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ART. I.—*Vesico-Vaginal Fistula: the Preparatory Treatment and Mode of Operation.* By THOMAS ADDIS EMMET, M. D., Surgeon to the New York State Woman's Hospital, New York.

SINCE the application of the metallic suture to the class of injuries under consideration, and its subsequent general use in obstetrical surgery, scarcely any other branch of our profession has made more progress, with a greater promise for the future. Posterity, regardless of counter claims of priority, will ever intimately associate the name of J. Marion Sims with the use of the metallic suture. It is not my purpose, however, to review at length the labours of Dr. Sims, or the subsequent claims of others who have contributed at home and abroad to the common stock, for they are as "household words" to the operator. But as an explorer in a field almost uniformly unsuccessful, as a demonstrator of the true principles applicable, and as the originator of the necessary instruments which have not been improved, whereby success is now the rule, he can rest his claims with the future. Through his teaching, in a development of the surgical field peculiar to woman, the progressive results have been such as seldom follow the efforts of a single individual, and the subsequent success of others can but confirm his claims.

In this country there are now but few surgeons who have not been successful, for the operation is one of the most certain of success in surgery, provided that the edges of the fistula are properly denuded and secured without undue tension by the metallic suture. This fact is demonstrated by the records of the Woman's Hospital, as, for some years past, with the increased experience of the profession in the mode of operating, but few cases have been admitted to the institution in which the loss of tissue had been so slight that the edges could be approximated without the aid of plastic.

surgery. It is my purpose to present in detail, from over two hundred successful cases, a selection in illustration of many points of difficulty which would be rarely met with in private practice, but which are of frequent occurrence in so large a school. With the exception of a few cases operated on while I was the assistant surgeon, all have occurred during the past five years in my service as surgeon to the hospital, or in private practice.

As the result of an experience based on some two hundred and fifty cases in my own practice alone, I may state as a principle that scarcely any case is incurable. The operator, however, like an engineer, must fully appreciate the peculiarities of the situation, and make each point available in his defence; and his success will be in proportion to his ingenuity in turning to the best account the peculiar features of each case. Unfortunately, however, in many difficult cases, the patient is either in indigent circumstances or unable to spare the necessary time from her home duties, and, withal, during the many progressive operations so often requisite, the faith of the sufferer, as well as the patience of the operator must often be severely taxed. The soft parts are susceptible of such great modification that it is often impossible for the surgeon to fully anticipate from the first what may be the result of his labours. It is only step by step, as the parts are relieved of tension, that they become moulded to their new condition. A full conception of what may be accomplished can only be formed with the gradual disappearance of the cicatricial tissue, and after a more healthy condition has been brought about by proper treatment. I have had but five cases which I have been obliged to abandon as wholly incurable, not so much in consequence of the actual extent of the injury sustained, as from the excessive obesity which rendered it impossible to bring the parts into view, and from the fact that, through great irritability of the nervous system, they were unable to bear a long operation on the knees, in the position necessary for their case. About fifty patients who have been under treatment in the hospital have returned home for various causes at different stages of their treatment. Many have done so after months of careful preparatory treatment, without waiting for a final operation, being satisfied with their improved condition. Others have done so with my advice, either to recuperate or to await the efforts of nature in bringing about some desirable change in the parts previous to another operation, and a small number for disorderly conduct. These cases are frequently relieved afterwards by an operation at home, and have been placed on record as cases which were discharged incurable from the Woman's Hospital, while the operator did not realize how much had been accomplished for him, and that in many cases the mere closing of the fistula was not difficult after the parts had already been properly prepared.

A vesico-vaginal fistula following parturition may be defined as an opening from sloughing in the bladder, resulting from delay in delivery after impaction has taken place. The exceptions to this rule are those

