Original Articles.

REMARKS UPON QUESTIONS ARISING DURING THE REMOVAL OF FIBROIDS, WITH ESPECIAL REFERENCE TO THE TECHNIQUE OF THE OPERATION.¹

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My subject may seem one about which so much has already been written that there is nothing further to be said. There is one reason, however, for the present communication which seems to me sufficient, namely, that the dangers inseparable from the operation for fibroids are grave or slight according to the methods used in performing it.

Before advising so serious an operation as hysterectomy careful examinations should be made as to the urine and the amount passed in twenty-four hours.

In tumors which threaten life one must often proceed to operate even when the amount of urine is dangerously insufficient, or when there is definite evidence that the kidneys are not perfectly normal. In hopeless and advanced renal diseases, however, it is unjustifiable to perform so severe an operation as extirpation of the uterus. In fibroids which do not threaten life—which justify hysterectomy, though they do not demand it—trivial changes in the quantity and amount of urine should receive careful consideration. Such changes should always suggest at least a postponement of operation until they have disappeared, or until it is apparent that they are secondary to the tumor, and that its removal is essential for their disappearance. In most fibroids it is possible to wait for this favorable period of intervention. In some it is not; the patient must run the risks of operation at an unfavorable time.

One cannot see a large number of abdominal cases without being impressed by the difficulties of palpation upon the conscious patient. Tumors which apparently were easily perceptible and well defined often present, when the abdominal walls are relaxed by thorough anesthesia, characteristics entirely different—so different, indeed, that one's previous estimate of the case, as to diagnosis, prognosis and indications, is entirely upset. An acute diffused tumor, for example, filling the right iliac fossa in suspected appendicitis often is resolved into the small and definitely outlined mass of an enlarged appendix. Smooth tumors, apparently fibroids, evidently connected with the uterus, may under anesthesia assume characteristics which suggest even more strongly an enlarged and inflamed tube, a tense solid ovarian tumor, or even an extra-uterine pregnancy. Neglect to examine under ether as a preliminary procedure has led me into several unnecessary operations, and into at least one costly error.

The importance of preliminary examination under complete anesthesia seems to me therefore great. Not that it is always essential, for in some cases as complete an examination of the pelvic viscera is possible without ether as with it. But even in such cases it is important to make a pelvic examination at the time of operation, for the reason that renewed examination may present new features; it may present old ones in a new light, or even the entire absence of features previously found. The importance of such

preliminary examination cannot be too strongly emphasized. The "ether examination," so called, may be made some days or weeks before the operation; even then a second should be made at the time of intervention. Too often one will find that changes which he can hardly believe possible will have taken place between the two examinations. The chief objection to the early preliminary anesthesia is in the occasional demoralization of the patient, and in the not infrequent disagreeable effects of the ether itself.

I could mention several examples of the errors into which I have fallen by neglect of the rule to examine vaginally just before opening the abdomen, and that, too, in apparently simple cases. Fortunately all the cases in themselves required operation.

The surgeon should never take the responsibility of operating upon the advice of another; he should himself concur or not concur in the diagnosis, for he himself has to bear the whole responsibility. The previous examiner, though experienced and skilful, may have made a hasty examination; he may have been drawn by preconceived ideas into a false opinion; he may not have used an anesthetic; he may have been entirely wrong. I have learned to take no man's opinion without a careful, unbiased history and examination of my own. On the other hand, I do not wish another to take my diagnosis without making his own investigation. A boy was once operated upon for appendicitis on the strength of my diagnosis, which was acute appendicitis. He had a pneumonia and later a pleurisy, with marked abdominal symptoms. I have several times operated for extra-uterine pregnancy on the advice of skilled examiners. Once I found a normal pregnancy, and once a tumor on the opposite side from that in which the tumor had been detected. At another time I operated for a fibroid and found a normal pregnancy. In all these cases, however, I had examined carefully under ether and concurred in the diagnosis.

