DUDLEY. (A. Palmer)

Varicocele in the Female: What is its Influence upon the Ovary?

BY

A. PALMER DUDLEY, M. D.,

SURGEON IN CHARGE, ST. ELIZABETH'S HOSPITAL.

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VARICOCELE IN THE FEMALE:

WHAT IS ITS INFLUENCE UPON THE OVARY?*

By A. PALMER DUDLEY, M. D.,
SURGEON IN CHARGE, ST. ELIZABETH'S HOSPITAL.

From a valuable paper read before this association at its first meeting, by Dr. H. C. Coe, entitled the "Exaggerated Importance of Minor Pelvic Inflammations," I make the following quotations: These "thickenings, increased tension, or whatever it is, which we find at the examining table and promptly enter in our case-books as cellulitis," frequently vanish after death, when the natural tension of the tissues has disappeared." That remark impressed me very much, and was parent to the thought, What pathological condition can exist in the broad ligament during life, giving rise to pain and symptoms simulating cellulitis, and still be found absent post mortem? It was certainly an interesting question, one I deemed well worthy patient search for an answer, and if I can be in any way instrumental in arriving at a correct solution by bringing the subject before this society for discussion, I shall feel that I have been amply rewarded for my efforts. After a careful study of the anatomy of the broad ligament, together with the experience

* Read before the Alumni Association of the Woman's Hospital at its third meeting.

I received from my service in the Woman's Hospital, and the results of such investigations as those set forth by Dr. Coe, it seemed to me that the condition must be one due to disturbances of the normal pelvic circulation, and I began to look the subject up. Hence the title of my paper.

Some doubts may arise in the minds of my hearers as to just why I should use the title "varicocele in the female" when the location of the condition I propose to consider is in the broad ligament. The only explanation I shall offer is the following: That the terms varix and varicocele are used synonymously is granted, but while the term varix is used to denote the existence of a dilated and knotted or tortuous vein in any part of the body, the term varicocele signifies a blood tumor, and is applied to a dilated condition of the spermatic veins.

Now, as all writers upon anatomy whom I have been able to consult declare the ovarian veins in the female to be the analogue of the spermatic veins in the male (some authorities even using the term spermatic for both sexes), and accredit them with performing analogous functions—that of returning the venous blood from the testicle and ovary toward the heart, by emptying it on the right side of the body into the inferior vena cava, and on the left side into the left renal vein—I feel quite sure the term is not misapplied when referring to a dilated and tortuous condition of the veins in the broad ligament.

To properly understand any pathological condition in the human system, one must first have a correct knowledge of the normal anatomical condition of the parts involved. This is a difficult matter to do with respect to the broad ligament in the female, owing to the various changes which it is subject to during the child-bearing period, which, though not pathological, but rather physiological, are still changes that modify the anatomical structure and relation

of the parts "for the time being" to a marked degree. If we pause for a moment and consider the anatomical relation and structure of the broad ligament while the uterus is in a state of rest, and then consider the changes which must certainly take place in the ligament and its vessels during the growth of a fœtus, the expulsion of the latter, and the period of time required for the proper involution of the pelvic organs, bearing in mind the accidents which are so liable to and do so frequently happen during this process, we certainly shall be led to the conclusion that varicocele in the broad ligament of the female can not be a rare condition.

Let us consider for a moment the anatomical make-up of the broad ligament in a woman whose uterus has never been impregnated. Here we find it a thin double layer of serous membrane, stretching across from each side of the body of the uterus to the inner surface of the pelvis, thereby dividing the upper portion of the pelvic cavity into two parts, an anterior and a posterior. Along its superior or free border runs the Falloppian tube, and to its posterior and superior surface is attached the ovary. Beneath the tube and ovary, between these two layers of thin serous membrane, which is their only support, lie the blood-vessels and nerves that supply and nourish the uterus in its normal state and maintain the life of the fœtus during the term of utero-gestation. A correct idea of the length, breadth, and thickness of these ligaments can readily be ascertained if we first consider the size and position of the uterus. The latter, pear-shaped, with an average transverse diameter of two inches, if in its normal position, occupies the central axis of the pelvis, the average transverse diameter of which is about five inches at its superior strait. Now, should we measure transversely across the fundus of the uterus, when in its normal position of slight anteversion, to the brim of the pelvis, such a measurement would only allow of an inch and

