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Nelson (R.)

GASTROTOMY,

FOR THE REMOVAL OF

NON-MALIGNANT TUMORS

FROM THE ABDOMINAL CAVITY.

✓
BY R. NELSON, M.D.

New York

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1891

GASTROTOMY,

FOR THE REMOVAL OF

OVARIAN AND OTHER TUMORS.

HAVING reported at different times to the Medico-Chirurgical Society of the city of New York, cases of gastrotomy for the removal of ovarian and other tumors from the peritoneal cavity, I was requested by several members to write and read a paper on the subject, founded on my own experiences, irrespective of the the literature on ovariectomy. At last I complied and furnished the following paper, read, January, 1864. The members expressed themselves gratified with the production, and wished that it should be published. After a few suggestions it was decided that it should be sent to the American Journal of the Medical Sciences, Philadelphia. Accordingly, it was sent to the editor about the end of March last; and a note from him to a friend intimated that it could not appear sooner than in the July number, as the matter for the May number was in type. The July number has come out, and no mention of this paper is made.

I have frequently been called for a copy, and was specially invited in May to read it before the medical section on obstetrics of the N. Y. Academy of Medicine. I complied, and received no less than four subsequent invitations to re-read it. On all of these accounts, I now publish it in a private form.

I am well aware that several of the statements made clash with received opinions—they are, nevertheless, true and im-

portant, being founded on facts of my own observation ; and, I am fully aware that my remarks on the mode of operating may be considered as offensive to operators in high esteem, and deservedly so ; but my excuse is—the interest of the patient before that of the operator.

GASTROTOMY.

The operation of gastrotomy may be needed for several purposes ; but principally for the removal of tumors situated within the peritoneal cavity. There are three kinds of tumors that particularly call for gastrotomy ; and which, without this operation, end always in death : 1st. Ovarian tumors. 2d. Fibrous out-growths from the uterus. 3d. A fibro-adipose mass that may have its origin and seat between the layers of the broad ligament, or in the parenchyma of the ovary ; or in the annexes of these organs.

The *ovarian tumor* most frequently met with is the *multilocular*, commonly called ovarian dropsy. It occurs between the ages of 18 to 25 years, and 30 to 60 years ; that is, about the periods of nubility and its cessation. It consists of a general hypertrophy of all the tissues that constitute the ovary—its internal structure, its capsule or external coat, and the peritoneum that covers it. All these enlarge, not by stretching, but by growth. Within, it is made up of numerous cysts that vary in size from that of a currant to an orange, and some of them even to a sac capable of containing 10 to 15 pints of fluid. The smallest of these cysts are the newest, and are filled with a glutinous transparent fluid ; but that which is contained in the larger and older cysts is thick, ropy, opaque, and colored from light bluish to dark brown. Each cyst is lined with its own proper membrane, of a quasi mucous character, and they are separated from one another by intervening septa of cellular tissue, which tissue gives passage to the long, slender and delicate vessels that supply the cysts. They are said to be graafian vesicles. They adhere to one another, and to

the outward envelop when next to it. The whole mass is of rapid growth, enlarging the abdomen in the space of a year or so, to the size of a full pregnancy; and when after repeated tapping and refilling, the parieties of the abdomen yielding with more and more ease to the distention from within, the tumor may attain to a size weighing 70 lbs. The largest cysts lie in front, and by paracentesis will discharge from a few to 15 or 20 pints of fluid. This operation gives all the other cysts an opportunity to increase, and to the lately emptied one to refill. When the tapped cyst is quite emptied, the trocar is compressed by the adjoining cyst out of the line of entry, and made to lie against the front of the abdomen. Some operators have taken advantage of this to thrust the instrument into a second cyst; but not without danger, for an intermediate vessel has been before now wounded, and has bled internally into the sac, even to filling it, and unto the death of the patient; for the patient is generally much reduced at this time, and her volume of blood greatly diminished. Such an error would be avoided by a practitioner acquainted with the structure of an ovarian dropsy, and the distribution of the vessels that run in the septa. Another error, one that has run the rounds of the journals, would not have been committed and cruelly repeated—that of emptying *one* cyst and injecting it with that universal panacea—iodine—had the operator reflected for a moment that he had treated only *one* cyst, while he left *one* hundred untouched; to say nothing of the stupidity of supposing that an analogy existed between hydrocele, and the cysts in an ovarian dropsy—the first a disease in a serous membrane and a single cavity, attackable in its whole extent, and capable of throwing out adhesive matter subject to organization; while the second consists of a multitude of separate and uncommunicating cysts, each lined with a *quasi mucous* membrane, incapable of throwing out plastic (fibrinous) matter, and becoming organized into an adhesion that should unite the parieties of the sac, and so obliterate the cavity.

The growth of an ovarian tumor is rapid, but unaccompanied

with pain, excepting that which is due to distention of the parietes of the abdomen. There is also distress, when large, from its encroachment into the thorax, pushing the diaphragm as high as to the 5th, or even the 4th rib, producing dyspnœa; also, by the pressure on the stomach, leaving to that viscus little capacity for the reception of food. In a few cases it will cause a partial ascites by its pressure on the large visceral veins and on the kidneys. When the tumor has attained to a large size, the length of the linea alba from the pubis to the ensiform cartilage has reached the extent of 28 inches in two of my cases.