The chief objection to vaginal examination just before opening the abdomen lies in the danger of carrying sepsis upon the examining fingers. This danger, considerable though it may be in careless and hasty sterilization of the hands, is completely obviated by thorough methods; it is absolutely prevented when—the vaginal examination having been made with gloved hands—fresh sterilized gloves are substituted after fresh sterilization of the hands.

From many observations in cases of my own, and from many in the hands of my colleagues, I have become convinced that the risks of the operation are minimized by the careful following of a certain technique. These dangers are, chiefly, owing to sepsis and to faulty dissection. The dangers of sepsis inseparable from every operation, no matter how rigid the precautions, may be greatly increased by faulty dissection. Faulty dissection adds the danger of wounded bowel, bladder and ureter to those of hemorrhage. An ideal hysterectomy is one in which all these dangers are reduced to a minimum.

Time as an element in hysterectomy is important in so far as it is reduced to a minimum consistent with careful and intelligent dissection. Time bears a similar relation to the dissection of pelvic viscera that it does to the removal of a tumor from the subclavian triangle, for instance, except that prolonged exposure of the peritoneal cavity is a more serious matter

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than prolonged exposure of the tissues of the deep neck. He would be a rash operator—not to say a careless one—who should dissect the subclavian triangle with the speed that made a clear recognition of structures impossible. Yet he would be an incompetent one, perhaps, who would waste time in a tardy recognition of the phrenic nerve, or even of the subclavian vein.

It is too often true that the operator uses caution in beginning his dissection when rapidity is safe, and ends it with rapidity when caution is essential. The truth is that he gets tired by the time that he should work carefully. Beginning with short and painstaking strokes of the knife, he ends with long and careless ones. In abdominal surgery the time for rapid work is in exposing the field; the time for caution is in dissecting the depths of it.

In hysterectomy, whether abdominal or vaginal, speed is permissible everywhere except in the dissection about the cervix, for in uncomplicated cases no harm can be done by the most rapid methods. As soon as the broad ligaments below the ovaries are secured, no step should be taken without exact knowledge of what is being done. In this way, and in this way only, can the uterus be removed without the mistake of wounding bladder, bowel or ureters.

To remove the uterus in absolute safety as regards these structures requires, by the method herein described, from fifteen to thirty minutes; to close the peritoneum over the stump of the uterus, and to finish the operation, from fifteen to thirty minutes more. This makes the operation from half an hour to an hour in duration. In some instances the time is, by unusually facile dissection, somewhat reduced; in others somewhat prolonged. When the operation is in progress, and when it is completed, I am absolutely sure that no harm has been done other than that inseparable from the operation itself.

In complicated cases, when, for example, the uterus is adherent to everything about it, when the tubes are inflamed and adherent, additional care must be used; free and rapid steps are impossible at any stage of the operation. Incision through the abdominal wall itself must be slow and painstaking to avoid wounding an intestine or a misplaced bladder, or rupturing too early an abscess cavity. In these cases the anatomy of the parts is frequently so obscured that it is only with extreme care and difficulty that no harm is done, and the time of operation is thus unavoidably prolonged.

In uterine tumors, especially those of large extent situated near the cervix, the normal anatomy is sometimes excessively distorted. A tumor in the cervical region may grow beneath the ureter and push it high into the lateral and upper aspects of the mass. A tumor starting in front of the uterus and becoming adherent to the bladder may, in years of growth, project slowly backward and to one side, and drag with it the bladder into an unexpected and apparently impossible position. In very rare cases a ureter may become obstructed and even obliterated among the changed tissues about the cervix. Fortunately the enlargement of uterine tumors generally pushes both bladder and ureters away from operative dangers rather than toward them. The occasional occurrence of the converse, however, should always put the operator on his guard.

The displacement and non-recognition of the bowel is much less frequent and therefore less important.

The intestine should always be easy of recognition and of avoidance; yet occasionally, in complicated cases, failure to recognize and to avoid the bowel leads to costly errors.