a half space to be occupied by the broad ligament; but such I feel quite sure would not be a correct anatomical measurement of the ligament, for the latter, being attached to the pelvic wall on a line much posterior to its attachment to the uterus, allows of greater length of ligament; and laparotomists, who have frequent occasion to examine the broad ligament in the normal and abnormal condition, will bear me out in the statement that the average length of it is from two inches to two inches and a half, while its depth is dependent upon the size and position of the uterus. Its thickness when in the normal condition is, as I have already stated, but trifling. It stands up as a thin partition-wall between the rectum and ovary and bladder. From this description it will be seen that the blood-vessels which course through it to supply the uterus have but very little support (especially the ovarian) from the time they leave the pelvic wall until they reach their destination, and *vice versa* with the veins on their return, while the latter are put at a disadvantage by gravity and lack of propelling force. Hence we can readily see how any undue pressure, from any cause, mechanical or otherwise, would tend to influence the blood-current through these vessels.

With this outline of the structure and relations of the broad ligament in the virgin, let us pass to consider some of the changes which necessarily take place should the uterus become impregnated. To accommodate the growth of the fœtus, the uterus undergoes its gradual increase in size, which is accomplished during the first three months with the uterus still occupying the pelvis. Its increase is nearly or quite symmetrical, and, while pressing the bladder and rectum to a certain extent, it must at the same time encroach upon the broad ligament. Then the relations and structure of the latter are soon changed. Its opposing surfaces are separated by the growing uterus. The blood-ves-

sels which it holds, receiving the stimulus and being called upon to do additional duty, increase in size also, at the same time changing their shape and position. And so the process goes on, until the broad ligament, from being a thin, quite transparent structure made up of two opposing layers of serous membrane, holding between them the small blood-vessels and nerves that supply the uterus, together with a small amount of cellular tissue and a few muscular fibers from the outer layers of the uterus, becomes a mass of blood sinuses, its superior border containing the Fallopian tube, lying perpendicular to the side of the uterus, and its two serous surfaces spread out over the sides of the organ.

This certainly is not a falsely drawn picture of the condition of the broad ligament at or near the time of parturition. When the latter is accomplished and the uterus is delivered of its contents, a retrograde process commences, and Nature makes an effort to return these broad ligaments, together with the uterus, to their normal condition, as before impregnation. Does she always succeed? No. Innumerable cases on record are evidence to the contrary. Some accident accompanies or follows delivery (laceration or cellulitis), and involution is arrested. The uterus remains large, and contains an abnormal amount of blood, the vessels being gorged and tortuous, while the overweighted uterus drags upon the ligaments, and in time displacement occurs, which still further complicates the difficulty. Is it unreasonable to believe that from such a condition the vessels of the broad ligaments, which have no lateral support for a distance of three inches along their course, should become permanently dilated and tortuous—in fact, varicose? I hope the discussion will answer this question.

After quite an extensive search for literature upon this subject, I have been able to find only one article published in this country—that by Dr. Dwight, of Boston ("Boston

Medical and Surgical Journal," February 15, 1877), in which he reports the accidental discovery of a large varicocele in the left broad ligament of a subject he had prepared for demonstration before his class. The case is one of interest, and I shall have occasion to refer to it further on. Winckel, in his work translated by Parvin, makes mention of the subject, and emphasizes the fact that the condition is one of great importance with respect to certain forms of uterine disease. Klob makes the statement that in no other part of the body are phleboliths so frequently formed, caused, he thinks, by absence of valves in the veins. Brandt has often seen stones in the veins of the broad ligament of the size of peas. Barnes thinks these stones the cause of early atrophy of the uterus.