Fibrous out-growths from the uterus into the peritoneal cavity generally proceed from the superior part of the uterus; sometimes from the front, or back, or any other part of it, and is immediately covered by peritoneum, hence called *subperitoneal*. A portion of the tumor is contained within the walls of the organ, the two comingling by degrees that render it difficult to say where one structure ceases and the other begins. When the tumor is largely developed, between it and its peritoneum, numerous broad veins are seen on the surface, leading inexperienced spectators of an operation to exclaim, "what large *varicose* veins." These veins are not in a varicose state, not having their parietes thickened or hypertrophied; but are only expanded laterally; they are nearly flat, and their parietes are thin like ordinary veins, and being flat contain little blood, since, like all flattened tubes, their area is much less than those which are cylindrical, a form of the greatest capacity. The arteries that lead into the tumor are few in number; but, within the new structure, they become numerous, though of small calibre; yet, their united areas much exceed that of the afferent vessels. Hence it is that fibrous tumors that ulcerate within the womb, or are wounded, pour out blood abundantly, because their vessels are, to some extent, held patent by the inelastic fibrous body in which they course, and in this way draw upon the afferent vessels, more than these furnish when

the tumor is in its integrity, and its vessels simply filled. The structure of the tumor is distinctly homogenous and fibrous throughout, as seen in a very large one that I extirpated (and in many others), composed of inextricable fibres, yellowish, dense, resembling boiled cow's udder, capable of being cut into slices without collapsing. This kind of tumor progresses very slowly; taking ten or more years to reach the size of a man's head; but, at last, puts on activity, and then grows rapidly, to the sure destruction of the patient, if it be not extirpated. While slowly increasing in size during many years, it does not disturb the health or even the comfort of the patient, giving no pain until grown large, and then only such as is due to unequally distributed distention of the abdominal parietes, more so when its shape is irregular, or its surface is bosselated by outgrowths from its own surface.

As long as the case is not troublesome to the patient, and its growth is slow, it had better not be meddled with; for such cases can go on for many years, and possibly the patient die from some intercurrent malady or accident in the interim, before the tumor shall put on activity and become dangerous. Besides, the longer a patient endures a disease curable by surgical means, the less is the danger that follows an operation. And the more the abdomen becomes stretched, within bearable limits, the more safely it may be cut into with less apprehension of subsequent inflammation; hence it is, that success is more likely to follow an operation for a large than a small tumor, to follow a protracted than a recent case.

In illustration of these statements regarding fibrous outgrowths, I now give two cases out of several: A discreet and virtuous woman, but of a salacious temperament, married at about twenty, and became a widow two years after, without having been impregnated, although, according to her statement, her connubial state had been quite satisfactory to her. Previously to her widowhood she felt an uneasiness or weight in the pelvis. As this increased she perceived that something

was enlarging within her. She consulted many practitioners, when, at last, a tumor in the epigastrium became palpable. This was diagnosed, at the time, as ovarian. Iodine internally and externally, leeches on the abdomen, and emetic-tartar pustules kept cropping out for several months, leaving their indelible marks on the surface of the abdomen, was the treatment pursued unavailingly. At last the tumor presented a bi-lateral or double appearance, the larger one filling one iliac region, and the lesser one occupying the opposite region; between the two, under the linea alba, there was a distinct hiatus. She was now told that she had enlargement of both ovaries; various medicines were persevered in unavailingly; and she at last, gave up "doctoring." All this time she enjoyed perfect health excepting the disturbance produced by futile medication. Her appearance was attractive, and her sexual desires great, lead to a second marriage, after she had honestly made her case known to her suitor. She married. All went on as usual for two years, when, without perceptible cause, the "two" tumors began rapidly to increase in size. I now saw her for the first time, and got from her the foregoing history. On examination, not finding fluctuation nor elasticity, conditions that belong to ovarian dropsy, and thinking of the slow progress of the case, I told her and her husband that there was no disturbance in the ovaries (her catamenia regular, and the sexual appetite as generous as heretofore); but that the resisting nature, and the hardness of the "two" tumors was different from what had happened in ovarian tumors.

They requested an operation, which I hesitated to undertake, but at last consented to do it. She went home, a distance of a hundred miles, to settle household affairs, and returned in eight days. In this short period, so rapid had been the increase, that the tumor reached half way between the umbilicus and scrobiculus, and she had become lean and looked much exhausted. A long incision, from the pubis to near the pit of the stomach, was made, exposing the tumor, which was a single one, with two outgrowths from its surface, the whole springing

from the greatly enlarged base of the uterus. It was cut off and removed, she made a good recovery in four weeks and continued well after. The tumor was covered under the peritoneum with broad meandering veins. The arteries that entered the pedicle were small where it was divided, and easily secured. The tumor itself was a solid homogenous mass, hard and resisting, and divisible into large yellowish slices, showing very few sections of vessels.

The second case is that of a married lady, the mother of two children, the youngest approaching puberty. A year or two after her last confinement she thought there was something unusual going on in the pelvis. In the course of a few years, a round, hard tumor gradually ascended into the hypogastrium, which continued to grow very slowly when I saw her, about ten or twelve years after its commencement. She suffered no pain or other inconvenience from it. I therefore advised her to do nothing. I heard of her a few years after, and she was in her usual health.

A third case I may as well mention. A married woman who had borne children, presented an abdomen as large as a pregnant one. She had had it some years. I saw her about a month before she died, in considerable suffering, but without fever of any kind. It grew from a much enlarged uterus, as seen on dissection, was solid throughout, and resembled the one first described.