In the exposure of the uterus the median incision through the linea alba or the lateral one through the fibres of the rectus may be used. I prefer and use the linea alba, for it is a space without blood vessels, and incision through it is therefore bloodless. The prevention of hernia is in no way ensured, in my opinion, by the lateral cut. In cutting through the peritoneum the greatest care must be taken, even in the simplest cases, for the tumor may prove to be not what it seems; it may have caused perplexing changes in both parietal and visceral peritoneum; it may have distorted bladder and intestine, and too bold and rapid cutting may open one or both.

In large uterine fibroids of slow growth, attacks of peritonitis may cause early adhesions to intestinal coils, which have thereby been displaced by the enlarging mass into positions of easy wounding.

The tumor itself may not be uterine: it may be an old abscess with thick and firm walls, or one whose anterior wall is the abdominal wall, and the first sign of which may be its unexpected and untimely rupture. The mass may prove to be one of the many varieties of ovarian tumor; it may be a salpingitis or an extra-uterine pregnancy—lesions which should be approached and unmasked with caution.

Whether uterine or not, the tumor may be covered by intestine flattened out over it. The bladder may be much higher over the tumor than one would think possible, even from extensive previous experience. Obscure pelvic tumors simulating uterine may prove to be tubercular masses to which the peritoneum is so closely adherent that free incision opens at once the intestine. It is a good rule to proceed with extreme caution whenever anything in the gross appearance of the peritoneum suggests the abnormal. A bladder wall will then be avoided as well as an adherent bowel. In certain rare instances excessively thin peritoneum will lie over distended intestine and be indistinguishable from it. So transparent is the peritoneum that it will have been cut through before the surgeon is aware of the fact. The intestine projecting into the wound may have precisely the appearance of parietal peritoneum. Such an intestine may be incised even when extreme care is used—it is almost sure to be when the cut is hastily made. The combination of transparent peritoneum and pale intestine is fortunately rare. Error will always be avoided by pushing the finger or a blunt instrument into the doubtful area. If the peritoneum has been incised, the finger or instrument will push by the intestine into the peritoneal cavity, and demonstrate at once the situation of things. This precaution seems worth mentioning because I, for one, have been very nearly deceived into opening the gut, and at a time when, perfectly sure that I was cutting parietal peritoneum, I was really cutting intestine. Such an error, especially liable to occur in changed conditions of the peritoneum, must be guarded against in the simplest cases. Not that incision into the bowel adds much to the danger—though the unavoidable escape of gas and fecal matter cannot but add something to it—but it delays further proceedings until the cut is repaired, and it is humiliating to the last degree. I have known an operator to go through the abdominal wall, intestine, and into

the tumor in one cut, and I have known several instances in which the peritoneal cavity has been opened by the first stroke of the knife. In such cases it is a matter of luck and not of skill that serious injury is not done and that the success of further procedure is not compromised.

It is a good plan to make in the first place a cut just large enough to admit one finger, for things may be found that will contraindicate further measures, and obviate the disadvantages of a larger incision. This cut should next be enlarged enough to admit the hand, by means of which the whole abdominal cavity may be thoroughly explored. In most cases this exploration will be negative, but in some it will prevent a worse than useless operation. Such conditions are, for example, hopeless malignancy of the tumor itself, metastases, contiguous infiltrations, and remote tumors too extensively and intimately adherent to permit removal. Independent and hopeless diseases of other viscera are extremely unusual, for the previous study of the case should have been too thorough to overlook the effective contraindication to operation which slight disturbances in other organs justify. In obscure tumors of the pelvis, and especially in malignant disease, the contraindications must be very strong to justify the giving up of further steps.

No contraindication having been found by exploration with the whole hand, the incision should be enlarged until there is abundant room for a clear view of the field. Such a cut must extend from the pubes to the umbilicus, and in very large tumors even higher. No greater mistake can be made than the dissection of a uterus through an incision too small for a clear view. I have found Doyen's pubic self-retaining retractor of great assistance. With this and a retractor on each side the whole lower abdomen may be inspected and examined with the greatest ease and satisfaction.

