

ON THE TREATMENT OF
VESICO-VAGINAL FISTULA
IN SOME CHINESE PATIENTS

by

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A Thesis accepted by the
University of Edinburgh
for the Degree of M.D.

July, 1925

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in some Chinese Patients

The subject of this thesis is dealt with under the following divisions:

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I. Introduction

The writer has chosen this subject because during his 30 years' practice as a medical missionary among the Chinese in the island of Formosa, he has frequently been called upon to treat cases of vesico-vaginal fistula of various kinds, numbering about 55. The practitioner of the old Chinese system of medicine can do nothing for such patients, and so they naturally come to the Western surgeon. The condition of the sufferers from this malady is a very distressing one. The joy that comes to a mother "because a man is born into the world" has been turned into sorrow because, in addition to her great and protracted sufferings, the child has in all probability been born dead. Furthermore the effort to bring him into the world has brought herself into a very distressing and - unless we can cure it - hopeless condition. The words of Dieffenbach quoted by Hayward⁷ well describes her miserable condition. "Such unhappy beings are forced to exclude themselves from society, the very atmosphere surrounding them is polluted by their presence, and even their children shun them. Thus rendered miserable both morally and physically, they yield themselves a prey to apathy, or a pious resignation alone saves them from self-destruction."

Their lot in China is especially hard because as happened in the case of some of the writer's patients, their husbands are apt to divorce them. It is not surprising therefore that an immense amount of thought has been expended and ingenuity shown by a large number of surgeons in the effort to cure this most distressing malady, and it is one of the triumphs of modern gynecology that there are now almost no cases which cannot be cured.

Fortunately at the present day in our own country, where medical aid can quickly be obtained, it is rare for a woman in labour to have the head of the child impacted in the vagina for a long period, and so the chief natural cause of vesico-vaginal fistula - excepting of course extension of cancer from the cervix, which is the most frequent of all causes - is much less frequently operative now than was the case in the old days. In China, however, and in other countries where Western medical science is not practised, or, owing to the want of travelling facilities, is not quickly available, cases of vesico-vaginal fistula following labour are naturally much more frequently met with than in the United Kingdom. The chief cause of the condition in China, apart from cancer of the cervix, is the impaction of the head in the vagina for a long time during labour, thereby causing gangrene and sloughing of the vesico-vaginal septum. Sampson¹⁹ has shown that in over 60% of the cases operated on in recent years at Johns Hopkins Hospital, vesico-vaginal fistula was due to vaginal hysterectomy.

So it seems that in America at the present day the operation of vaginal hysterectomy is - apart from inoperable cancer of the cervix - the most frequent cause of vesico-vaginal fistula, and no doubt the same is true in this country.

II The various kinds of vesico-vaginal fistula
met with by the writer among the Chinese of Formosa,
with treatment adopted and comments thereon

The following kinds were met with:-

1. Easy fistulae in which approximation could be readily secured without tension.
2. Inaccessible fistulae.
3. Very large fistulae.
4. Very small fistulae.
5. Cases in which the margins were bound down by scar tissue.
6. Juxta-cervical fistulae.
7. Fistulae with partial destruction of the neck of the bladder and of the urethra.
8. Fistulae with complete destruction of the bladder sphincter, and partial or complete destruction of the urethra.

These different kinds of fistulae are, of course, not mutually exclusive. Some belong to two or more of these classes, e.g. a fistula, for instance, might be inaccessible and also be very large, and also have its margins bound down by scar tissue.

1. With regard to the first class, i.e. the easy fistulae, in which approximation of the edges was easy, I have little to say except that a fair number of such cases were met with and that they were all treated by the classical method of J. Marion Sims²², except that silk-worm gut was used for the suturing instead of silver wire. In every case I aimed at getting a line of union as far as possible at right angles to the long axis of the vagina as greatest freedom from tension seemed to be obtained in that way. The margins of such fistulae were always denuded, never split. Only one set of interrupted sutures was used, never a buried and a superficial set such as Vulliet²⁷ employed.