The *Fibro-Adipose Tumor* is composed of large fatty masses separated from each other by tenacious cellular tissue and fibrous bands, but no where distinctly separate. These masses vary in size, from that of a fist to a foetal head. The whole are enclosed in a fibrous envelope, and the peritoneum is spread in front above and over all. One that was removed by operation weighed thirty pounds, and another forty. They seem to be generated within the broad ligaments, at least this was the case in both instances just now mentioned. Hypertrophied fibres of these ligaments, much lengthened and more or less separated from each other, enveloped the mass all round and sent bands

into the new structure, growing with the growth of the tumor. The peritoneum expands before it, behind and all round, excepting where it has its attachment, which is very extensive, like a mesocolon, to the last lumbar vertebræ, promontory and hollow of the sacrum. In the few cases I have seen it had extensive adhesions to the whole front of the abdominal parietes—some few to a loop or two of intestine. Through the parietes of the abdomen the tumor gives a softer or more yielding fielding than does the fibrous outgrowth from the uterus; and, on palpation there may be felt a deceptive sense of fluctuation, which is due to the quality of the fat, of a very soft nature, in them, it being much less dense than that which is met with in lipomas under the common integuments. This apparent fluctuation I have known to deceive a surgeon. These tumours and their lobules are supplied with few but not large arteries; and, abundantly with expanded veins, some of them resembling sinuses. These fatty tumors are less rapid in growth than are the ovarian, but more so than the purely fibrous outgrowths from the uterus.

There are other abdominal tumors occasionally met with that might possibly be relieved in some cases by an operation; but the three kinds I have mentioned are those that specially call for gastrotomy, which may be undertaken with hopes of success, and which are sure to end in death if not removed.

ADHESIONS.

All these tumors, when of long standing and grown large, are liable to become adherent to the anterior parietes of the abdomen, sometimes even to the liver, which they crowd up, to the diaphragm, or to the spleen or to some portion of the omentum; but this last, in most cases of very large tumors has become more or less absorbed by the pressure they make against it. Posteriorly there are few, if any adhesions, which absence is due to the almost ceaseless peristaltic movement of

the intestines, and their alternate distention and collapse, affording no time for union to become effected.

These adhesions are not due to inflammation, effusion of lymph and its subsequent organization; for, in all the cases I have observed, excepting one, the patient has at no time suffered from any—the slightest—symptom of fever, or from that peritoneal pain that invariably accompanies inflammation. The adhesion is due, simply to great pressure of the tumor against the tensely stretched abdomen. In the early stages this tightness does not exist, and the lesser size of the tumor admits of its sliding to some extent during the movements of the patient while getting up, lying down or walking. On the contrary, when the tumor has attained a great size, its anterior surface presses forcibly, and *constantly*, against the front of the abdomen, causing the epithelii of the two surfaces to disappear, and by the same cause—its great size—is held steadily in one place, immoveably. The two peritonei having come into *immediate* contact coalesce into a single membrane/apparently, in those places where the pressure is greatest, constant and fixed; but in other parts less pressed the two membranes adhere less intimately, and can be easily separated by the fingers of the surgeon pressing between them, without giving escape to so much as a tinge of blood, because here no vessels exist.

Having heard that adhesion of separate parts cannot take place without the intervention of inflammation, and its office of throwing out fibrous matter to become organized between adjacent surfaces and thus effecting union between them denied, I may as well give one or two examples, out of many, to prove that an intimate union of naturally separated parts can take place without the intervention of the famous *adhesive inflammation*.

CASE: A child affected with intervertebral softening, ends with distortion of the spinal column which draws the ribs with it. The arches of the ribs on the convex side of the curvature become widely separated from each other; while the arches of the ribs on the lesser curvature are approximated. The intervening intercostal muscles was by pressure which arrests nu-

trition and permits the absorption of the effete material to go on, and when the upper and lower edge of two adjoining ribs approach nearer and nearer, until at last the periosteum of each has ceased to exist, the two ribs *touch*, unite, and in that place form a single, broad and flat rib. All this goes on without the slightest complaint of pain or inflammation, because it is a natural process. It is common enough to get such a skeleton if sought for; and many are to be seen in museums, where not only two but three ribs are united into a single one on the concave side of a distorted trunk.

Another example may be mentioned: A man had his foot badly crushed, it swelled enormously under the treatment, and sinuses formed in the course of some of the thecæ of the tendons. When consulted at a late period, I advised his surgeon to put a thick compress above and below the phalanges with a roller over all, with the view of diminishing the swelling by the absorbent effect of pressure, and to keep all wet with water. This was persevered in too long, the epidermis between the second and third toes was washed away, gradually admitting the *retia mucosa* of each to come into immediate proximity. When I saw the case subsequently the two toes were united, as regards the soft parts, into one. All this occurred in the complete absence of inflammation, and the effusion of fibrin to become organized subsequently. In this way toes have united, little by little from simple entertigo, they being maintained in contact by pressure. In the case of burns it is different, for here fibrin in a thick coat is quickly thrown out, and if not peeled off will surely organize, and in the subsequent stage, long after having healed, the fibrin becoming absorbed, irremediable contractions gradually follow.

Tumors do not become adherent to the parietes of the abdomen, or viscera, as long as they are small or of recent growth; because they exert no great pressure on the opposite parts and are so mobile as not to stay long enough in contact with one point to become connected.

CASE.—A girl about twenty years of age had ovarian dropsy, which, from the first perception of it to when I removed it lasted 18 months. It was unadherent although nearly 30 lbs. in weight. Other patients with similar tumors of about the same size and standing, were without adhesions. A fibroid outgrowth from the uterus of ten years standing, had reached only a little above the umbilicus, when it suddenly took to rapid growth and in two or three months after, when I removed it, it was unadherent, although it now filled both iliac regions and reached half way up between the umbilicus and scrobiculous; but then for a long time it was small, and when grown large at last had done so in a period too short to have contracted union by pressure to adjacent parts. It is quite different in large tumors of long standing. A girl 29 years of age had a very large ovarian tumor of over two years' standing. After removal it weighed 55 lbs. It then adhered to the whole front of the abdomen and sides, to the anterior third of the diaphragm, to a portion of the spleen, and to a part of the liver, but no where to the intestines. The anterior adhesions were easily severed by the hand and outspread fingers, while in other places the adhesions tore into tough ribbons, and a few had to be cut through. No blood escaped. She quickly recovered notwithstanding the great extent of the adhesions severed. No peritoneal inflammation or fever followed, doubtless, because no true peritoneum remained at the seat of adhesions. In several other cases of large and long standing tumors adhesions existed, and must be expected. They will be found strong, according to the length of time they have existed, requiring considerable force to tear through them. In all these cases there need be little fear of hemorrhage to occur from severing them.