The tumor itself should be first examined, especially as to its nature and the difficulties of its removal. If malignant, with infiltrations into viscera that cannot be themselves excised, further procedure must depend upon questions of relief rather than of cure. In fibroids it is rather a question of extent and operability, for in some instances the tumors will present difficulties of such magnitude that removal will be too dangerous to be justifiable. Under such circumstances the lesser evil should be chosen, and the patient should be allowed to live with her tumor, uncomfortable and dangerous though it may be, rather than subjected to an operation so severe as to give but slight chance of recovery.

I recall several tumors of this class, in some of which I have proceeded to extirpation, in others to abandonment of the operation. I have been influenced in my decision by the wishes of the patient as expressed before operation. In one case I was begged to proceed at any cost; in another to undertake nothing desperate. It seems clear to me that the patient should be advised to make the choice under all circumstances, and especially in the case of tumors which — no matter what they may ultimately become — are at the time of operation discomforts rather than dangers.

The duty of the surgeon seems quite different when, in addition to the discomforts of the tumor, there is found evidence of pressure upon the ureters and beginning changes in the kidneys, both easily perceptible to the examining hand. In such cases the operation

should be continued, even at great risk, for with increased pressure the changes in the kidneys, perhaps just beginning, cannot but progress to a fatal termination. It is well, therefore, as a preliminary step, to palpate both kidneys, and to examine the ureters at the most accessible point.

In a recent case I found both ureters distended — the right to a considerable, the left to an extreme degree. The renal pelvis were themselves dilated correspondingly. The obstruction was found near the cervix. That involving the right ureter was a calcification of a semi-solid ovarian cyst which complicated a uterine fibroid; that of the left a deviated and thickened cervix uteri. The right ureter ended apparently in the calcareous mass, from which it was dissected free enough to permit its insertion into the bladder. The left ureter was relieved by amputation of the uterus low down upon the cervix. In this case the tumor was sessile and everywhere adherent below the plane of the true pelvis. The question of possible removal arose, and it was decided to go on, in spite of the formidable difficulties of separation. The tumor involved the sigmoid flexure, and removal left a gap in it. It was impossible in this case to ascertain the true condition of things until the dissection had been carried too far for retreat. It was fortunate that the difficulties were not known, for they would have been prohibitory. They were successfully overcome, however, and the patient has made a brilliant convalescence. Early recognition of the hydronephrotic kidneys would perhaps have justified abandonment of the operation on the ground of hopelessness, for it would have seemed too much to impose upon a patient with double hydronephrosis the dangers of a formidable dissection.

In uterine fibroids it is important to ascertain the situation of the fundus and the cervix, in order that the possibility of saving the uterus may be considered. Careful examination of the tumor after hysterectomy has shown in several cases that it would have been feasible to remove the tumor without sacrificing the uterus — a most desirable procedure, especially in the young.

The rules for guidance in deciding between hysterectomy and myomectomy depend upon many things, chief among which are age, likelihood of marriage and childbearing — conditions which make conservation of uterus and ovaries desirable. The general condition of the patient must be considered, as well as conditions of heart, lungs and kidneys — conditions perhaps requiring that procedure which is quickest and least bloodless; or conditions, on the other hand, permitting leisurely and painstaking dissections. The one characteristic of the fibroid itself which indicates myomectomy is facility of removal. A fibroid with small pedicle should always be removed from the uterus; so should small subperitoneal fibroids, especially those which are hard and bloodless. Large, hard fibroids which bulge from the uterus, even if they are not pediculated, are often easy of separation. They present pale masses, smooth and rounded, over which numerous flattened veins ramify. Such fibroids do not bleed when incised; moreover, the veins over them bleed but little, the hemorrhage soon subsiding after enucleation of the tumor. Many fibroids which lie deep in the uterine wall, even subserous ones, present features of hardness and mobility which strongly indicate easy enucleation. When the indications favor

enucleation, the possibility can be settled almost with the first stroke of the knife, for an easily separated tumor projects into the incision as soon as its capsule is cut. Brief attempts at separation with finger or blunt instrument will show at once the feasibility of extirpation. The operator will proceed to extirpation or to hysterectomy in accordance with the information thus gained. If, with incision, hemorrhage is excessive, and from numerous points and difficult of control, not ceasing or diminishing as the tumor is uncovered,—if this difficulty increases rather than diminishes as the depths of the tumor are reached,—it may become necessary to abandon enucleation, and to remove the uterus and all. Exploration of the tumor in this way takes little time; it adds little to the risk, for it is undertaken only in those cases in which the patient is in good general condition.