2. The inaccessible fistulae In this class of case, the inaccessibility was due partly to high position, e.g. in juxta-cervical fistulae, but more frequently to cicatricial contraction in the vaginal walls. In these cases I have never adopted Bozeman's² preliminary treatment which consisted of dividing the scar tissue and stretching the vagina after such division with glass dilators which were worn for a fortnight or more before the main operation. Nor did I ever try the suprapubic method of Trendelenburg²⁵ and Von Dittel²⁶ which is supposed to be indicated in fistulae inaccessible from the vagina, as I found sufficient access could be got by the straight left paravaginal incision of Duehrssen³ and others. This incision divides the vaginal wall on its left postero-lateral aspect and passes out through the left labium margin[^]s at the junction of its middle and posterior thirds in an outward and backward direction into the left ischio-rectal fossa. It is then deepened as much as may be necessary and any bands of cicatricial tissue that need incising can be dealt with at the same time. In one or two cases I have added a similar incision on the right side. I can testify from practical experience to the great value of this incision in all cases of inaccessible fistulae. I have employed it in nearly all difficult cases of vesico-vaginal fistula. Even where access is fairly good, this incision makes it better, which is always an advantage in difficult cases.

^{x?} majus

I have had no experience of Schuchardt's²¹ vagino-perineo-perirectal incision described by him first in 1893 and strongly recommended by Ward²⁸. It begins high up in the vagina on its left postero-lateral aspect and passes downwards and outwards dividing the vaginal wall to the junction of the middle and posterior thirds of the labium majus which it also divides. So far it has been straight; it now becomes curved, sweeping backwards outside of the external sphincter of the anus to a point on the middle line about a finger's breadth behind the anus. Gellhorn⁶ says of this incision "The effect of Schuchardt's²¹ incision is surprising. In place of a vaginal tube, we have before us a shallow excavation not deeper than one inch".

The vesico-vaginal fistula which follows vaginal hysterectomy and is so often met with at the present day belongs to the class of inaccessible fistulae as it is situated high up in the vaginal vault. It is also surrounded by scar tissue. Of course the cervix has been removed. This class of fistula is best closed by the plan described by Ward²⁸ (i.e. A Schuchardt's²¹ incision followed by free and wide separation of the bladder and vaginal walls and separate suture of the openings in each as in Mackenrodt's¹³ method).

3. **Very large fistulae** Some of the fistulae I met with in Formosa were of very large size, the whole of the vesico-vaginal septum from the cervix to the internal opening of the urethra having sloughed away. In a few even the proximal end of the urethra had not escaped destruction. The bladder wall was prolapsed through the fistula into the vagina. The finger could of course be easily introduced through the abnormal opening into the bladder and the whole of the uterus could be palpated by it with unusual distinctness. In all these cases there was more or less cicatricial tissue round the margins of the fistula and in the vaginal wall. The urethral openings are sometimes to be seen on the posterior margin of such fistulae but I have not myself observed them.

The great difficulty in these very large fistulae is of course to get the edges approximated without undue tension. In some cases (e.g. case 3) in which the fistula extended right up to the cervix, I have succeeded by denuding the anterior lip of the cervix and using it to help fill the gap. Kelly¹² recommends that the cervix should be split bilaterally in such cases so as to separate the anterior lip completely from the posterior lip and so to free it more. In one case (case 5), in which the anterior lip had sloughed away, I denuded the posterior lip and used it instead of the anterior lip.

I have never tried to close a fistula by flaps either pedicled (such as Trendelenburg²⁵ and Milton¹⁶ have used) or in the form of a cuff of vaginal mucous membrane dissected up all round the margin of the fistula and turned in so that the edges of its raw surface might be sutured together so as to close the fistula as Martin¹⁴ or Berlin & Ferguson⁵ of Chicago have done. Latterly I have invariably in such cases followed the method of Kelly¹² described by him in his Operative Gynecology and there called by him "my method". It consists in making a transverse incision in front of the cervix and separating the bladder from the cervix right up to the utero-vesical fold and well out laterally. If the urethral orifices are seen on the posterior margin of the fistula as in the case described by Kelly¹², ureteral catheters can be passed into them and out by the urethra, so that the ureters are easily avoided in the suturing, their position being marked out by the catheters.