caused by rapid labour, lacerating the neck of the uterus, and extending beyond so as to involve the base, together with lacerations at the neck of the bladder, which sometimes occur on delivery by forceps. The accepted teaching to wait any given length of time after the occurrence of impaction, with the hope that nature may yet accomplish the delivery unaided, is, as a rule, attended with great danger. After a careful review of all the recorded cases admitted to the Woman's Hospital since its foundation (some twelve years ago), I cannot satisfy myself that more than three cases out of the whole number should be regarded as having resulted from instrumental delivery. These were cases of malpractise, and of no value in a statistical point of view. An escape of urine frequently follows immediately after delivery by forceps, but only as a result of the slough, which had already taken place, and at the time partially detached. In accepting the teaching based on so large a record, I believe that, after impaction has occurred, a novice would be likely to do less damage to the soft parts in applying the forceps or using the perforator, if familiar with the mechanism of labour, than in leaving the case to nature, as is frequently done. I have known the greater part of the base of the bladder lost by subsequent sloughing after an impaction of the head for only two hours. And, again, we have cases on record which had been left to nature undelivered from a week to ten days, and one over a week after the head had passed the vulva. It is evident, therefore, that the average duration of labour cannot be taken as a guide, for the injury had actually resulted long before delivery, although the slough may not have been separated for a week or two afterward, as is frequently the case. The only deduction that we can draw from experience is, that the longer the head is left in the pelvis the greater is the danger, and that less than two hours even is sufficient to cause extensive loss of tissue; also, that the amount of injury is by no means in proportion to the length of labour, and that the only safety consists in as rapid delivery as the circumstances of the case will admit.

After treating of the proper means of preparing the patient, the necessary instruments, and the method of operating which has proved most successful in my hands, together with the after-treatment, I shall present a series of cases under the following classifications: 1st. Fistulæ from laceration of the cervix, with or without sloughing, and involving a portion of the base of the bladder; 2d. From the sloughing of some portions or loss of the whole base; 3. Lacerations across the neck of bladder or urethra; 4th. Loss of the entire base of the bladder, the cervix uteri and the urethra.

Unless the greatest care has been given to cleanliness, the sufferer, in a few weeks after receiving the injury, becomes a most loathsome object. From the irritation of the urine, the external organs of generation become excoriated and œdematous, with the same condition extending over the buttocks and down the thighs. The labiæ are frequently the seat of deep

ulcerations, and occasionally of abscesses. The mucous membrane of the vagina is in part lost, and the abraded surface rapidly becomes covered at every point with a salacious or offensive phosphatic deposit from the urine. If the loss of tissue has been extensive, the inverted posterior wall of the bladder protrudes in a semi-strangulated condition, more or less incrustated with the same deposit, and bleeding readily. This deposit will frequently accumulate to such an extent in the vagina that the sufferer becomes unable to walk or even to stand upright without the greatest agony.

This deposit must be carefully removed, so far as possible, by means of a soft sponge, and the raw surface brushed over with a weak solution of nitrate of silver. If, at any point, it cannot be at first removed without causing too much bleeding, the deposit itself must be treated in the same manner, or coated with the solid stick. Warm Sitz baths add greatly to the comfort of the sufferer. The vagina must be washed out several times a day with a large quantity of tepid water. After bathing, it is best for the patient to protect herself by freely anointing the outlet of the vagina, and the neighboring parts with any simple ointment; the ceratum calaminæ, however, being the best. She must be instructed to wash her napkins thoroughly when saturated with urine, and not simply to dry them for after use. Time and the increased comfort of the patient are gained by judicious attention to such details. About every fifth day, the excoriated surfaces yet unhealed should be protected with the solution of nitrate of silver; and it is necessary frequently to pursue the same general course for many weeks, before the parts can be brought into a perfectly healthy condition. This point is not reached until not only the vaginal walls, but also the hypertrophied and indurated edges of the fistula have attained a natural colour and density. This is the secret of success; but the necessity is rarely appreciated; without it, the most skilfully performed operation is almost certain to fail.

When the proper condition has been brought about, the surgeon may then be able to decide upon some definite plan of procedure for the closing of the fistula. The edges should be seized at opposite points with a tenaculum held in each hand, and the degree of tension judged by an approximation in different directions. If, at any point, the edges do not come readily together, the finger can detect the seat of resistance, while the parts are kept on the stretch by a tenaculum in the other hand. When the hands are comparatively slight, and superficial, or brought well up by traction, it is generally sufficient to divide them with scissors at the time of the operation for closure. But, on the contrary, when the tension is due to more extensive sloughing, or when the cal-de-sac has been destroyed, the parts can seldom be properly freed without more or less hemorrhage as a complication, and it will be necessary to make one or more preparatory operations. Placing the patient on the back, with two fingers of the left hand introduced into the rectum as a guide, and the thumb into the vagina