A contraindication to myomectomy lies in the presence of many small fibroids, some of which are difficult if not impossible of removal. It is obviously unwise to remove one or two large tumors and to leave several small ones. Even if all that can be felt are removed, it by no means follows that some too small for detection do not remain. This argument against myomectomy is not sufficient to contraindicate the operation when the desirability of saving the uterus is great—for it does not follow that the fibroid, if any is left, will ever grow, or that growing, it will ever cause symptoms; moreover, if it does grow and cause symptoms, years will probably elapse before a second operation becomes necessary, if indeed it ever does.

In examining the uterus to determine the feasibility of myomectomy, the region of the cervix must not be overlooked, for not infrequently a fibroid will be found there which may be the chief cause of the symptoms.

From the experience thus far gained, I should say that when in doubt it is better to perform a hysterectomy than to attempt a myomectomy. Yet with renewed experience it may prove that the uterus has been sacrificed more often than was really necessary.

Deep pelvic examinations, besides demonstrating the presence of tumors at or near the cervix uteri, will show whether there are adhesions, inflammatory masses, cervical or incarcerated portions of the tumor. One of the dangers in the forcible delivery of abdominal tumors is tearing the rectum or other pelvic structures—an accident which may happen when the pelvic portions of the tumor are firmly adherent to surrounding parts. One should examine carefully the ovaries and tubes. I have in several instances been surprised to find that the masses which I supposed to be fibroids were tense ovarian cysts or solid tumors, dilated and tense tubes, or even extra-uterine pregnancies.

In myomectomies the incision should be carried well down upon the fibroid; otherwise the separation will be carried through uterine tissues so difficult of separation that a false impression will be given as to feasibility of enucleation. The actual substance of the fibroid must be reached, and this will be easy of recognition. I grasp the presenting mass with double hooks, and often am able to deliver and separate it by traction alone. At times tumors of great size can be torn out of their beds with the greatest ease; if not torn out, dissected with a few strokes of the knife. The hemorrhage comes usually from the edges of the incision, where it may be easily controlled. Occa-

sionally it comes from the loose tissues of its matrix, where it can be easily checked by ligation. When there are several fibroids I usually pack with gauze the spaces left after removal. When all have been enucleated, the wounds in the uterus are closed by inverting their edges and suturing in the interrupted Lembert fashion. If blood fills the spaces, it is confined there until it has been absorbed. I have never seen any unpleasant results from this method. Even when the tumors have been large, or have been taken from the submucous spaces of the depths of a large uterus, no evil has followed.

In hysterectomies, as well as in myomectomies, it is desirable that the field be bloodless. First, because loss of blood adds greatly to the shock of operation; secondly, because blood is a very inviting medium for infection; and, finally, because a bloody field encourages slovenly methods.

It is impossible to make myomectomies bloodless, for the blood vessels cannot be secured before the incision is closed. The enucleation of some tumors will be practically bloodless. The incision exposing others—particularly the soft, vascular and rapidly growing ones—will often cause formidable bleeding, and, in fact, demand immediate ligation of the uterine arteries and removal of the uterus.

Removal of the uterus with the fibroids may be, in the majority of cases, absolutely bloodless if the following technique is carefully followed. Occasionally, in spite of the greatest care, the operation will be marked by a bloody, slovenly field. The cause of unavoidable hemorrhage lies in the situation of those numerous large veins which surround the tumor and inosculate freely with the venous plexuses of the broad ligament. These veins are flattened out over the tumor, where they cannot be grasped by pressure forceps, and where attempts at ligation only cause fresh bleeding. In such cases oozing continues until the uterine arteries are tied.