The mobilised bladder wall is then pulled down and its raw margin is united to the denuded anterior half of the margin of the fistula. Of course a raw surface is left in the vagina but I have found that it rapidly granulates over, and causes no trouble. This method of Kelly's¹² seems to be to differ very little, if at all, from "the incision of Jobert" described as "autoplastic par glissement" by Jobert⁸ de Lamballe. I have found no other method so useful in obtaining approximation without undue tension in large fistulae as this method of Kelly's¹² (see cases 1, 2 and 6). I have never tried the method of Mackenrodt¹³ which consists in separating the bladder wall from the vaginal wall widely all round the fistula, so that the opening in the bladder wall is completely separated from the opening in the vaginal wall. Mackenrodt¹³ also separates the bladder wall from the cervix up to the utero-vesical fold of the peritoneum.

After the bladder wall has been thus thoroughly mobilised and separated from all its surroundings, he closes the opening in it with catgut sutures which do not traverse the vesical mucosa. The opening in the vaginal wall is then closed separately with silk-worm gut sutures, the anterior surface of the uterus being used to help to close it if necessary. This method of Mackenrodt¹³ makes the last most important advance in the treatment of vesico-vaginal fistulae. Kelly's¹² method also secures mobilization of the bladder wall by separating it from the cervix. It is not so complete as Mackenrodt's but I have found it very efficient in giving approximation without undue tension. Kelly himself says that it is easier to apply than Mackenrodt's method where the destruction of tissue is so great as to include the upper part of the urethra.

4. Very small fistulae These very small fistulae sometimes give more trouble than would be expected especially if they are surrounded by scar tissue or are situated close up to the cervix. If touching with a hot wire fails to cure them, Sims recommends that they should be drawn towards the operator by a tenaculum passed through their margins and excised by a circular sweep of a narrow bladed knife in a funnel-shaped fashion so that more vaginal mucous membrane than vesical mucosa is cut away. The enlarged opening is then closed by sutures in the usual way. If a small opening is left in the line of union of a large vesico-vaginal fistula, and a hot wire fails to close it, considerable difficulty may be experienced in effecting one's object owing to the scar tissue which is naturally present in the line of union.

In one case of large fistula (case 2) in which I had used Kelly's¹² method, I did not succeed in closing a small sinus which remained after the otherwise successful operation until I separated the bladder wall again from its new attachment to the cervix uteri in the vicinity of the sinus and sutured it to a fresh area of denuded vaginal wall. Clarence Webster³⁰ describes a simple method of treating very small fistulae which consists in excising a circular piece of vaginal wall about 1/2 to 3/4 inch in diameter with the small fistula in its centre. The raw area is then closed by continuous catgut suture as in anterior colporrhaphy. Dr Crenshaw of the Mayo Clinic has closed some small fistulae by the high frequency current.

5. **Fistulae in which the margins were bound down by scar tissue** This binding down of the margins by scar tissue occurred in many of the fistulae met with, and prevented approximation in some (case 1). These cases could probably be best treated by Mackenrodt's¹³ method. I found however that I could get approximation without tension by using Kelly's method, i.e. separating the bladder wall thoroughly from the cervix so as to mobilize it. I did not meet with any cases in which the margin of the fistula was adherent to the pubic bone. In these cases Schanta²⁰ recommends that an antero-posterior incision should be made through the labium majus on the side on which the adhesion to the bone is situated.

This incision goes down to near the bone, and through it the adherent margin of the fistula and the tissue round it are separated carefully by the finger and by a blunt instrument from the bone. The fistula is then closed in the usual way, the wound in the labium majus being stuffed with gauze.