to make counter-pressure, freely snip with a pair of blunt-pointed scissors, point after point, as indicated by the pressure of the thumb. This can be done to any extent without the speculum, and without fear of entering either the rectum or the bladder, if the position of the uterus is recognized, and a proper use is made of the fingers in the rectum as a guide. After opening up the vagina as freely as is deemed prudent at the time, a glass vaginal plug, only just long enough to pat the canal well on the stretch, without fear of producing sloughing or pelvic inflammation by too great a length, should be introduced, and secured in place by a T bandage. The instrument has a sufficient rim to prevent it from slipping into the vagina, with a depression to receive the urethra along its course, and to protect it from pressure. This useful instrument was devised by Dr. Sims, and is fully described in his *Clinical Notes on Obstetrical Surgery*. The hemorrhage is sometimes excessive, but is generally controlled as soon as the plug is introduced; and as the instrument is hollow, it possesses all the advantages of a speculum in exposing the condition beyond. If the blood, however, begins to escape along the sides of the plug, it can be controlled by introducing, with a pair of dressing-forceps, portions of damp cotton along the depression made for the urethra, while rotating the instrument until the outlet of the vagina has been encircled by a tampon and the starting-point regained. It is remarkable how much can be accomplished through the absorbents in a few weeks with judicious pressure exerted by this instrument on cicatricial tissue. Experience has fully demonstrated that the use of the scissors is preferable to that of the knife; with less risk of inflammation and certainly less hemorrhage, cicatricial tissue lacerated or divided by scissors, as we shall show hereafter, does not heal so rapidly, and time is consequently gained to bring about this absorption.

The patient should be lifted into bed and kept there for a week or ten days. Opium should be administered freely, if needed. The urine can be drawn by a catheter, if necessary, without removing the instrument; for, if there has been much hemorrhage, it is not well to remove the speculum until it has become somewhat loosened by the discharge. When it is deemed safe to remove the plug, then large warm water injections with a little castile soap should be continued daily, and oftener if the discharge is profuse. After the parts have been properly healed, if necessary, repeat the operation for enlarging the canal until the object in view has been attained.

Before operating for closing the fistula, the bowels should be thoroughly acted on by a cathartic. A table, some four feet long and three feet in height, covered with several folds of blankets, should be prepared for the operation. The patient should be dressed in a night-gown and drawers, with the abdomen free from any restraint about the waist. It is rarely that any other position is needed than on the left side, with the knees flexed on the abdomen, the body well rolled over on the chest, the left arm turned up over the

back, and the head elevated as little as possible. If covered with a sheet, and with drawers, the night-gown of the patient should be slipped up around the waist, so as to protect it from becoming soiled, all of which can be arranged beforehand by a nurse or female attendant. The buttocks must be drawn down to the edge of the table, and a portion of the sheet on which the patient is lying thrown over her, the speculum introduced, and the edges of the sheet properly tacked in between the legs so as to prevent exposure. If Sims' speculum can be properly held by an assistant, it is the best instrument of all others for this operation. A very good substitute, however, is a self-retaining speculum which I have lately perfected so as to answer exceedingly well in a large majority of cases, if the cul-de-sac has not been lost. It withdraws the perineum and elevates the upper labium as is done with Sims' instrument; while for the treatment of uterine disease it now answers every purpose, and brings the cervix in view with the same facility. But I shall always employ his instrument to a great extent from having well-trained nurses accustomed to its use, as well as from its simplicity and the saving of time in adjusting it.