When it has been determined that no deep adhesions or other complications prevent the forcible delivery of uterus and tumor, the fundus may be grasped between the hands or by some especially adapted instrument. The corkscrew has one disadvantage in that it may penetrate the uterine cavity, the contents from which, with the oozing blood, may contaminate the peritoneum. Another disadvantage is in the impossibility of rotating the tumor about its longitudinal axis—a very desirable manipulation while working upon the structures about the cervix. Instead of the corkscrew, therefore, I use a pair of very large specially constructed double-hooked forceps, with broad grasping areas. These forceps are carefully applied, including between their teeth, perhaps, two or three inches of the presenting summit, whether tumor or uterus. When the fundus uteri presents, it is usually possible to tell whether the hooks will be likely to penetrate and tear the uterine cavity. If the uterine wall is thin, the hooks should be superficially inserted. I usually apply them so that they grasp the fundus or the tumor anteroposteriorly. When applied to friable tumors they often tear the tissues and cause oozing. It is best to seize such tumors as a whole rather than their summits. The hooks should be applied in vascular tumors in such a way that the venous plexuses will not be torn open. The handles are firmly closed and held by a ratchet or tied together by means of a strip of gauze. Very considerable control may thus

be exerted over the tumor: it may be forcibly drawn from the pelvis in any direction; it may at the same time be rotated so as to bring to the operator, standing, say, on the patient's left, the anterior cervical region, the posterior, and, in very long pedicles, even the opposite side.

The minute details of dissecting and removing uterus and tumor are of great importance in carrying out a bloodless and safe operation—one which gives no post-operative anxiety as to bladder, intestines, and especially ureters. The method which I have used for many years, and the one which I think all practical anatomists would naturally adopt, is one of clean dissection, beginning at the summit of the broad ligament and ending with the amputation of the cervix, or with its separation from its vaginal attachments. Every step that is taken, every cut that is made, is in regions and through tissues that are seen and recognized. Not a single blind step is taken from beginning to end. The first step is the passage of a ligature, by means of the Cleveland needle, between the left ovary and the uterus, through an area of the broad ligament translucent and free from veins. This ligature tied checks hemorrhage from the uterine side. If the ovary is to be removed, the next ligature is passed outside the ovary and fimbriated extremity of the tube through a translucent space in the broad ligament. The third ligature passes through the openings made by the second and first, and is tied below the ovary. Ligation of the ovary in one ligature is dangerous because the ligature, after the ovary and tube have been cut away, is near the apex of a truncated cone, and often allows the slippery peritoneum to escape before the operation is completed.

The next ligatures are placed about the round ligament far enough apart to cut safely between them. The left ovary and tube are now hanging from the left side of the summit of the tumor, which can now be lifted considerably above its former position, until the deeper regions of the left broad ligament are accessible. The knife is now used to make an anterior flap, the incision being carried through peritoneum as far as the reflexion of the right broad ligament. A similar flap is made posteriorly. The anterior flap will be dissected with ease, being loosely connected with the uterus; the posterior with difficulty, being intimately adherent to the back of the cervix. The cut may be freely made through peritoneum without injuring the veins lying upon the tumor, if one is skilled in making such cuts. If not, careful dissecting is essential, for the subjacent veins lie flattened upon the hard surface of uterus or tumor, and can be controlled only by the slow process of passing a ligature under them—a manœuvre which is quite as likely to increase the hemorrhage as to check it.

In making the flaps and in dissecting the deeper regions of the broad ligament the assistant intelligently rotates the tumor with his double-hooked forceps, at the same time drawing it upward and toward the right. The uterus with its tumors is now rapidly dissected through the loose tissues of the left broad ligament until the cervix is reached. The exact position of the vaginal attachment should be ascertained, for we may be in close proximity to the ureter, and it is therefore important to know the level upon which we are working.