6. **Juxta-cervical fistulae** Not a few cases of this were seen. The smaller ones are usually due to a tear of the cervix extending into the bladder. In the large ones there has been sloughing of the vesico-vaginal septum with more or less loss of tissue. They were, of course, situated in the anterior fornix but some of the large ones extended far forward in the vesico-vaginal septum. Indeed in some cases they extended right up to the urethra, the proximal end of which was destroyed. In the treatment of some of them (case 3), the anterior lip of the cervix was denuded, and in one case (case 5) the denuded posterior lip was used to help close the abnormal opening. In large ones, latterly at least, I always used Kelly's method described above on page 9 and found it very satisfactory.

7. **Fistulae with partial destruction of the neck of the bladder and of the urethra** Quite a number of these came to our hospital. Some of them were of ordinary size and some were very large involving the whole vesico-vaginal septum as well as part of the neck of the bladder and part of the urethra. In one of these cases (case 4) in which the proximal end of the urethra was buried in scar tissue so that there was complete atresia of the urethra, a preliminary operation (described under case 4) was done in order to make the urethra pervious. The margins of the fistula were then denuded posteriorly and laterally and the denudation was carried forwards so as to extend over the proximal end of the urethra and its new opening. The margins were then successfully approximated by sutures so that the line of union was more or less transverse. In some of these cases in which a large part of the neck of the bladder was destroyed (cases 4 and 6), it was feared that the bladder sphincter would not be able to perform its function and that control of urine would not be obtained even if the fistula were successfully closed. It was found, however, that in only one case (one in which the whole urethra was destroyed, case 7) did the bladder sphincter fail to give control after the fistula had been closed. It is to be noted that Watkins²⁹ gives a hopeful prognosis in many cases where the vesical sphincter seems to be ~~inseparably~~ *irreparably* damaged. He recommends a modification of Mackenrodt's¹³ operation with wide separation of the bladder wall from the vaginal wall, and separate stitching of each.

When there is doubt as to whether the vesical sphincter has been completely destroyed, it would seem advisable to close the fistula if possible by whatever means seems best, in the hope that the sphincter will be able to perform its function. If it fails to give control over the urine, other means of attaining this end described in connection with the next variety of fistula can be considered.

8. **Fistulae with complete destruction of the bladder sphincter and partial or complete destruction of the urethra** I met with two of such cases (case 7). In both of these the urethra was completely destroyed, and in both I succeeded in making a new urethra with flaps from the vaginal wall. In one of the cases the vesico-vaginal fistula had its margins denuded, and the area of denudation was extended forwards so as to include the mucous membrane over the proximal end of the new urethra. The denuded margins were then approximated with sutures and perfect union resulted, but the urine continued to dribble away through the new urethra except when the patient was in the recumbent position. In the other case, all attempts to close the fistula failed.

In these cases various methods have been used with the object of getting some control over the urine. Emmet⁴ (Principles and Practise of Gynecology) for instance recommends in some cases, where the fistula extends far back, that the anterior lip of the cervix should be stitched to the neck of the bladder or the urethra in the hope that the pressure of the cervix against the pubis might give some control. Kelly and Burnham¹¹ mention a case in which Kelly succeeded in getting some control by the use of a pessary with reinforced transverse bar which helped to press the cervix against the pubis.

All such attempts, however, to gain control of the urine when the vesical sphincter has been completely destroyed or is absent are usually unsatisfactory. It is obvious that Simon's Colpocleisis is quite inapplicable in such cases as it presupposes an intact bladder sphincter. The operation that provides sure control of the urine with little operative risk is the one first performed in 1880 by Maisonneuve¹⁸, namely colpocleisis together with the formation of an artificial recto-vaginal fistula. A very full account of this method of operating is given by Peterson who had himself performed it successfully three times. Peterson¹⁸ found that 43 cases of the operation had been reported up to the date of his paper (1917) with a very low mortality. Furthermore there seemed to be no risk of ascending infection of the kidneys. The anal sphincter controlled the evacuation of the urine as well as of the faeces with very little if any inconvenience.

