and dozens of cases in which I am absolutely positive no obstructive condition ever existed, and where the elements present were practically only prostatic in character. I am under the impression that in all those instances there is some change or some cause for the lack of formation of the spermatozoa, and in these cases up to the present time treatment of all kinds has been of no avail. For the past four or five years or longer I have tried these different methods, but with absolutely no sign of change in any of these cases.

Dr. V. D. LESPINASSE, Chicago: In reply to Dr. Wolbarst I would say that the spermatozoa are protected from the vaginal secretion by the physiologic clotting of the semen, and not, I think, by any change in the reaction of the vaginal secretions. The semen deposited in the vagina clots around the cervix, forming a sort of cup around the os, and from there the spermatozoa get into the cervix and into the uterus. In cases in which the spermatozoa are intimately mixed with vaginal secretions the spermatozoa are killed quickly as a rule in one hour; but if you obtain a mass of semen and get the spermatozoa from the center, you will find that they will be normally motile even two or three hours after intercourse. The yellowish white material that I spoke of I have observed in the vas several times. The first time I saw it I thought it was normal sperm. It is very deceptive. When the vas is exposed it appears as if the vas was distended with normal sperm. When you put this material under the microscope you see little globules that look like fat, but they do not take the sudan III and osmic acid stain. Just before leaving Chicago yesterday I submitted some of my slides of this material to Prof. F. R. Zeit, and he was not willing to express an opinion as to the exact character of these globules. He would not say it was debris, but thought it was some degenerative product. When you find this material you can be sure there is an obstruction further down in the vas, and the material itself is not so thick but that it will come through on intercourse. In regard to the technic of uterine insemination, there are two or three points about it. The first is, you cannot inject very much into the uterus. The second is, you must use a very soft and very small catheter so that you can deposit not to exceed five or six minims, better about three, in the uterine fundus. If you do not have a small catheter you will not deposit any semen in the uterus or you will deposit too much, and the woman will have a very severe colic. Before insemination the presence and motility of the spermatozoa should be determined. We have tried to standardize this work on an hour. Let the couple have intercourse at home, and then get right up and come to the office. It is remarkable the difference in the motility of the sperm that you will find. Just recently I had a case in which I examined a woman who as a young girl had had a tuberculous peritonitis. She is a strong and healthy woman now. The husband is a healthy man with absolutely normally movable sperm. There was a striking difference in the motility of the sperm taken from the vagina and those taken from the cervix at the end of an hour. Those taken from the vagina were barely moving, while the cervical ones had an absolutely normal motility. One little by-product of this work is the length of time of pregnancy. We have had one baby now from this work, and the baby was born 280 days after the insemination, and that checks up with most of the literature of the cases in which they could check it from one intercourse—it runs from 270 to 290 days.

Need for Improvement in Care of Pregnant Women.—According to S. G. Moore (*Med. Press and Circular*, Nov. 15, 1916), who advocates the notification of pregnancy, mothers are dying in excessive numbers just as children died and still die in excessive numbers from preventable causes. The majority of them do not come under the care of a duly qualified and legally registered medical practitioner until their condition is desperate, and until the opportunity of taking measures to prevent catastrophe is overpast. Pregnancy cannot be concealed, and ought not to be concealed, whether it be legitimate or illegitimate, and since it cannot be concealed, what valid objection is there to comply with a provision which has for its sole and exclusive object the welfare of the woman and her baby?

THE OPERATIVE TREATMENT OF CRYPTORCHIDISM *

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AND

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The object of this communication is not to discuss the propriety of attempting to place the retained testicle in its proper place in the scrotum, but simply to describe in detail the method we employ to achieve this result. The operation is essentially that described by Bevan, but we feel that many of its details have never been thoroughly discussed, and it is our purpose to describe these. Such a description appears particularly opportune, since we are convinced that practically every testicle can be placed in the scrotum if the operation is carefully performed. Several recent publications describing series of cases of which as many as 30 per cent. have resulted in leaving the testicle within the abdominal cavity seem to call for some such detailed description.

Let us preface our description with a few statements that appear to us axiomatic, and on which we justify the employment of an operation.

1. The testicle retained within the abdomen is doubtless much more liable to teratomatous change than the normally situated testicle. The testicle retained in the inguinal region perhaps shows a similar though lesser liability to malignant disease.