With the uterus pulled upward and to the right, there will appear the blood vessels running verti-

cally, the uterine artery being surrounded and buried up in plexuses of veins. Its position can be found by its pulsation. It may be necessary, however, to relax the traction to feel them. I uncover the uterine artery by dissecting the veins away from it. The artery is so intimately connected with its surrounding veins, and both artery and vein are so firmly bound together by unusually dense and strong connective tissue, that isolation by blunt instruments almost always tears open the venous plexuses and causes abundant hemorrhage. When the artery has been satisfactorily isolated from the vein, a fine silk ligature is passed under it and tied. No other ligature is applied. The ureter, being the most important structure in this region, is sought for and exposed, that it may not be injured; but only in case the dissection is being carried into evident proximity with it. In most cases the isolation of the uterine artery is the lowest point reached, and the amputation of the cervix is so much above the point of ligation that no anxiety need be felt for the ureter. The left half of the dissection is now complete. A large piece of gauze is now placed in the region just dissected, and the uterus and tumor are drawn toward the left. Any oozing or renewed bleeding is controlled by pressure of the uterus upon this gauze. The operator and assistant now change places, and the right side is dissected precisely like the left. The uterus now remains attached only by its cervix. Returning to the left, the pelvic gauzes are removed and large fresh ones substituted all about the cervix. A single gauze is placed just behind and below the cervix, where it is proposed to make the amputation.

The Paquelin cautery is used to cut through the cervix. The cut is made low enough to go through healthy uterine tissue. It begins on the left side, well above the ligation of the uterine artery, and is carried across the cervical canal to the right side. The canal itself is carefully seared above and below. Frequently fluids will run down from the uterine cavity; these must be met and destroyed before leaving the canal. The remaining portion of the cervix is then divided, and finally the veins and ligated artery of the right broad ligament. Just before the uterus is separated, an assistant grasps the anterior half of the stump of the uterus with small vulsellum hooks, and draws it up into view. Any bleeding points are grasped with pressure forceps. The single pad placed behind the cervix to catch the discharges from the uterus is now removed and a fresh one substituted. The stump is carefully inspected and all its bleeding points tied. The cervix is sewed up anteroposteriorly by means of interrupted silk ligatures. Over the stump the peritoneum is drawn, inverted, and closed by continuous silk sutures of the Lembert style.

Before the cervix is sewed over, it is wiped with gauze wrung out of corrosive sublimate solution 1-1,000. The completed peritoneal suture is wiped with gauze wrung out of corrosive sublimate 1-5,000. When the operation is completed, nothing remains but a short transverse line of peritoneum marked by a running silk thread.

Since seeing Doyen use the angiotribe I have tried to save time by it, applying the instrument where I have used temporary ligatures to prevent bleeding. I found that the great veins of the tumor, though crushed together, began to bleed when disturbed by subsequent manipulations. Its use to make a sulcus

of crushed tissue for the more efficient application of the ligature I have tried and abandoned.

When it is decided to remove the cervix greater care is essential for the preservation of the ureters. After ligation of the uterine artery, the cervix is dissected toward the vagina, the dissection being carried close to the uterine tissues when the cervix is benign, and as far from it as possible when the cervix is malignant. The ureters need not be exposed when the dissection hugs the cervix unless the operator is in doubt. When in doubt, or when dissecting far from the cervix, the ureter should be sought by careful dissection with blunt instruments between the cervix and the sacro-iliac synchondrosis. If it cannot be found elsewhere, it can be found as it passes over the iliac vessels and followed down to the desired point. At the cervix the ureter lies in loose tissues and its isolation is easy. Indeed, its easy displacement is the very characteristic which makes blind grasping and cutting so dangerous in hysterectomies.

When the posterior flap has been carried well down behind the cervix, the posterior lip is grasped with forceps and drawn upward and backward, making tense the retro-uterine fold. The vagina, previously sterilized, is now opened. The vaginal attachments are divided with scissors close to the cervix on all sides. As soon as the separation between the cervix and the vagina is complete, the uterus is easily torn from the remaining loose connective tissue, and the operation is completed by inverting the peritoneal flaps over the gaping vagina.