Before treating of the operation it may be as well to examine the subject of inflammation; for this is the ghost that haunts many surgeons before and after an operation—especially so when its seat is in a serous membrane—bewilders and obfuscates the judgment, induces preparatory measures that al

ways add to the disorder, and after an operation is so prolific through fear of it, of numerous injurious medications to the risk of the patient.

INFLAMMATION.

Many practitioners regard wounds of the peritoneum as peculiarly dangerous from the inflammation that follows them. Hence has arisen a dread of performing operations within the abdominal enclosure. This fear has so greatly influenced the judgment and practice of some surgeons that they decided, in cases of hernia, to divide the stricture without cutting into the sac, and, in this way avoid wounding the peritoneum, and not expose it to the much dreaded malignancy of the atmosphere. We have all seen the direful consequences of this innovation, founded on the mistaken notion of regarding all peritoneal inflammation as *of one* kind only, while there are at least *two*, differing from each other in cause and course, each of which is subject to different phases and terminations; which I shall now examine, and endeavor to show that one kind, idiopathic in certain seasons, and countries, is really a fearful disease; and the other—that which is likely to follow gastrotomy is ~~is~~ less to be feared than the first. Although what follows ^{is} not mentioned in books or in lectures, let it be born in mind as an axiom, that any inflammation is merely an *accident* to many diseases which differ widely from each other; that it is never the cause of the malady; but is always the effect of a disturbance elsewhere situated—near by, or far off, and sometimes is of so prominent a character as to be taken by some practitioners as being itself the whole disease, and the only thing to be combatted.

1st.—IDIOPATHIC INFLAMMATION.

A remarkable example of the erroneous opinion entertained regarding inflammation, among a thousand others that arose and lived a day, was that of the celebrated Broussais and his disciples, a doctrine that overshadowed all "Young Europe" for a few years, and filled so many untimely graves. He and they denied the possibility of Idiopathic or Essential fever, as the schools call it, on the ground that they always found in every fever some one or other organ inflamed—true, so far; and asserted that the inflammation seen was the cause of the fever. They disregarded the fact that the fever in *every* case had existed several days before the local disorder—inflammation—became manifest; passed over the patent fact that, in the same fever, during the same epidemic, patients in the same house, at the same time, might have the local disorder—inflammation—(as in typhus) situated in a different organ in one patient, it might be muco-gastritis; in another an enteritis, in a third a bronchitis; in another an arachnitis, while the fever—typhus—was the same in all.

In variola, the fever (which is the real disease) exists with violence three whole days before the irruption; six, before the commencement of areolar inflammation. In *idiopathic* erysipelas the fever preceeds the local disorder at least 24 hours;—and so on, for every *essential* fever or disorder.

Idiopathic peritonitis and enteritis are always preceeded by fever, more or less marked: but, the inflammation once become manifest, like in the irruption in variola, and other exanthemata, the inflammation is the most notable condition of the patient. The idiopathic peritonitis is a specific disease, due to a general cause; it rapidly spreads, in high latitudes, over the whole peritoneum—parietal and visceral,—throwing out a thick layer of fibrin, and, there, too often ends in death in a few days; so also, in puerperal peritonitis; but here, the ef-

Fusion is less fibrous or solid than in pure peritonitis. These inflammations are due to occult cause hidden in the system. The physician claims the attendance on these cases as peculiarly belonging to his branch of what may be truly called the *baek art* of the profession—conjecture bedaubed with speculative imaginings; claiming that the pysician alone is competent to prescribe, holding the knowledge of the surgeon in contempt as compared with his conceits.

2D.—TRAUMATIC INFLAMMATION,

As the name implies, is always due to mechanical injury, and varies in severity according to the nature of the lesion—bruising, tearing, or simple clean cutting. It is a very different affair from idiopathic inflammation, which has a prescribed course to run, and which is merely the expression of a disease in the whole system. The traumatic is merely the sequel of a local injury. It rarely becomes manifest before 24 hours after the accident; and in four or five days produces pus, a natural crisis, the generation of which mitigates all the inflammatory symptoms, unless the lesion have some poison, morbid or chemical, added to it, in which case it may increase even after the generation of pus, and progress indefinitely. But in a healthy person, should the lesion consist of a clean cut, and the edges be brought nicely together, union will take place without the intervention of inflammation, even of that slight degree erroneously called “adhesive.” This result I have seen in several cases of gastrotomy.

There is a difference in the amount of inflammation that follows wounds in different parts of the body, or when the patient is unherlthy at the time of being wounded. A cut into the abdominal cavity of persons that have had it previously much distended, as by pregnancy, by large ovarian or other large tumors, is followed by much less inflammation than in those who have not so suffered. Every surgeon of only a few years’ practice has noticed that small cuts, like that of a pen-

knife into the abdomen of a man, or of a female who has never been stretched, is a rather serious affair; while a similar stab into a previously distended abdomen, by even a worse instrument—a trocar—is never followed by peritoneal inflammation.