Having decided on the direction for closing the fistula, its edges must be scarified by seizing with a tenaculum the most depending point, and, with a pair of scissors of a proper curve, proceed to remove the inner edge in a continuous strip. It requires but little practice to make this in most cases continuous around the entire fistula to the starting-point; and, if the denuded portion is not of sufficient width, another strip can be removed just outside of it. The scarification should be extended as near the mucous membrane of the bladder as possible, without actually involving it. A number of probang sponges are indispensable, and an active assistant will be able by their means to keep the freshened edges so far free that, unless an unusual hemorrhage takes place, the operator will not be inconvenienced by the bleeding, if scissors have been used for paring the edges. I have for several years confined myself to the use of scissors made with two different curves, and each duplicated in the reverse, so that they may be used with either hand. I may be deemed an enthusiast in my preference for the scissors to the exclusion of the knife. But, although alike practised in the use of both, I am satisfied that with the scissors I can complete the scarification in half the time, that no portion is left undenuded, and that there is less bleeding; for, since confining myself to their use, I have not had either to delay or to abandon an operation, a frequent occurrence formerly with the knife. Sims' tenaculum of the proper size is much smaller than the instrument generally used, and can scarcely be made too delicate if well tempered. My friend, Dr. John G. Perry, Assistant Surgeon to the Woman's Hospital, has devised a barb-pointed tenaculum, which is a most useful instrument, as it prevents the tissue from slipping off when once fairly caught up. In the choice of needles, I prefer that they should be made small, short, and round, with a slight curve near the point, thickest

at the eye, and countersunk to receive the thread. These have the advantage of making a punctured wound, which will be perfectly filled by the wire. The needle in general use, however, which is spear pointed, or triangular in shape, with a cutting edge, and of many times the diameter of the wire, frequently causes a troublesome oozing of blood after the sutures are secured, and sometimes a small fistula will remain along its tract, if by chance its course has been too near the bladder. The needle forceps first introduced by Dr. Sims, has not yet been improved upon for the facility with which the short needle can be introduced at any angle and in a confined space. The point of the tenaculum should be introduced toward the fistula, at a convenient distance from its vaginal edge; then, by a rotation of the hand in the opposite direction, the bladder edge of the fistula will be turned out. Introduce the needle behind the tenaculum, bringing out its point just at the bladder surface, and while still grasping it with the forceps, withdraw the tenaculum, pass its hook over the point of the needle to make counterpressure, while it is advanced as far as the forceps will allow, then seize the exposed portion of the needle, and draw it entirely through. On the opposite side, seize the edge of the fistula with the tenaculum, in the same manner, and introduce the needle at a corresponding point, near the bladder surface. As a rule, from four to five suture should be introduced to the inch, and one or more passed at each extremity beyond the fistula, according to the shape of the angle, the necessity of which will be hereafter demonstrated. The needle should be armed with a short silk loop and tied with a half knot at the eye. As each suture is introduced, it is better to follow at once with the wire, for the silk soon becomes weakened after being saturated with the blood and urine. It is secured by hooking a small portion into the silk loop, mashing it flat at the angle, and giving it one or more turns so that it may not slip. Frequently the strain is too great on the tissues to pull the suture through at a sharp angle; then a shallow, forked instrument, devised by Dr. Sims, is necessary, so that by pushing one portion after another near the point of exit, by the instrument in one hand and the silk loop held in the other, it may cause the wire to follow in the line of introduction. As to the best method of securing the edges of the fistula, I have an unqualified preference for the simple interrupted suture. Dr. Sims, some nine years ago, abandoned his clamp, having demonstrated that the interrupted suture fulfilled every indication, a fact which my experience since has fully confirmed. While Dr. Bozeman's button suture fulfils in his hands all that he claims for it, and gives an elegant finish to the operation, all do not possess his dexterity in its use. I have used it frequently, and with success, after understanding its application, but at the same time I could never satisfy myself that it simplified the operation, or that I could in any case gain a better result by its use than with the simple interrupted suture. When the fistula is a large one, and a number of sutures are required, to save time and some confusion afterward, shorten