The operation of hysterectomy seems to me one of the most gratifying and satisfactory in surgery. When it is performed anatomically—when every step is taken in full recognition of the anatomical structures involved—no harm can be done. When carried out in darkness, with blind grasping and cutting, no operation is so likely to lead to costly and irreparable blunders. It is perhaps natural for me to emphasize the anatomical features of this operation. Indeed, anatomists are said to be timid—but when the dissector is timid it is time to be timid. The time to be cautious is when caution is needed. A hysterectomy performed in the full light of day, with sigmoid flexure, bladder, rectum, ureters, arteries and veins conspicuously shown in their relations to the uterus, is an operation followed by no harassing fears that the ureters may have been tied or cut, that feces may be escaping into the abdominal cavity, that the bladder may have been included in a ligature or a suture. On the contrary, the surgeon feels that no avoidable harm has been done, that the patient will run only the risks incident to the removal of the uterus itself, and that her chances of recovery are at least 95 per cent.

THE VALUE OF THE HOT-WATER IMMERSION BATH IN THE TREATMENT OF THREATENING PUERPERAL ECLAMPSIA.¹

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ALTHOUGH the etiology of puerperal eclampsia is not, as yet, fully known, it is undoubtedly true that the group of symptoms leading up to the eclamptic seizure must be attributed to the ultimate, toxic effect on the nervous system of excrementitious products re-

maining in the blood, on account of imperfect functional activity of the eliminative organs.

Renal insufficiency is doubtless chiefly responsible for the gradual accumulation of toxic products in the blood. But every obstetrician has seen serious cases of eclampsia, in which renal activity was but slightly impaired, and, indeed, fatal cases in which autopsy revealed little or no pathological change in the kidney. Indeed, it must not be overlooked, that the lungs, liver, skin, and bowels have important eliminative functions, and that imperfect action of one or more of these organs must often play an effective contributory part in the development of eclampsia. It is also to be remembered that the condition of the nervous system must be taken into account in all considerations of the etiology of eclampsia. To be sure, nervous systems of equal strength and stability react differently to similar irritations; but it is rational to believe that a nervous system depressed by malnutrition and anemia, by overwork, by the frequently observed despondency in those illegitimately pregnant, and in those who have an abnormal dread and fear of labor—or a nervous system rendered unstable by insufficient or disturbed sleep, undue excitement or inadequate mental repose, is more liable to the eclamptic seizure under a given toxemia, than a nervous system well nourished, well rested, well balanced, and not unduly subjected to the worriments, annoyances, and excitements of daily life.

It is perhaps superfluous to repeat the generally accepted dictum that prevention of disease is the greatest function of medical science. But when it is remembered that eclampsia is probably the most serious, and in these days, under whatever treatment, the most fatal, complication of pregnancy and parturition, it behooves the student and practitioner of medicine to realize that the symptom-complex known as puerperal eclampsia is to a large degree a preventable disease.

Intelligent and successful prophylaxis of eclampsia presupposes an opportunity for the observation of pregnancy from the early months. It presupposes that the observer will exercise an intelligent supervision over the daily life and general health of the gravida: that he will not content himself with an occasional test for albuminuria, but will assure himself that the skin, bowels, and liver are performing their functions, that the lungs, unhampered by undue compression by tight clothing, are supplied with pure air, and that the nutrition is adjusted to the increased demands of fetal development, with a view to preventing undue impairment of the maternal well being. He will satisfy himself that the kidney is eliminating a proper percentage of urea, and, when necessary, will so regulate the use of highly nitrogenous food that this important organ will not be unduly taxed. He will bestow especial attention upon the condition of the gravida's nervous system, enjoining freedom from needless excitement, worry, and mental perturbation, quieting groundless fears, and ensuring undisturbed and adequate sleep and mental repose. It is unfortunately true that adequate supervision of pregnancy is not always possible; but it is also true that except in the lowest social strata it generally would be possible, were its importance fully appreciated. Nor is it to be supposed that proper supervision of the pregnant entails, as a rule, either a large expenditure of time on the part of the physician or burdensome pecuniary expense to the patient: under

¹ Read before the Obstetrical Society of Boston, October 16, 1900.