One of the chief objections to the operation is, of course, that it interferes with married life. In some cases too, owing to stagnation of urine in the vagina, calculi form. This happened in four of the 43 cases recorded by Peterson¹⁸. It is necessary to make the recto-vaginal fistula large as otherwise it is apt to close from contraction. The faeces do not seem to tend to pass into the vagina or bladder and cause trouble. Of course it is necessary in this operation to extirpate the urethra or destroy it with a cautery unless it has been destroyed or is absent. As an alternative to this operation, transplantation of the ureters into the large bowel may be done with a similar object. There is, however, a considerable immediate operative risk and the danger of ascending infection of the kidneys is always in the surgeon's mind. This operation has been done mostly for exstrophy of the bladder but may also be undertaken for inoperable vesico-vaginal fistula. C.H. Mayo¹⁵ says "Transplantation of the ureters is advisable in the few cases in which extensive destruction of the base of the bladder and urethra have occurred after childbirth".

Owing to the fact that ascending infection has followed all the cases in the lower animals in which the cut proximal ends of the ureters have been inserted into the large bowel and stitched there, Maydyl, Moynihan¹⁷ and Peters transplanted the whole trigone of the bladder with the ureters, or the ureters with a portion of the surrounding bladder wall into the bowel with considerable success. Latterly Stiles²⁴ and C.H. Mayo¹⁵ made the ureter lie in the bowel wall between the mucosa and the muscular coat of the sigmoid. Beesly and Johnson¹ assure us that "provided the urine, ureters and kidneys are healthy" there is no risk of ascending infection. Nevertheless transplantation of the ureters is obviously a much more serious operation than colpocleisis plus the formation of an artificial recto-vaginal fistula and most surgeons would hesitate to perform it for a condition such as vesico-vaginal fistula which does not threaten life, especially as there is a less risky alternative operation. Transplantation of the ureters has the advantage, of course, that it does not involve closing the vagina and there is no danger of the formation of calculi.

III. Some Illustrative Cases

Case 1: Vesico-vaginal fistula with cicatricial tissue preventing approximation of the margins.

This woman had a vesico-vaginal fistula of fair size in the base of the bladder following childbirth. It was surrounded by some cicatricial tissue which interfered to some extent with approximation of its margins.

It was judged, however, that there would not be too much tension if the edges were approximated after free denudation. So the classical operation of Marion Sims²² was performed except that silk-worm gut was used instead of silver wire. The stitches however gave way and the operation was a complete failure. About a month after the first operation, a transverse incision was made in front of the cervix uteri and the bladder wall separated from the cervix in the middle line up to the peritoneum and as widely as possible laterally according to Kelly's¹² method described on page 10. This allowed of the denuded margins coming together without tension with the result that perfect union was obtained.

Case 2: Very large vesico-vaginal fistula cured by Kelly's method. Small recurrence after a subsequent confinement.

The patient was pale and anaemic, and had a large spleen from malaria. She had a very large fistula following labour, nearly the whole vesico-vaginal septum and the anterior lip of the cervix having sloughed away. Owing to the patient's anaemic condition, it was feared that it would be difficult to succeed in any operative measures, but it was decided to make an attempt. The first step was to make a paravaginal incision on the left side after the manner of Duehrssen³ as described on page 7. This improved the access very much. A transverse incision was then made in front of the cervix and the bladder separated freely from the cervix as in Case 1.

This mobilized the bladder and allowed of its being drawn down so that its raw margin could be sutured without tension to the denuded anterior half of the margin of the fistula. A glass self-retaining catheter was then introduced into the bladder through the urethra and the bladder drained. For seven days there was no leak and we ventured to hope we had succeeded but on the eighth day leaking began and a few days later we found, on removing the stitches, that there was a small opening on the left side large enough to admit a piece of slate-pencil. This was readily closed, however, by denudation of its margins and suture. It was then found that there was still a small opening which only admitted a probe on the right side close to the cervix at the end of the line of union. Touching with a hot wire failed to close this opening and two attempts to close it by denuding its margins and suturing them also failed. We then separated the bladder wall from its new attachment to the cervix in the neighbourhood of the small opening and sutured the raw bladder wall to a freshly denuded surface on the opposite side of the little opening. Perfect union resulted and the patient was cured. She remained perfectly well for two years, when she became pregnant and was delivered by forceps of a living child at full term. Shortly after the delivery she returned to hospital with a small fistula at the side of the one which had taken three operations to close, due no doubt to stretching and yielding of the cicatrix during labour.