the suture by drawing it well through, make a small loop in the short end, and pass the long one through it, to be held by the assistant behind the speculum. Dr. Sims has always insisted on the importance of introducing the sutures with great care, so that the points of entrance and exit should be at the same distance from the edges of the fistula. The principle is correct, in order to avoid the approximation of a scarified surface with an opposite portion which has not been denuded, in which case, of course, no union would take place. But, in reality, to introduce the sutures with any such degree of accuracy is almost impossible, even with constant practice, and with the fistula in a favorable position. Within a reasonable limit this great accuracy is unnecessary, if the sutures are properly shouldered at the time of securing them, so that the point of twisting shall be immediately over the line of union. In other words, each end of the suture must be bent flat on itself to the vaginal surface at the point of exit, and at a right angle again just at the edge of the fistula. If this is done with care, and the suture is only twisted up to the angle formed at the edge of the fistula, it is evident that there can be no tearing in of either border. It is generally most convenient to secure first the suture nearest the outlet of the vagina. By following up on end from the fistula with a blunt hook or tenaculum, it can be readily disengaged from the others held by the assistant. While the long end is held in the left hand, shorten the loop by traction to about three-quarters of an inch in length; seize the little slip-knot with the twisting forceps, so as to insure by so doing that both ends of the suture are included within its grasp, and cut off the excess of wire. Make sufficient traction to bring the edges of the fistula together, then shoulder properly with the blunt hook each strand, as already described. After introducing the loop within the slit of the shield, bring the forceps and the handle of the former together and twist until the angle formed by the crossing of the two strands of wire is lost just at the edge of the slit in the shield. The surface over which the suture is to be twisted should be properly made with a very thin edge; therefore, when the wire is bent at a right angle over it, by moderate traction, as the two instruments are brought together and the twisting is not carried beyond a given point, it is evident that with ordinary care the edges of the fistula will be only just brought into apposition. The drawing up of the suture with too great traction, and continuing the twisting beyond the proper point so as to strangle the parts included within the loop, can be the only cause for a metallic suture ever cutting out, if the parts have been properly freed from tension before the operation. As it is very necessary that the suture should lie flat on the vaginal surface, after it has been secured, withdraw the shield and, while still grasping the suture, pass a tenaculum beneath the twisted portion close to the line of the fistula, in order to lift it up; then bend the wire down by moderate traction over the hook used as a fulcrum; withdraw the tenaculum, and press the wire downward near the end in the grasp of the forceps, as the latter is made

to bend the wire opwnrd in the opposite direction; cut the wire just at the angle made by pressure of the tenaculum; it will be then found that by thus turning the suture over and making pressure in the middle, as the free end is bent opwnrd in the opposite direction, the suture will lie perfectly flat. The angle where the suture is to be cut off should be made about half an inch from the edge of the closed fistula. When there is room to admit of doing so, it is well to turn every other suture to the opposite side as a guide afterward, when they are to be removed, should any of them become imbedded in the tissues.

After completing the operation, turn the patient gently on the back, introduce a catheter, and, if the urine is discoloured, inject tepid water into the bladder for the purpose of washing out any blood which may have accumulated. To Sims' sigmoid, or self-retaining catheter, we are greatly indebted for success in this operation, as well as for much additional comfort to the patient. It should always be made of block tin, that the curve may be altered to fit each individual case, so as not to touch the fundus of the bladder, yet of sufficient length, so being nicely balanced in the urethra, to lie close up behind the pubes. The patient must lie the greater part of the time on the back, and, if possible, preserve this position until after the sutures have been removed. It will add greatly to her comfort to have a double-inclined plane well padded to support the lower limbs when drawn up, which can be removed from time to time to stretch them at full length for a change of position. The support should be open at the ends with a portion of the side removed so as not to interfere with the catheter. We have generally used as a receptacle for the urine a large sized oval bird-bath or cup, such as are placed in cages. The catheter must be removed several times a day for the purpose of cleaning it by forcing a stream of water through it by means of a large syringe, and the patient must be instructed to notice carefully that the urine has a free escape at all times. It is well to have two catheters, so that one may be introduced immediately on the removal of the other to be cleaned. A sufficient quantity of opium should be administered daily to keep the bowels constipated until the sutures are removed, and the diet regulated with a view to this end. The sutures are usually removed from the eighth to the tenth day, by gently elevating each in turn with the forceps, and clipping the nearest side of the loop so that, as the suture is being withdrawn, it still continues to bind the parts until its exit. Twelve hours afterwards, a dose of castor oil should be administered. The catheter should be continued in use for a few days longer, according to circumstances; and, from the fourteenth to the twentieth day, the patient may set up.

I have now reviewed, but only in brief, the general management and mode of operating. To have entered more into detail would have been impossible, without repetition in anticipating many practical points to be hereafter illustrated by cases, which shall be carefully selected with this object in view.