. This objection is entirely obviated by the use of chromicised catgut. It is strong enough to bring the pillars of the ring firmly together, and its durability is such that, by its intrinsic force, it maintains them together for about a fortnight. In four such cases, two occurring in adults and two in children, the pillars of the ring were brought together by a couple of chromicised stitches. The wounds healed over them, and they were never seen afterwards. At the end of six months three were examined, and found to have their rings closed; the fourth was seen about nine months after, and had still a firm wall.

En Résumé—The physical qualities of the catgut are such as to commend it as a ligature. It is very pliable, having very slight elasticity, but not sufficient to cause it to yield before the impulse of the current of blood in the largest arterial trunks. A firm secure knot can be tied on it. Physiologically, it produces no irritation in the wounds. It resists the action of the tissues for about a fortnight. It disappears about the twentieth day. It is eventually absorbed by the tissues, as is evidenced by their action on the chromicised stitches.

Bone-Sutures and Drains.—Chromicised catgut, prepared in stronger solutions than the above, will resist the action of the tissues for a much longer period; and catgut of this kind has been used as bone-sutures, with the idea of doing away with the removal of the stitch. A drain may also be formed of catgut, which will resist the action of the tissues for a fortnight, and then be slowly absorbed. This might, in certain cases, be substituted for hair.