In the case of gastrotomy for the removal of tumors, the cause of this difference is very simple and of easy explanation. In the slowly and long stretched abdomen, all the parts that conspire to form its lateral and anterior boundaries have been gradually expanded in both latitude and longitude, but not in thickness, the parts did not *grow*, as the pregnant uterus. The vessels elongate, but scarcely enlarge, they rather diminish in calibre, for instance, the epigastric artery which, in the natural state reaches from Poupart's ligament to the upper section of the rectus, there to anastomose with branches of the substernal—and lower intercostals, is scarcely 9 inches long, while in the largely distended abdomen from pregnancy or tumors it is drawn out to 24 or 26 inches, according to the degree of stretching of the abdomen, which I have known, will reach 28 inches from the pubis to the ensiform cartilage. The veins will correspond in elongation, but not in capacity, they appear to superficial observers much larger than natural, while in reality they are not so; they, like all the other tissues, are merely expanded in length and breadth, but not in capacity, for, on close examination they will be found, although much broader than usual, to have no more or less capacity than usual, by reason of the approach of their anterior and posterior sides, rendering them into flattened tubes, which shape, however broad, is of small capacity, by reason of their diminished area. This state of the veins, it may be mentioned here, is very striking in appearance on the surface of any abdominal tumor, so much so, that I have heard spectators of an operation exclaim "how varicose the veins are," while no varicose state exists.

Once more : All the tissues that conspire to constitute the abdominal parieties are stretched by tumors equally. The skin so much so as to suffer long lines of partial rupture of its chorion, ruptures that are never recovered from, and which leave those marks constantly seen in women who have born children, wrongly called vergitures. The muscles, their tendons and fasciæ also spread out greatly both in length and breadth, but not in thickness, for there is no growth. Each rectus, instead of being only $2\frac{1}{2}$ inches wide, expands to 4 or more ; its sheath increases proportionally, as I have seen when a bungling operator deviating from the medium line, has laid the sheath open, the edges of the muscle not reaching its breadth and filling its capacity. The length of the rectus with its intervening tendons, in extreme cases, has been 28 inches, instead of 10 or 11, the usual length. What the muscles just named have suffered, all accompanying tissues with their nerves and vessels, have undergone in equal proportion.

The consequence of this expansion is, when the distending force, the tumor, is removed, the parieties, whose contractility has been greatly overcome, and to some extent lost, recover their primitive proportions very slowly, but never completely. This recovery is not wholly due to contractility that interests all the molecules of the parts, it is partially so, but is mostly effected by a folding of the fibres one against another ; in this corrugation the vessels and nerves participate, bending into numerous flexuosities, a condition that not only retards but obstructs the passage of blood through them, a state ill adapted to furnish that supply of blood which is *one* of the essentials of acute inflammation. Hence it is, that gastrotomy, for the removal of large tumors, is followed by very trifling inflammation, when the operation has been well performed, and the case well managed subsequently.

On the other hand, an abdomen that has not suffered the expansion mentioned resembles other parts of the body as regards the inflammation that follows injuries, since the tissues

are actively contractile like elsewhere ; the vessels are short and round, with a full calibre instead of long, and in the case of the veins flat without capacity and contractility ; the nerves also have been stretched and proportionally paralyzed.

Having hastily noticed the difference existing between idiopathic and traumatic inflammation, and the reasons why the latter is less to be dreaded than the former, especially in gastrotomy when performed on a stretched abdomen, I now proceed to examine the question of

THE TEMPERATURE OF THE APARTMENT

in which the operation is to be performed. The early operators, anxious for success, but having no facts to rely on, theorized in advance as to what might interfere with, or favor, the result ; and, among other ideas, imagined that inasmuch as the temperature of the viscera was constantly near 100° Fahr., the room in which the operation was to take place ought to be heated to that degree, lest a colder atmosphere should provoke great irritation on the exposed parts. Had these practitioners have called to mind the numerous cases of wounds through which the bowels have escaped, been exposed for some length of time, and which subsequently did well, they might have banished the fear of cool air, and have saved themselves and their patient from the oppression of a torrid atmosphere. The length of time necessary to complete a well conducted operation is so short, that a moderately cool air (between 50 and 60 degrees) has not time to act injuriously, while the heated room will prove far from beneficial. I operated on a patient living in a temporary house—a mere shanty—where there was no means of heating it, on a dark, rainy day in the month of December, while the temperature was so low as 46 deg. Fahr.—so low that our breath was visible, as was the steaming hilla-tus from the open abdomen of the patient. Not one anxious

symptom followed, the patient recovered perfectly in twenty days, and has since become the mother of two fine children.

Another patient was operated on in a room opposite a large window, which was kept open to admit light, and through which blew a smart breeze at 60 deg. Fahr. This patient did well, and quite recovered in the space of three weeks. In every case that I have had since these, the operation has been performed regardless of either temperature, or exposure of the viscera to the air. Let, then, the heated bugbear be banished from the precautionary paraphernalia attendant on the operation.

HOT CLOTHS EMPLOYED TO PROTECT THE BOWELS FROM AIR,
AND TO RETAIN THEM FROM PROTRUSION,

Constitutes the next injurious precaution that a false theory has engendered, put into practice, and is still in use by some operators; a practice that is even worse than that of the heated atmosphere just condemned. Any meddling with the protruded bowels is more injurious to them than to permit them to escape freely, should they do so, which does not always occur, and is most likely to happen when the tumor is small, because in that case the abdomen is more contractile than when it has been greatly stretched by a large tumor. Suffer the intestines to escape and remain outside until the tumor is removed. To see assistants busily engaged in futile endeavors to return the intestines during the operation, and by so doing embarrass the operator at a time that they cannot be controlled; to see loop after loop poked back and re-escape between the busy fingers of three or four hands; to see fruitless efforts made to restrain the truant parts—is a sight humiliating to a good and experienced surgeon. Does not the operator know that all this manipulating, pawing, fingering and poking among the slippery intestines, must interfere with, or remove, or abrade the thin

varnish and epithelium that invest and protect the surface of the escaped parts ; and that, under such treatment, they must become greatly irritated ? Does he not perceive that such conduct is many times more injurious to them than could possibly be that air he so much dreaded, and uselessly heated ? But the case grows worse when the hands of the assistants are armed with steaming hot cloths—even flannel bristling with sharp points of hair.