2. Yet we find no evidence that the testicle which has been placed in the scrotum by operation is unusually subject to teratoma.

3. The retained testicle has often lost its spermatogenic function either by congenital deformity and obliteration of the epididymal tube, or by atrophy of the spermatogenic elements in the testicle itself. Such atrophy is not likely to occur before puberty in an organ otherwise normal and with normal epididymis only.

4. Hence there is every reason to operate at about the time of puberty in order to forestall atrophy. If the operation discloses grave deformity and separation of the epididymis from the testicle, the occlusion of the duct may be taken for granted. Yet this is no reason for not proceeding with the operation, since the testicle is doubtless safer from teratomatous malignant change and is certainly more decorative when in the bottom of the scrotum.

5. Almost every retained testicle is associated with either clinical hernia or with a pouching of the peritoneum, which predisposes the patient to hernia. The operation thus indicated for the cure of hernia is somewhat prolonged but not gravely complicated by the effort to replace the testicle in the bottom of the scrotum.

6. The safety of the operation is attested not only by our own series of thirty-three operations with no deaths, but also by similar statistics from other authorities.

7. Unless operation is called for by grave hernia at an early age it is safer not to attempt the procedure much before puberty, for the vessels are so small and delicate that they are likely to be torn unless the operator is unusually expert.

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TECHNIC OF THE OPERATION

The skin incision is made as for inguinal hernia, extending obliquely from a point over the internal abdominal ring to a point about 1 inch below the external abdominal ring, the incision lying parallel to and about a finger's breadth above Poupart's ligament.

As in the operation for hernia the dissection is carried down to the external oblique aponeurosis, which is then split, thus opening the inguinal canal. Until this step has been made no attention is paid to the testicle, for any effort to free this is likely to result in mixing the operator up in a mass of adhesions.

The inguinal canal having been opened, the cremasteric fibers lying over the contents of the canal (cord, testicle, hernia) are picked up and divided between two thumb forceps.

Working within the fascial layer inside of the cremaster the contents of the cord are then separated and delivered as in the operation for hernia.

The hernial sac is now sought for, in the upper part of the canal if necessary, opened and separated by blunt dissection from the spermatic cord.

The testicle is now freed from the gubernaculum and other attachments below it, leaving it attached to the patient only by the spermatic cord.

Now comes the delicate part of the operation, the lengthening of the vas and vessels. In a minority of cases this can most readily be done by treating the spermatic cord as if one were about to operate for varicocele or for division of the vas. First, the muscular and fascial compartment in which the pampiniform plexus lies is incised longitudinally and the veins picked out. Then the smaller compartment, in which lies the vas with its vessels, is similarly opened and the vas picked out. The spermatic cord is now represented by three separate bundles, the pampiniform plexus, the vas and its vessels, and the musculofascial envelope. This last is divided and its ends carefully stripped back over the vessels and vas, the exuberant tissue being cut away. This dissection is carried with especial care up toward the abdominal cavity until the point is reached at which the vas distinctly separates in its intra-abdominal course from the pampiniform plexus. It will now usually be found that there is ample length of spermatic cord to permit the testicle to descend well into the bottom of the scrotum without any tension whatsoever.

Certain exceptions may be noted, however, as follows:

1. The younger the patient and the smaller the testicle, the less developed is the cord likely to be and the more intertwined with muscular and fascial fibers, so that in such cases (and they constitute the majority) it is impossible to make a clean separation of the vascular elements from the fascial capsule without tearing many and perhaps all of the vessels. It will be found in such cases that fascial separation by snipping may be made here and there along the vessels and that a great deal of slack may be obtained by separation within the abdomen.

2. If the testicle is originally found near the internal ring or within the abdomen, it is usually necessary to divide the pampiniform plexus, although atrophy will doubtless result from this, in order to bring the testicle down to the bottom of the scrotum.

3. If the testicle is at or near the external abdominal ring the slack obtained in the veins is usually

greater than that obtained in the vas, so that there is no reason to divide the pampiniform plexus.