Attempts were made to close the little opening with a hot wire but these failed and the writer intended to repeat the procedure that had been successful before (i.e. separating the bladder wall from the cervix in the neighbourhood of the fistula and suturing its raw surface to a freshly denuded surface on the vaginal wall opposite) but he did not get an opportunity of carrying this out.

Case 3: Very large vesico-vaginal fistula. Denuded anterior lip of cervix used to assist closure. Subsequent confinement with no recurrence of the fistula.

This patient had a very large vesico-vaginal fistula following labour. It extended from the anterior lip of the cervix to near the internal opening of the urethra and it was almost as wide as the vagina. There was also a good deal of scar tissue round the margins of the fistula and in the walls of the vagina. A para-vaginal incision as in Cases 2 and 3 was first made which greatly improved the access. The edges of the fistula were denuded in front and at the sides, and the anterior lip of the cervix uteri which formed the posterior part of the margin of the fistula was also denuded. Union was perfect except at one point where a small sinus was left through which urine exuded, but this little opening healed quickly after being touched with a hot wire.

This woman became pregnant some time after being cured, and she came into hospital for her confinement. When labour came on at full term, a great deal of cicatricial tissue which formed a septum in the vagina with a hole in the centre of it had to be freely divided before a live child was delivered with forceps. This woman made a good recovery, and there was no recurrence of the vesico-vaginal fistula.

Case 4: Very large vesico-vaginal fistula with partial destruction of neck of bladder and atresia of proximal end of urethra. Closed by denudation and suture after a preliminary operation which made the urethra pervious.

This woman had a very large vesico-vaginal fistula. The base and part of the neck and the proximal 1/4 inch or more of the urethra were destroyed. The urethra was also completely occluded by a mass of cicatricial tissue. In this case a preliminary operation was done to restore the patency of the urethra. A sound was passed along the urethra from the meatus down to the scar tissue where it was arrested. The end of the instrument was then cut down upon, and the urethral mucous membrane stitched to the vagina, and a piece of rubber tubing was passed through the new opening and left in situ for ten days or so, so as to help in keeping the opening patent.

The urethra was thus made pervious. At a subsequent operation the margin of the fistula was denuded posteriorly and laterally. Anteriorly the denuded area extended over the proximal end of the urethra just in front of its new opening, and was of course made continuous with the rest of the denuded area along the lateral and posterior margins of the fistula. The denuded area was then approximated with silk-worm gut sutures, so that the line of union was transverse. Perfect union was obtained except at one point where a small hole remained. This was closed at a subsequent operation by denudation and suture. It took some time before the patient regained complete control of her urine, but she did so eventually and became a hospital nurse.

Case 5: Very large vesico-vaginal fistula with destruction of anterior lip of the cervix and the whole vesico-vaginal septum with the proximal end of the urethra. Closure with the help of the denuded posterior lip: subsequent formation of calculus.

This woman came to hospital with the condition mentioned above, following her first labour. She was also suffering from secondary syphilis. So operation was postponed until she had had anti-syphilitic treatment. A band-like area of denudation about 1/4 inch wide was made over the proximal end of the urethra transversely, and extending round the margins of the fistula to the cervix.