Imagination has become so exalted as to propose a protecting medium between the hands and the viscera, against their injurious contact with the peritoneal surfaces. This is, as far as it goes, an admission that contact (meddlesome hands) is injurious. To imbue the operator's hands with any material is to apply it to the surface where it is not needed ; and there is no art that can make serum—a living substance—itself not destitute of life. While on this subject it may be as well to say that the best application to the hands is clean washing ; and perhaps, coarse, hairy, red, freckled, and sweaty hands had as well be excluded from participating in the operation.

SPONGE.

There is not the slightest need of a sponge during the cutting part of the operation, nor in the interior of the abdomen in cases of non-adherent tumors. When there are adhesions a sponge may (rarely) be needed to dip away the little blood that sometimes obscures the orifices of a divided arteriole, in order to secure it by torsion or ligature. The sponge ought never to be *rubbed* on the part, for, by doing so, the part becomes irritated, the ⁿervation exalted, and the little plug that had closed the vessel drawn out, both these effects setting the bleeding agoing actively when it had ceased. A good operator rarely employs a sponge, and when he does he is careful to make use of a new one, and not one that has been contaminated by use.

THE LONG AND SHORT INCISIONS CONSIDERED.

Early operators employed the "*Long incisions*," that is, long enough to admit of the escape of the tumor, and to afford an insight to what they were about, a cut from fifteen to twenty-six inches long. Recent operators, anxious, both for improvement and, perhaps, novelty, deprecate it as being dangerous from its great extent, and advocate a short cut, since, by puncturing one or more cysts, the contents can be evacuated and so much reduced in size, that the sacks may be drawn through a cut of only a few inches long, and then severed outside of the abdomen, without exposing the viscera to the air. This notion has been largely put in practice of late years with results far from favorable.

A short cut is less painful than a long one. This is its only merit, and which is now overcome by chloroform. In all other respects it is exceedingly defective. The short cut is utterly useless in all cases where the tumor is solid; also in cystic tumors that are adherent; for the solid tumor cannot be reduced in size since its contents cannot be evacuated, and therefore it cannot be brought through a small opening. Should the tumor consist of cysts and be adherent, the adhesions must be severed in the dark, with great risk to the parts to which it adheres, and in total ignorance of any hemorrhage that may occur. It is only ovarian tumors that can be diminished in size by evacuating the cysts, and subsequent dragging the flabby portions through a short cut; a slovenly procedure as any one who has seen this mode of operating can testify; a mode that favors the entry of some of this unnatural fluid into the abdomen, there to set up irritation and that inflammation which is so greatly feared. The advocates of this method say a great deal about the advantages it gives of fixing the "stump" in the cut, and outside of the abdomen by means of a clamp, which is to strangulate the peritoneum and tissues within its grasp, until

the part sloughs off outside ; rather than leave it within the abdominal cavity, therein to slough, to putrify, and empoison the patient.

All this surgical complication is due to hypothetical speculation in advance of what is expected to happen ; to a fear of hemorrhage ; to a fear of leaving ligatures in the abdominal cavity ; to a fear of exposing the viscera to a malignant influence of the atmosphere ; all of them imaginary and unfounded fears, completely disproved by experience ; and what my old friend Blundell would call " meddlesome surgery."

The long cut admits of the only means of severing adhesions safely, without injury to adjoining parts, and admits of means to arrest any hemorrhage that, possibly, might happen from a divided arteriole ; and in the case of solid tumors is absolutely necessary to get space for it to pass through ; enables the operator to see what he is about, and to get at the few small vessels going to it that may require ligatures.

Some operators advise and employ a thick ligature—whip cord—with which to tie the whole stump in a single noose. In this way a large " stump " will no doubt be left to putrify ; a disgraceful piece of surgery, when it is so easy to tie the few arteries that enter into it, divide it, and leave no stump of any notable size, behind. But to tie these vessels neatly and efficiently, it is requisite to have room, which the short cut cannot give ; hence the lugging out of the stump, and strangulating the whole in a clamp ; thus carrying surgery back to the epoch of horse-gelders and sow-spayers, who know not how to arrest hemorrhage otherwise than with clamps and searing irons.

By the clamp process the stump is forcibly stretched from the broad ligament, or the spine, according to the attachment, to the abdominal surface, like the yoke about a goose's neck. The viscera have to place themselves within the abdomen as best they can, on each side, above, and below, like about a

post set up among them. The two edges of the abdominal incision bear on the right and left sides of the hauled out stud and must contrive to unite with the serous surfaces of the stud by some strange process—cut surfaces with serous surfaces.

There need exist no fear of hemorrhage in ovarian cases, since only two sets of vessels travel along the broad ligament to the tumor, both of which can be rolled under the peritoneum and collected into two groups; one, the spermatic at the upper edge; the other, some uterine from the internal iliac at the lower edge, each group to be strangled with a fine ligature into a compass scarcely as large as the size of a crow quill, as is manifest by the loop of several ligatures in my possession that have come off in the course of cure.

The fear of inflammation from leaving two or more ligatures attached near the sacrum, and hanging out at the lower end of the cut over the pubis is unfounded. The greatly relaxed parieties in these cases render them much less liable to inflame than do parieties that have never been stretched and are tense.

Another fear, that of air entering by the side or track of the ligatures, is also unfounded; since, during the first few days after the operation the peritoneal liquor oozes constantly out, a discharge from within being opposed to an entry from without; and this discharge ceased only when by ^a little fibrinous exudation around the ligatures in their whole track it encloses them in a canal and by this means virtually excludes them from the abdominal cavity.