Causes.—The causes of varicocele in the broad ligament are manifold—some constitutional, others mechanical. Among the former may be enumerated: 1. Arrest of involution of the uterine and ovarian vessels, keeping up pelvic engorgement long after confinement. 2. A relaxed condition of the tissues from a low state of general health. 3. An unhealthy condition of the vessel wall; an absence of valves in the veins, allowing of blood-pressure from gravity. Chief among the mechanical causes of this condition are the anatomical relations of the veins themselves. It is a noted fact that varicocele appears much the most frequently upon the left side of the body in both sexes, and this has been demonstrated to be due to the emptying of the venous blood from the left broad ligament into the left renal vein at right angles to the blood-current from the kidney, thereby obstructing the free flow of the blood from the ligament into the general venous circulation. The spermatic and ovarian vessels being of such great length, the weight of such a column of blood also has a tendency to weaken the vessels, while still another prominent mechanical cause of this con-

dition is the habitual constipation to which so many women are subject, and this is accounted for by the passage of the veins behind the sigmoid flexure of the colon. The latter, being distended with fæces, makes direct pressure upon the veins. The veins upon the right side are less liable to this affection from not being subject to any direct pressure, and, emptying as they do into the inferior vena cava at an angle, they are provided with a valve, and thereby escape backward pressure. Displacements are a fruitful cause of this condition. Winckel emphasizes the fact in the following words: "Associated with uterine displacement is a tension of the broad ligaments, which become rotated about their transverse axes. Their outer extremities passing to the pelvic wall on either side, the infundibulo-pelvic ligament is even more distorted, and when we consider the great frequency of retropositions of the uterus it is not surprising to find that they are associated with a variety of complications," which he illustrated by the results of twenty-four post-mortems, in which he found one double parovarian cyst, four myomata, four ovarian cysts, one senile hæmatometra, and, he says, of greater significance, three varicoceles in one or the other broad ligament.

From the scanty literature upon this subject, it is impossible to arrive at any correct conclusions as to the frequency of this condition, but that it exists much more frequently than has been supposed, I think careful observation in the future will demonstrate. Winckel found it ten times in three hundred autopsies, but he does not mention having made a *diagnosis* of it in the *living subject.*

Symptoms and Diagnosis.—In attempting to bring to your notice the symptoms which point to the existence of varicocele in the broad ligament, and by which I have been able to make a diagnosis of that condition, I am obliged to confine myself to my own experience and a short narration of

the results obtained from it, for, as I have previously stated, I have been able to find nothing written upon the subject except the results obtained from post-mortem investigations, although medical literature is teeming with narrations of cases and methods of treatment for the various forms of varix in the male. Therefore I hope that this explanation will be sufficient apology for my lack of more positive symptoms. That which I consider the most prominent symptom (aside from those furnished by physical examination) is pain of a peculiar dull, aching character, extending up the side to the region of the kidney (and when the patient is in the erect position for some time), having its greatest intensity about that organ. Also the fact that this pain will disappear after the patient has occupied the prone position for a time, and reappear after taking the erect position. Of course there are numerous pathological conditions which may exist in the female and give rise to pain resembling this, but a careful examination and history of the case will usually exclude them. The pain is quite similar in character to that experienced by the male who suffers from varicocele, while several of the general symptoms are analogous in character, such as lassitude, a vague sense of unrest, and mental depression. These symptoms are accompanied by a history of injury at childbirth, followed by inflammatory conditions which have arrested the proper involution of the pelvic organs. Chief among the physical signs elicited by digital examination will be a thickened ligament, flexible, but tender under pressure, and transmitting a doughy sensation to the touch. Examined with the patient in the erect position, the ligament is thicker than appears by examination in the prone position, but positive evidence of the varicose condition of the vessels of the ligament can be obtained only by careful digital examination *per rectum*, after the patient has been allowed to stand for a short time. Bi-

manual pressure of the ligament will then readily reveal the knotted, angle-worm appearance of the vessels. Such was the method employed in the diagnosis of my cases. My experience is yet too limited to allow me to express an opinion as to the ultimate result of the procedure I am advocating, but I beg your indulgence while I lay before you the results so far obtained in the treatment of four cases of varicocele in the broad ligament:

Case I.—Mrs. P., aged forty, married twelve years. One labor (instrumental); three abortions (produced). No history of menorrhagia or metrorrhagia. Some leucorrhœa. No vesical symptoms. Bowels very constipated. For the preceding ten years she had suffered from pain in the left side, increased by standing or walking. This pain was also felt in the back near the kidney. She had been treated by various physicians for spinal irritation, nervous prostration, etc., and in 1881 underwent an operation for lacerated cervix by Dr. Mann, of Buffalo (then of Hartford). For twenty months previous to my seeing her she had been able to sit up only about three hours each day, and to take a few steps across the room with assistance. She was brought to St. Elizabeth's Hospital on May 4, 1887, when I made my first examination of her. Digital touch showed the perinæum in good condition, the vagina about normal, the uterus in proper position, the cervix small and showing evidence of having been sutured. The endometrium appeared to be healthy. The broad ligaments were thickened and tender, while the ovary lay somewhat prolapsed behind the left one. Not being satisfied with an examination *per vaginam*, I made a careful rectal examination of the ligaments, and then discovered that, besides the prolapsed ovary on the left side, both ligaments contained a large cluster of dilated tortuous veins, giving just the same feel to the finger as that given by a varix in the scrotum. I advised laparotomy for her relief, believing I could tie the veins off and cure her, and I put her upon preparatory treatment for one week. On May 10, 1887, I did abdominal section and removed the ovaries and tubes, together with a large varix in

each ligament, the left one the largest, the veins being nearly as large as my little finger. The tubes were not diseased, but both ovaries were atrophied and dotted with small cysts. The patient made a good recovery, her pain was relieved from the time of the operation, and four weeks later she left the hospital to return to her home. Fourteen months after the operation she writes that she is perfectly well and free from pain.

Case II.—Mrs. B., aged fifty-one, married thirty-three years. Had borne four children. No miscarriages. Last child born ten years and a half ago; labor rapid. She had never been well since, suffering all the time from pain in the left side. Never had had metrorrhagia, but had suffered from menorrhagia during the last two years of menstrual life. Menopause two years ago. Leucorrhœa to some extent. No vesical symptoms. Bowels much constipated. She had received treatment during the previous eleven years from sixteen different physicians without benefit, many diagnoses being made. She had been in bed most of the time for the past eleven years, and for the past three years had only got up to use the commode at the bedside. Her principal complaint during this time had been of pain at about the lower edge of the spleen, from there shooting down into the left groin. Careful physical examination of the abdomen by palpation, percussion, and auscultation showed nothing abnormal, except a prominent pulsation of the abdominal aorta (a diagnosis of aneurysm of the abdominal aorta had been made by one physician). Vaginal examination showed the uterus thrown back somewhat and fixed in its position, about normal in size, although the menses had ceased for nearly two years. There also seemed to be an enlargement to the left of the uterus in the broad ligament. Careful rectal examination showed the enlargement to be a mass of blood-vessels, and beneath it a strong pulsation of the uterine artery could be plainly felt. I made a diagnosis of varicocele, and advised the patient to come to New York for operation. She was brought to the city upon a bed, October 7, 1887. I at once put her upon preparatory treatment of milk diet, vaseline baths, etc.

On October 11th, in the presence of Dr. Smith, her family physician, and my assistants, I put her under the influence of