As the anterior lip was quite gone, it was decided to use the posterior lip instead, though such a procedure, if successful, would necessarily make the uterus open into the bladder instead of into the vagina. So the posterior lip of the cervix was denuded, and the raw surface so produced was made continuous with the band-like area of denudation which surrounded the fistula laterally and anteriorly. It was then found possible to suture the denuded posterior lip of the cervix to the opposite part of the denuded area lying over the urethra. The opposing denuded areas on the lateral aspects of the fistula were also sutured to each other with silk-worm gut sutures. Union occurred except at one point near the extremity of the line of union on the left side where there was a small opening admitting a probe. About twelve unsuccessful attempts were made to close this opening. Fortunately the woman had considerable control over her urine and voided it at regular intervals, but nevertheless there was slight leaking. She regained excellent general health and was able to do hard work as a washer-woman. It was certain that the little opening was not a uretero-vaginal fistula because, when lotion was injected per urethram, it came out at the opening.

At the last operation it was found that there was a calculus about the size of half a chestnut just in front of the cervix. The stone was removed and the opening through which it was extracted was stitched up. The little sinus, however, did not close, but it did not cause any more inconvenience than before. This case shows that calculus formation is apt to follow an operation for vesico-vaginal fistula, in which the posterior lip of the cervix is used to assist in closing the fistula because such a procedure is apt to leave a little pouch in which urine is apt to collect and stagnate, with tendency to the formation of a calculus.

Case 6: Very large vesico-vaginal fistula with destruction of anterior lip of the cervix and the whole vesico-vaginal septum, with proximal 1/4 inch of the urethra and apparent destruction of neck of bladder. Small recto-vaginal fistula also present. Success following operation by Kelly's method.

This young Chinese woman had been delivered of her first child - born dead - after a very difficult and protracted labour about a month before she came to hospital. There had been a great deal of sloughing of tissue, and much cicatrisation of the vaginal wall. The condition was as described above. It did not seem a hopeful case especially as the neck of the bladder seemed to be almost entirely gone, but it was decided to operate before the cicatricial tissue became more tough. A para-vaginal incision on the left side gave good access, and also divided some of the cicatricial bands in the vagina.

The bladder wall was separated from the cervix as in Kelly's¹² method right up to the peritoneum. A raw band of denudation 1/4 inch wide was then made on the anterior wall of the vagina passing over the proximal end of the urethra transversely, and extending out laterally along the margin of the fistula on each side till it met and became continuous with the raw surface formed by separating the bladder wall from the cervix. The bladder wall which had been mobilized by its separation from the cervix was then drawn down and the edge of its raw surface united by silk-worm gut sutures without undue tension to the denuded band-like area in front and at the sides, so as to close the large opening. The large raw surface of bladder wall which was left facing towards the vagina gradually granulated over. No attempt was made at this operation (which lasted two hours) to close the recto-vaginal fistula. Perfect union resulted and the patient was discharged cured. The recto-vaginal fistula was small and did not cause inconvenience, so it was left alone. In this case it is remarkable that perfect control of the urine was at once obtained although it seemed as if the neck of the bladder was irreparably destroyed. As the sequel showed, sufficient of it must have been preserved to give control of the urine. The woman was seen about a year after the operation and found to be well and strong and free from all urinary trouble. This case was the most remarkable success that the writer has had.

Case 7: Vesico-vaginal fistula with complete destruction of the neck of the bladder and of the urethra.

Successful formation of a new urethra and closure of the fistula but with very incomplete control of urine.

This patient came to hospital with a fistula which seemed to have destroyed the neck of the bladder. The urethra was also completely destroyed. It seemed very doubtful if control of the urine could be obtained even if the fistula were closed and a new urethra communicating with the bladder formed. But, as it had been found in one or two cases (Case 6), in which the whole neck of the bladder seemed to be destroyed that nevertheless control of the urine had followed closure of the fistula, it was resolved to make the attempt. At a preliminary operation a new urethra was first constructed by dissecting up flaps from the sides of the vagina in exactly the same manner as is done in the case of hypospadias in the male.