There is no difference in the length of time requisite to heal a short and a long cut; since the agglutination takes place throughout the whole length of each at the same moment, and not progressively from one point to the next successively. The process that unites one atom of the cut goes on in all at one and the same time. In gastrotomy, in cases of a previously distended abdomen, when properly performed and judiciously

dressed, I have found union to take place without any inflammation, even of that low degree erroneously called adhesive; and have only seen a little of it with a harmless suppuration where the ligatures come out above the pubis.

THE OPERATION.

Any medication of the patient previous to the operation is either useless or hurtful, as fretting the economy to some extent. All that need be done is to give a dose of castor oil the day previously, or an enema in the morning before the operation, merely to empty the bowels; and the enema should be tepid water simply.

The patient well under chloroform, being on her back, should the tumor incline to one side more than to the other, let an assistant push it so much to the other as to make its centre of convexity lie directly under the linea alba. The operator now commences by making a steady, deliberate cut from a little above the pubis to half way above the umbilicus, or higher up or quite to the scrobiculus, according to his judgment of the size of the tumor. Let it be made fearlessly through the skin down to the fascia over the linea alba. No blood, or less than a spoonful will escape if it be made exactly in the median line. Let him next either above or below the umbilicus, exactly in the centre of the linea alba, neither to the right nor to the left of it, cut carefully three or four inches long until he comes to the peritoneum, which is readily distinguished should the tumor be non-adherent in the centre. To enter the abdomen in this way there is no need of probes, directories, forceps, &c, and that scratching and lamina, after lamina dissection too often seen done. Having entered the cavity of the peritoneum he will insert two fingers; on one or between both, place the back of his knife, the edge forward, and then carry it down and upward in the direction of the first incision to the extent needed. and thus effectually and safely open the abdomen. This much

completed, insert the hand, palm towards the tumor, one on each side of it, and if there be no adhesions, turn the mass out; but care must now be had that an assistant support it when outside of the abdomen, lest by its great weight it draw too much on the broad ligament, tear or do other injury. The next step is to secure the vessels, which is easily done by collecting them as already said, into two groups, since they roll freely under the investing folds of the peritoneum, one set at the upper edge of the broad ligament, the other set or group at the lower edge, dividing the space between, which contains no vessels. A careful cut must be made through the peritoneum, which lies on and under the vessels which can be done without the slightest risk of wounding them, in which cut the ligature must be buried, in this way the peritoneum will suffer less than when strangulated. Let the ligature, a small one, be drawn quite tight, and the same done to the other group. Leave at least 9 inches long of the ligature to hang out at the lower end of the incision over the pubis. Next cut through the attachment or pedicle of the tumor about half an inch from the ligatures; in this way no fearful "stump" will be left behind, more than is left in the case of arteries in amputations. The tumor is now extirpated. Wait a few minutes and see that all is right—there need be no hurry. During the operation the intestines may escape when the tumor is small, or from straining of the patient should the chloroform be insufficient, or excite vomiting; but the escape of intestines is a rare occurrence when the tumor is large, because the patient has not had capacity sufficient in the stomach to take in enough food to nourish her; she is lean and the pressure of the tumor has caused the absorption, more or less complete, of the mesenteric and omental fat, so that what with emptiness and absence of adeps, I have seen the intestines remain in the cavity of the abdomen resembling flat ribbons. However, should the intestines escape, suffer no meddling with them, which will injure them more than leaving them outside, untouched by busy hands

until it is time to close the wound. The surgeon ought to do this without assistance, and without touching them, by merely taking hold of each side of the cut as he would the open mouth of a bag, and lifting the loose and flabby parieties up, the intestines will naturally slip in of themselves. Any attempt to restrain their exit during the performance of the operation will be to bruise them, and embarrass the operator.

The next step in the operation—the closure of the abdomen—is a very nice one, to exactly and neatly approximate the edges of the incision. For this purpose four twisted suture pins will be required to transfix and maintain the edges in perfect coaptation. These pins must be at least three inches long, made of brass, copper or iron wire well tinned—copper is the best, as being very pliable and easily bent after insertion to suit the track it lies in. To insert them, pass the steel needle through the skin an inch from the edge of the wound on one side of it, thrust it obliquely inwards until it pierce the peritoneum half a line from its cut edge within the abdomen, again pierce the opposite side in a corresponding way to come out at the same distance as the first entered. Fit the cut edges exactly and neatly together, and with a figure of 8 ligature secure this first pin. Do the same with the three remaining pins at equal distances from each other. This done insert at suitable intervals a sufficient number of common interrupted sutures between the interspaces of the pins. Add long straps of adhesive plaster, and place over the line of cut a strip of old rag moistened with a little blood that can be had by squeezing out the veins of the removed tumor. This blood dressing is the one most congenial to a wound; it soon dries, and retains the parts like a splint, and is easily removed when *quite dry*. Lastly, lay a compress, made of one or two folded napkins on, with a sufficiency of tow to fill up the empty belly to the level of the ribs, so as to press up the liver and support it from hanging too heavily on its ligaments, until the ribs come down. Retain this thick compress by a many tailed

bandage, the only kind that will fit snugly and not roll up out of shape and place as does a broad napkin. The many tailed bandage ought to have its slips scarcely four inches broad, and so laid on each other that the centre one opposite the navel will be the first one lapped on, and the next one above and below to shingle over each other alternately, to reach as high as the ribs and as low as the pubis ; the last slip to be passed under the nates, come over the groins up in front of the abdomen, there to be pinned, or tacked with ~~sticks~~ *stitches*, to those that already encircle the belly.

SUBSEQUENT TREATMENT.

