

STIMSON (L. A.)

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OF ABDOMINAL SURGERY, LIMITING THE
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BY

LEWIS A. STIMSON, M.D.,
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**ON SOME MODIFICATIONS IN THE TECHNIQUE
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THE period during which the important and brilliant operations, now so frequently and successfully performed within the abdominal cavity, have been practised is relatively very brief, and although the accumulated, and, in many instances, the individual experience is large, the work has, in the main, been done along lines and according to methods and principles which, it may be assumed, have yet to undergo modifications that will be slowly evolved from the thoughts and experience of successive generations of surgeons. In this respect abdominal surgery differs widely from the other branches of the art: it can profit, not by the experience of centuries within its own field, but by that of only a few decades of years; and as, in addition, the material conditions of this field present wide variations from those of the regions upon which the skill and thought of surgeons have heretofore been concentrated, it is

¹ Read before the American Surgical Association, 1889.

not singular that corresponding differences should appear in its operative principles and methods. Of these differences the most striking is in the measures taken to prevent or arrest hemorrhage, which consist, as a rule, of *ligatures en masse*, ligatures of heavy silk, each embracing a large mass of tissue, and thus creating one or more "stumps" from which the blood-supply has been cut off, and which, subsequently, are either fixed in the external wound to be slowly cast off, or are left in the abdominal cavity to undergo molecular disintegration and absorption.

The advantages which, in theory at least, belong to this method are celerity of performance and freedom from hemorrhage, and it is not to be denied that in many cases, and especially in those which were the first undertaken in this branch, and success in which led to the great extension that has followed—the removal of narrow pedunculated cysts of the ovary—these advantages do exist. By no other method of treatment, probably, could the cyst be removed through so small an incision, so rapidly and so safely, and it is not strange that its admirable adaptability to these cases should have led to its habitual use in others, and that the attention and ingenuity of operators should have been directed by its defects to its improvement and modification rather to the substitution of a radically different method.

The principal objections to the *ligature en masse* are two in number: (1) It is not always an efficient

protection against hemorrhage, and (2) the mass of tissue embraced by it and forming the stump is sometimes so large or so related that it cannot safely be returned within the cavity and treated intra-peritoneally, but must be fixed in the parietal wound to be cast off as a slough, and thus to necessitate healing by granulation, with its delay and risks. The size of the stump is not the only reason for treating it extra-peritoneally; another and equally strong one arises from the fear of hemorrhage or from the nature of the means used to prevent it, such as the elastic ligature, the clamp, or the *écraseur*, which cannot be left within the peritoneal cavity. The danger of hemorrhage from a stump that is long enough to be treated extra-peritoneally is not great, for the protective means at our disposal are efficient, and, if bleeding should occur, it can be promptly detected and readily controlled. But it is vastly different with ligatures that are left within the cavity, ligatures of silk or catgut embracing, usually, a broad layer of parietal peritoneum that has been drawn in from all sides toward the ligature and is retained by it under considerable tension. Within this puckered fold of peritoneum lie the vessels and the tissue in which they are imbedded, all tense because they have been lifted up and drawn upon in the application of the ligature, and all constantly solicited by this tension to slip out of the loop. Each slight yielding to this traction makes the next one easier, for it diminishes the amount of tissue embraced within the loop, and thus diminishes also the friction

by which the rest is retained. Hemorrhage from such a ligature is not uncommon, and has been fatal, and the post-mortem examination plainly shows the mechanism by which it has been made possible; there is the large circular gap in the peritoneum, the wide extravasation in the subperitoneal connective tissue, and far up within it the divided vessel, all indicating by their separation the traction necessary to bring them within the loop of a single ligature. The fault is not in the tying of the ligature; it has not become untied, but it has failed to hold, just as it would have failed if it had been placed upon a smooth, hard cone. The ligature has not simply to compress the vessels contained within it, but it has also to oppose a constantly exerted everting strain, acting toward all sides, widening its loop, and favoring the escape of the central vessels by loosening the friction upon them, and in this contest it has too often proved the weaker.