This operation was quite successful. At a subsequent operation a strip of vaginal mucous membrane, 1/4 inch wide, was removed round the edge of the fistula posteriorly and laterally and over the proximal end of the new urethra anteriorly. The anterior and posterior halves of the band-like area of denudation so produced were then united with silk-worm gut sutures. Perfect union resulted and all the urine was discharged by the new urethra. Unfortunately, however, owing to destruction of the sphincter vesicae, control of urine was very imperfect. It still dribbled away by the new urethra when the patient was in the perpendicular position, but it was retained for some time when she was lying on her back. Possibly a colpocleisis together with formation of an artificial recto-vaginal fistula would have been a better operation to perform in this case as by that method the urine would have been controlled by the sphincter ani.

IV. Practical Points in the Operation for
Vesico-Vaginal Fistula

1. Access: The improved access which can be got in inaccessible cases by a paravaginal incision has already been alluded to. I have also found it helpful in getting good access to pass a series of 10 or 12 silk loops through the vaginal wall all round the fistula including one through the cervix at a distance from the margin of fistula of about half an inch. Traction outwards and downwards on these loops by assistants keeps the sides of the vaginal wall out of the way and also draws the fistula towards the operator and renders its margins taut so that they can be easily incised and denuded.

2. **Suturing:** In passing interrupted silk-worm gut sutures after the margins have been denuded, I have found it an advantage to enter the point of the needle on the raw surface as near as possible to the vesical mucosa. After the needle has emerged from the vaginal mucous membrane, it is unthreaded and then threaded onto the other end of the suture and its point is again made to enter the opposite raw surface and passed exactly in the same way, emerging again from the vaginal mucous membrane close the opposite margin of the fistula. In this way the needle always passes from raw surface to vaginal mucous membrane, and complete approximation of the raw surface is more certainly secured. If the needle is passed from the vaginal mucous membrane, one has to aim at the edge of vesical mucosa trying to make it emerge at that spot, and there is always the possibility of missing one's mark. Sir James Y. Simpson²³ recommends that if the needle passes too deeply and transfixes the vesical mucosa, it should be withdrawn and another attempt made, but the method mentioned above obviates the possibility of its missing its mark. Anyone who operates on cataract knows that while it is quite easy to enter the knife just behind the corneo-scleral junction on the temporal side, it takes good aiming to make it emerge at a corresponding point on the nasal side. I may say that in operating on harelip I always pass the needle from the raw surface at the edge of the oral-mucous membrane outwards to the skin, never in the reverse direction. This may seem a small point but I feel sure it would tend, especially in the hands of a beginner, to secure accurate coaptation of the raw surfaces, and that is not a small matter.

3. **Miscellaneous:** With regard to needles, I use the smallest fully-curved fistula needles, held in a Spencer Wells' needle-holder, except in some extra difficult situations where I find Lane's needles for cleft palate held in his needle-holder very useful. In denuding the margins of the fistula, I have found an angled iridectomy knife helpful in places where access is difficult.

If severe secondary haemorrhage should occur after the operation, I have always found it necessary to remove most of the stitches, which of course means failure of the operation. If the bleeding should be slight, I have succeeded in stopping it by washing out the bladder with boric lotion.

V. Summary

1. In countries such as China where Western medical science is not yet much practised, or where it is not properly available, cases of vesico-vaginal fistula following labour are more frequent than in this country.

2. In inaccessible vesico-vaginal fistulae, a paravaginal incision especially Schuchardt's²¹ is of great service.

3. In very large vaginal fistulae or in those in which the margins are bound down by adhesions and also in juxta-cervical fistulae, the best method of treatment is one which mobilised the bladder wall by widely separating it from its attachments. Kelly's¹² method of separating the bladder from the cervix has been in the writer's experience of great value in such cases, but Mackenrodt's method is still better in most cases though not so simple.

4. When the vesical sphincter has been destroyed, it is better to perform colpocleisis and make an artificial recto-vaginal fistula than to subject the patient to transplantation of the ureters with its greater immediate operative risk and the possibility of ascending infection of the kidneys later.

5. In passing interrupted sutures after denuding the edges of the fistulae, greater accuracy and better coaptation of the raw surfaces can be secured, especially in the hands of beginners, by passing the sutures through the opposing raw surfaces always from within outwards, i.e. from the raw surface to the vaginal mucous membrane, as described above.

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