The operation is now finished ; the patient in her bed, and soon out of chloroform, is to take three grains of solid opium (no morphine or other fancy preparation). After this she will probably sleep six or eight hours. After that period some slight pain will return, and is to be met with another dose of one or two grains more. It may be necessary to repeat the opium in two grain doses for a few days more, morning and evening, but the larger dose should be given in the evening, as that is both the time of exacerbation and the natural period of repose when opium acts most kindly. It is better to give one adequate dose that will last several hours, than tease the system with repeated small doses. After a full dose the system may be allowed time to recover from its unnatural state—the effect of opium ; but, never give more, nor oftener than there be real need for, indicated by pain. Where there is pain there is irritation, and where there is irritation inflammation is likely to be set up—*ubi dolor, ibi fluxus est*.

No heed need be taken to move the bowels—a routine practice—injurious after an operation that requires the greatest repose of the body and viscera—nothing interferes more with the recovery of the parts than acting on the bowels. The

patient may well go five or six days without a motion, unless flatulency require an enema, or a small dose of castor oil to restore peristaltic action of the intestines; as the bowels were never full for a long time before the operation, and what little remained was removed by the enema, and nothing since accumulated within them during the low diet. But the diet must not be too low, the stomach must not be left empty, like a mill without grist to grind itself, therefore she must have a little bread and toast water, or tea, or both, according to her previous habit of living, for a few days.

The dressing need not be changed earlier than the 5th or 6th day, when some of the sutures may be removed, and the dressing carefully replaced.

In cases where there has been no adhesions and the peritoneum remained natural, it will secrete as usual a small quantity of *liquor abdominalis*. This will escape at the exit of the ligatures, and wet the lower portion of the dressing for a few days; a little later, the ligatures become enclosed in a sort of canal made by a slight deposit of fibrin, and thus become shut out, as is were, of the abdominal cavity, and now no more will escape. Care must be taken to secure the outward ends of the ligatures under adhesive plaster to prevent them being drawn out before the vessels they constricted become completely closed. The ligatures, left to themselves, will take from 3 to 5 weeks to come away of themselves, because they always include a few fibres of the fibrous tissue that accompanies the vessels in the broad ligament. But no inconvenience results from their so remaining, since the patient can go about as in health.

The foregoing description of the operation of gastrotomy may be taken as the type of any one form for the removal of tumors generally, from the abdominal cavity. Variations may be needed in particular cases, as when adhesions exist. Also, when the case turns out to be a fibrous out-growth from the uterus, and fibro-fatty tumors.

Gastrotomy may be availed of for the extirpation of the uterus, as suggested by Blundell nearly fifty years ago. On one occasion I hesitated between extirpation of the uterus, or excision of a large fibrous tumor that grew from its base, and ascended mid-way between the umbilicus and scrobiculas, filled both iliac regions and encroached in the hypochondrii, its pedicle, if pedicle it might be called, was over three inches in diameter, and was confounded with the substance of the enlarged fundus of the uterus. It was severed close to the uterus, the patient recovered perfectly in three weeks time. At the time of the operation it was hard to say which of the two, severance from the uterus, or extirpation of the latter with the tumor, was likely to be the safer operation. Had I decided on the removal of both, I should have first tied the two internal iliac arteries, a simple and easy operation in the then open abdomen, where the vessels lie very apparent. In such a case the principal difficulty will be to sever the organ from the urinary bladder in front, and from the rectum behind, besides a careful regard not to wound the ureters. The open vagina can be closed with a couple of sutures, so inserted as to permit the ends to come through the vulva.

Very rarely gastrotomy may be needed for the removal of a foetus in a case of its escape into the abdomen through a ruptured uterus, and for the removal of the remains of an extra-uterine conception. Such an operation is very simple in its execution, and the incision will be of very limited extent.

Cæsarian section I think ought never to be performed. There are very few cases of natural obstruction so complete as will not admit of instruments capable of extracting the foetus, piecemeal at least, by the natural passage, and so save the mother in preference to the foetus. I have seen several Cæsarian operations performed in 1832 and 1834, to satisfy or rather gratify a bigoted clerical prejudice. They were all unfortunate and cruel.

A FEW MISCELLANEOUS REMARKS.

It is not without great interest that we can look into the empty abdomen after the removal of a large tumor—for the cavity looks empty. The stomach will be found very small, all the intestines nearly empty, and so reduced in size as to resemble flat ribbons ; no fat anywhere, in long standing cases, —even about the kidneys. In this state of emptiness, and no support on the vessels, we cannot help smiling at the caution so seriously inculcated in cases of paracentesis to keep up great pressure, without which it is supposed that syncope—even mortal syncope—may occur.

Whipcord as a ligature to the pedicle is too large to be capable of being drawn sufficiently tight to compress the small vessels it is so disproportionately applied to. It will stand a strain of nearly a hundred pounds without breaking, a force much greater than needed. A single thread well applied I have found adequate to every purpose.

The Ecrasure (crusher) a novel instrument recently introduced to sever parts without the risk of hemorrhage. It is a more barbarous instrument, if possible, than the gelder's clamp, and equally disgraceful to the progress surgery has made. Where it can be applied with precision, and bruise its way through parts a knife can cut with exactitude, and any severed vessels tied, should the surgeon possess no more than limited abilities.

One word more about hemorrhage in the case of extirpating ovarian tumors. Here, hemorrhage can come from two sources only—I say nothing about adhesions. The first is from the spermatic vessels ; these cannot give trouble. The second source is more important, furnished by the uterine vessels, deep in the hollow of the sacrum, where, in a few cases, diffi-

culty may be encountered from the "welling up" of blood. But this can be easily commanded by a good assistant compressing the internal iliac with his finger against the brim of the pelvis—alternately pressing and relaxing—to enable the operator to see the point of escape, and there apply a ligature with the aid of a forceps or tenaculum, or the old method with a needle.