The consideration that appears to have had most to do with the general use of this dangerous form of ligature is the supposed necessity of tying all divided tissues in order that all hemorrhage may be prevented, not only that from the larger vessels, but also that from the minute vessels of the peritoneum and connective tissue. But this necessity, I think, does not exist, and this mode of ligature should be abandoned, except in certain special cases, for that which is the rule in operations upon other parts of the body, the ligature of the arteries alone with the smallest possible amount of additional tissue, and

every effort should be made to exclude the peritoneum itself from the grasp of the ligature. Ordinarily, this is not difficult to accomplish. Take, for example, the outer portion of the broad ligament, where its peritoneal layers are reflected forward, backward, and outward, over the pelvis, and where the bundle of ovarian vessels lies. Draw it well up by lifting the ovary, place a rather long-bladed pair of self-holding forceps transversely upon it close to its base, divide the ligament a half inch on the distal side of the forceps along the full length of its blades; the divided vessels will be plainly seen on the cut surface, where they can be readily grasped with an artery-clamp, the peritoneum stripped back, and a ligature applied. Then, on removal of the first pair of forceps, the peritoneum retracts to its original position, the vessels lie free in their bed of connective tissue, and the ligature is subjected to no other strain than if it had been placed upon an artery in continuity; traction upon the parietal peritoneum by any shifting of the viscera or change in the attitude of the patient leaves it unaffected thereby. This can be done wherever a clamp can be placed between the abdominal wall and the part that is to be removed, and the cases in which *ligature en masse* will be preferable appear to me to be only those in which the abdominal incision is so small or the anterior wall so thick and so slightly depressible that a clamp cannot be securely applied and the cut surface readily inspected and handled. The cut edges of the peritoneum can afterward be brought together

with a continuous suture, if it is thought best to close this gap. The principle which, in my judgment, should govern the method of securing vessels divided in the removal of a viscus or a tumor from the abdominal parietes may be formulated as follows: The ligature should be applied to the vessels alone, underneath the peritoneum, and should under no circumstances include a circular layer or sleeve of parietal peritoneum that has been forcibly drawn up to form a pedicle, and will have to be held by the ligature against a diverging lateral strain.

A special and very valuable application of the substitution of isolated ligature of the vessels for the *ligature en masse* is the preliminary ligature of the uterine arteries in continuity, in supra-cervical or total abdominal hysterectomy. I have employed it with complete success in five cases, the first two of which were reported to the New York Surgical Society, January 9, 1889, and published in the *New York Medical Journal*, March 9, 1889. Each artery is sought for at the side of the upper part of the cervix by palpation of the broad ligament between the finger and thumb; after its position has been thus ascertained, a small incision is made through the peritoneum along its course on the front or, preferably, the back of the broad ligament, the artery separated from the veins with a director, and a ligature passed by means of an aneurism needle. The ureter lies to the outer side and is easily avoided. When both uterine arteries have been thus tied, and the ovarian vessels secured, as above described, by

clamps, both ovaries and tubes and the body of the uterus can be removed by a transverse incision just above the clamps and ligatures, and the cut surface will be almost absolutely bloodless. The cervix can then be removed by cutting through between it and the bladder into the vagina and then cutting around it with scissors, or, of course, the cervix can be removed without previously cutting away the body of the uterus by cutting through each broad ligament to the side of the uterus, carrying the incisions through the peritoneum on the front and back of the uterus, and then working down through these latter incisions to the vagina as in the other case. The hemorrhage from this part of the operation is trifling, and as the cut surface is freely exposed to view, any vessel that may require it can be readily caught and tied. The following record of a hitherto unpublished case (my fourth) may serve to show the details.

F. W., forty-eight years old, colored, unmarried, had suffered for a number of years from abdominal pain and discomfort, and profuse hemorrhages from the womb attributed to a slowly increasing abdominal tumor situated in the hypogastrium. When I first saw her, in March, 1889, she was greatly reduced in strength and had been confined to bed for several weeks. Examination showed a solid, irregular, movable tumor filling the space between the umbilicus and pubes, and extending a hand's breadth to either side of the median line. The cervix could not be reached *per vaginam*, and the upper wall of the vagina was somewhat depressed by

a firm, rounded mass, movable and apparently continuous with that lying above the pubes. The diagnosis of multiple uterine fibroids was made, and an operation for their removal was proposed and accepted. I sent the patient to the New York Hospital, and operated there March 26, 1889.