4. If, in spite of a deep dissection within the pelvis, the vas remains too short, about 1 cm. may be gained by displacing it to the inner side of the internal epigastric vessels. It has been suggested that the vessels be cut for this purpose, but we have found it perfectly feasible to perforate the fascia to the inner side of the internal epigastric vessels without cutting them, and to slip the testicle through the opening thus made. As far as we are aware no direct hernia has resulted from this procedure.

5. Retention of the arterial supply is of utmost importance, and it will sometimes be found that the artery of the vas short circuits, as it were, a loop of the vas itself, so that in order to save the vessel we must omit the unfolding of this loop.

6. In four cases all of the vascular supply of the testicle was apparently destroyed, only the vas remaining to connect it with the body. Yet in only one of these cases did sloughing result. The others were considerably atrophied already and there is no evidence that they atrophied any further.

The cord having thus been lengthened, the tunica vaginalis, which has doubtless already been opened, is inverted as for the operation of hydrocele.

With two fingers the scrotum is opened down to its very base for the purpose of receiving the testicle. This simple procedure would seem scarcely worth insisting on did we not know that one of the most experienced hernia operators in New York City has confessed that he has in the past placed almost 50 per cent. of his retained testicles in the thigh instead of in the scrotum. Apparently his surgical modesty was such as to forbid him from looking to see where he was putting the gland. The dissection of the scrotum must be carried rather toward the perineum so as to get to the bottom of the sac and deeply enough so as to open the fascia right to the skin.

The scrotum is now inverted on a finger so that it is turned inside out and brought up into the inguinal incision. With a straight needle and a fine suture of chromic gut the testicle itself is then sutured to the bottom of the scrotum. Two precautions are here necessary. In the first place the suture must be placed in the testicle itself, for if the surrounding fascia is sutured there is so much laxity that the testicle may not be drawn down into the scrotum. It is obviously improper to suture the epididymis to the scrotum for fear of obstructing the excretory duct, whereas a suture in the testicle itself does no harm. The second precaution is to avoid very carefully any torsion of the testicle.

With the finger withdrawn, the testicle enters the scrotum and is pulled down into place. There it should lie without any tension whatsoever at least well below the pubic bone, preferably so low as to be opposite its fellow. If the testicle does not lie spontaneously in good position it is our belief that no amount of suturing about the neck of the sack or suturing the testicle itself to the thigh will better the situation.

The wound is now closed in the usual manner, beginning with closure of the hernial sac and then passing to closure of the inguinal canal. It has not been our custom to transplant the cord as in the usual Bassini operation.

It is noteworthy that three patients have come for a second operation, one a personal failure, the other

two failures at other hands. Each of the three was reduced with no real difficulty although the separation of adhesions considerably prolonged the operation. The ultimate result was just as good as that obtained in primary cases.

RESULTS

We have operated on forty-two testicles, twenty-two right, nineteen left, nine bilateral. The average age of the patient was 19, the youngest was 5, the oldest 33. Five of the patients were between the ages of 5 and 9 years; all had excellent results excepting one operated on in 1907. He was 9 years of age at the time of operation, and both of his testicles were in the inguinal canal. They were placed in the scrotum and sutured to the thigh, but they broke away and retracted into the inguinal canal again. Eight years later the right one could not be felt, the left one lay near the external ring and was, by our present method of operating, readily placed in the scrotum, giving a good result. One other patient, aged 16, had an extremely bad result. The right testicle sloughed, the left retracted over the pubes. In one other case the testicle is not in good position, being only just below the pubes and in danger of injury. All of the other testicles operated on are in excellent position, that is, they hang free in the scrotum, although many of them are rather in the upper part of this sac. On the other hand, a few of the testicles operated on are lower in the scrotum than their unoperated fellows.

We have three times operated on testicles that have been badly operated on before. All three operations were complete successes.

Before operation three of the testicles lay in the abdomen, thirteen in the inguinal canal, twenty-three at or about the external ring. Hernia was noted in all but eight cases.

During the operation the pampiniform plexus of veins was cut to reduce all of the abdominal testicles, one half of the inguinal ones, and 30 per cent. of those at the external inguinal ring. Most of these operations, however, were performed before we had perfected our present technic. With the present technic we have only once had to cut the vessels of any testicle that lay outside the abdominal cavity. Including even our earliest cases, however, we claim 88 per cent. good results, and no mortality.

We have little to say about ultimate results. A number of our cases have been followed several years, and we are fully satisfied that a patient whose testicle is in good position a month after operation is safe from any retraction of that organ into the inguinal canal. We have no observations of any value on the spermatogenic function in bilateral cases after operation. None of the testicles operated on by us showed, either at the time of operation or subsequently, any evidence of neoplasm.

ABSTRACT OF DISCUSSION

DR. JOHN A. HAWKINS, Pittsburgh: There is no question that moving pictures such as Dr. Keyes has shown illustrating nephrolithotomy and suprapubic cryptorchidism are of inestimable value and will be of more value as they are worked out. In Pittsburgh, Dr. C. L. Bradford about nine months ago started to take some of these pictures, and kept it up for three or four months. I have an idea that he became bankrupt and had to quit. The expense is very great. It is also rather hard on the operator. The lamps used create an intense heat, which is all right for cold weather, but in hot weather it is awful.

DIVERTICULUM OF THE URETHRA*

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Diverticula of the urethra, whether congenital or acquired, are of very rare occurrence, Ehrlich¹ having reported but seventy cases all told up to and including the year 1908. Habernern² three years later conceded that but twenty cases found in literature up to that time were authentic cases of congenital diverticula, the rest being of the acquired type.

Of the two cases mentioned in this paper, Case 1 probably represents the acquired type, while Case 2 probably represents the congenital type as described by Grünfeld³ and De Keersmaecker, who have seen six or seven similar cases and believe they are of the congenital variety. These authors have described cases of small diverticula in the bulbous or prostatic urethra which they accidentally discovered during a urethroscopic examination for the purpose of discovering the cause of a persistent urethral discharge. There was, as in our case, no stricture or other obstruction present, nor was there any history of trauma, and the writers think that they are due to a defect in the urethral groove.

CASE 1.—H. W., aged 30, referred by Dr. W. O. Osborne, had a mucopurulent discharge of several years' standing, and wanted to know whether the discharge was infectious. Externally the genitalia presented no abnormality, no tumors, scars, etc., being evident. At about the junction of the membranous and prostatic portion a No. 28 F. sound met some resistance, but was finally passed into the bladder. Cystoscopy revealed bladder capacity good, mucous membrane apparently normal, except at the trigon, where it seemed to be slightly congested. The sphincter was regular. Anterior urethroscopy, except for a very pale mucosa, was also negative. Posturethroscopy with the Wossidlo showed a cavity on the right side in the membranous urethra, about 1.5 cm. high by 0.5 cm. in breadth. Catheterizing this opening did not produce any pus. The patient was seen only once and has not been heard of since.

I believe that the diverticulum in this case was due to passage of sounds, was a false passage in fact, made while attempting dilation of the stricture.

CASE 2.—H. L., aged 32, referred by Dr. W. G. Mussum, complained of discharge of two years' standing. There were no abnormalities, and no tumor visible or palpable externally. Cystoscopy was negative. Anterior urethroscopy showed a very pale mucous membrane, studded with many inflamed, gaping morgagnian crypts.

Posturethroscopy with the Wossidlo irrigating urethroscope also shows a chronic fibrous condition of the mucous membrane; the colliculus was small and pale. Just anterior and to the left of the colliculus, a small cleft presented itself transversely across the urethra, which on treatment with the Geraghty syringe could be catheterized to the depth of about $\frac{3}{4}$ inch. Its walls seemed rather resilient, as they gave way under the pressure of the irrigating fluid. Its capacity was very small, but could not be determined accurately. This case was very similar to the cases described by Grünfeld and De Keersmaecker, and later quoted in this paper.

The patient was treated by instillations of silver nitrate up to 5 per cent. into the diverticulum, and also by anterior and posterior dilations, and cauterization of the morgagnian crypts, but with practically no improvement in his condition.

* Read before the Section on Genito-Urinary Diseases at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

1. Ehrlich: Zur Kasuistik und behandlung der Divertikel, Beitr. z. klin. Chir., 1908, 59, 193.

2. Habernern: Kongenital Divertikel der Urethra, Ztschr. f. Urol., 1911, 41, 734.

3. Grünfeld: Zur Lehre von der Divertikula der Harnröhre, Halbmonatschr. f. Haut. u. Harnkr., 1915.