The peritoneal cavity was opened by an incision extending from a little above the pubes to the umbilicus, and through this the tumor and both ovaries were with some little difficulty turned out. By division of some broad adhesions between the rectum and the back of the uterus, Douglas's pouch and the posterior surface of the broad ligaments were freely exposed to sight and touch. The two layers of each broad ligament were found to be widely separated from each other near the uterus by the development of a fibroid low down upon the back of this organ, and each uterine artery could be felt lying much nearer the anterior than the posterior layer. The left one was first sought for through an incision in the posterior layer low down in the pelvis close beside the above-mentioned fibroid; it was found at the depth of about an inch, raised upon an aneurism needle for inspection and identification, and tied with catgut. The search for the right uterine artery was more difficult, because of its even greater distance from the posterior layer, but it was ultimately secured and tied, although not so cleanly isolated as the other had been. Up to this time twenty-five minutes had been consumed in the operation, fully ten more than in any of the preceding operations, the delay being due partly to the difficulties created by the depth at which the arteries were placed, and partly to an intercurrent exploration made to ascertain if they could be exposed and recognized with

certainly close to their origin upon the anterior branch of the internal iliac artery.

The outer portion of each broad ligament was then clamped with hæmostatic forceps well below the ovary, each ligament completely divided with the knife above the clamp, the cuts united by incisions through the peritoneum covering the front and back of the uterus, and through these incisions the uterus was peeled away from the peritoneum well down to the cervix, and then its body cut away by a transverse cut. There was no bleeding from the cut surface.

The stump of the uterus was seized with Volsella forceps and drawn upward and backward, the cut edge of the peritoneum adjoining the bladder drawn forward, and the anterior surface of the cervix rapidly dissected out until the vagina was opened into, the dissection being guided by the left forefinger introduced through the vulva into the vagina. After the opening had been made the finger was withdrawn and reintroduced into the vagina through the opening to serve as a guide in the division of the remaining attachments of the cervix; this was quickly and easily made with scissors, taking care to cut on the sides between the ligated uterine arteries and the cervix. There was no hemorrhage requiring attention, except from two small vessels divided in the dissection of the anterior surface of the cervix.

Turning then to the cut surfaces of each broad ligament at its outer part, where held by the clamp, the bunch of divided vessels was caught with another clamp, drawn out of its peritoneal sheath, and tied with catgut. The removal had thus been made and all bleeding arrested or prevented by six catgut liga-

tures, two on the uterine arteries, two on the bunches of ovarian vessels, and two on small bleeding points between the bladder and vagina.

The remaining details may be briefly given. The peritoneal flaps raised from the front and back of the uterus were turned down toward the vagina so that their serous surfaces were opposed to each other, and the sides of the peritoneal gap left by division of each broad ligament were brought together by a continuous catgut suture; a rubber drainage tube was placed in the vagina so that its inner end projected about two inches into the peritoneal cavity, and the anterior incision was closed. The vagina was loosely packed with iodoform gauze. The drainage tube was removed after forty-eight hours; loose packing was kept in the vagina for a week, and this passage was occasionally cleaned with a douche. The patient made a good recovery.

The capital point to be attended to is that the uterine arteries should be tied sufficiently low down in the pelvis, before branches of any considerable size are given off, for otherwise time will be lost in securing these branches when they are subsequently divided. In case of accident, such as the slipping of the knot of the ligature, or the wounding of the artery or of a branch by the aneurism needle, or of hemorrhage from an unsecured branch, the bleeding can be easily arrested by pressure with the finger upon the corresponding internal iliac artery or its anterior branch, and an opportunity thus afforded leisurely to repair the damage or secure the wounded vessel.

The advantages of the method are apparent: rapidity and ease of execution, absolute and permanent security against hemorrhage, relief from the necessity of creating strangulated stumps with the concomitant risks of setting up suppurative or septic processes, and immediate closure of the abdominal wound. In cases in which it may be deemed desirable to retain the cervix, it can be entirely shut off from the peritoneal cavity by drawing the peritoneum together over it, and its raw surface and that of the subperitoneal space can be drained by a tube placed in the cervical canal and brought out through the vagina. If the operation is undertaken for procidentia, the cervix may be retained and fixed in the lower angle of the abdominal wound, as in one of my fibroid cases, or it may be removed and the upper cut edges of the vagina fixed in the same place, as was recently done with success by my friend and colleague Dr. William M. Polk.

Whether or not the isolated ligature of vessels upon the cut surfaces of the base of implantation of broadly pedunculated tumors of the ovary and of those formed by distention of the tubes can be advantageously substituted for the *ligature en masse* I have not yet had an opportunity to determine by trial, but I believe that it can be. Certainly the ovarian artery can be thus secured, and it does not seem probable that the branches coming from the side of the uterus will prove too large or too numerous thus to be safely and promptly secured. It is within the experience of all that a heavy silk ligature

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drawn with all the force that it will bear about such a pedicle does not always prevent bleeding, but that separate ligatures need in addition to be placed upon one or two spiriting vessels. The trial can be easily made, and, I believe, without serious risk.

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