an anæsthetic and made an incision, four inches in length, through the linea alba, sufficiently large to allow of the introduction of my hand and wrist. I carefully examined all the abdominal organs before touching the pelvic cavity. Nothing pathological was found in the region where the pain was complained of. There were no adhesions about the spleen or intestines in that region. The spleen was small, the stomach normal, the transverse colon low, and the aorta normal, except that it bifurcated high up (behind the navel), and at the point of bifurcation the pulsation was prominent. Tracing the descending colon down, I found it bound to the left ovary and tube to the extent of an inch. The ovary and tube were atrophied, and the uterus was somewhat retroverted and adherent. Beneath the ovary and tube on the left side was the bunch of knotted varicose veins that I had previously diagnosticated by rectal touch. All adhesions about the parts were broken up, and as much of the ligament as could be drawn up, at the same time that gentle traction downward was made upon the ovarian vein. (From the extreme emaciation of the patient most of the ligament could be brought into view.) It was then quilted with the cobbler's stitch, commencing at the outer extremity, near the pelvic brim, and including all the ovarian vein that I dared to draw down. As I neared the uterine extremity of the ligament I passed the stitches deeper, quilting close to the pelvic floor, and in the last two stitches I included the round ligament so as to be able to remove about an inch and a half of it. The ovary and tube, together with the varicose veins, were then cut away. On the right side the vessels were not so large, but I wished to correct the displacement if possible at the same time, so I treated the right broad ligament in the same manner. The result of such a pronounced shortening of both broad ligaments can be readily understood. When I let go of the pedicles the tension upon the round ligaments at once sprang the uterus into a position of anteversion, where it remained at the time she left the hospital, nine weeks later. She never had a day's pain after the operation, and her after-treatment was simply with good diet and a nerve tonic of dilute phosphoric acid and strychnine in calisaya elixir. Her recovery was slow but steady, and when leaving

the hospital she walked down two flights of stairs and out to the carriage. A letter from her daughter, received July 25, 1888, says that she is perfectly well, rises at 7 A. M., never thinks of lying down during the day, and goes to bed at 10 P. M. to sleep well all night.

I have reported this case somewhat at length owing to the fact that the patient had been bedridden for such a long time, and after the operation has returned to such perfect health.

CASE III.—Mrs. L., aged fifty-three, married twenty-six years, entered the hospital January 24th. Menses first appeared at fifteen, regular but scanty, with pain in the sides and back. She had given birth to three children, the first by instrumental delivery. Had one miscarriage, between the first and second child; the last child born thirteen years ago. No history of metrorrhagia, menorrhagia, or leucorrhœa, but had had frequent and painful micturition. Locomotion painful. *Bowels much constipated.* General health poor. She had passed the menopause a year and a half. Had never had local treatment. Her symptoms at the time of entering the hospital were severe pain in the back and pain of a sharp, stinging character down through the left side and limbs, also pain in the stomach (dyspeptic). Her last confinement had been followed by some form of inflammation in the pelvis which confined her to bed twelve weeks. She gave no evidence of heart, lung, or kidney disease, except that the urine showed some phosphates, evidence that the kidneys were laboring. She was put upon the use of a strictly milk diet for ten days, and the urine then examined with a better result, the phosphates having disappeared. Digital examination showed the uterus small; also a small, tender thickening behind each broad ligament; the broad ligaments were thickened, boggy, and very tender to the touch. A rectal examination was made with the same result as in the two previous cases, except that the ovaries seemed somewhat enlarged. On February 9, 1888, I did laparotomy, and quilted both broad ligaments and removed all that I could of them; cleansed the

abdominal cavity thoroughly and closed the wound. She made a good recovery. There is nothing in the after-treatment of her case worthy of mention. She left the hospital five weeks after the operation, relieved of the pain through her back and hips, but still suffering somewhat from the dyspepsia.

Note.—July 26, 1888.—To my personal knowledge she is now well and doing her own work.

This was the third case in which I had made a diagnosis of varicocele in the broad ligament, and done laparotomy for its removal. It was the most obscure of the three, the varix being the smallest, and on that account I determined to have a careful microscopical examination of the specimen made, to either confirm or invalidate my diagnosis. I gave the specimen for examination to Professor Porter, of the Post-graduate School, who had sections of it mounted and drawings made from them for me. The following is his report in full:

Pampinocele.—Upon microscopical examination of the ovaries, tubes, and broad ligaments removed by Dr. Dudley, the following conditions were found:

First, the ovaries were slightly enlarged and the seat of a few small cysts, some of which were filled with a clear serum and others with a semi-gelatinous substance. The stroma of the ovary was composed of ordinary white fibrillated connective-tissue substance (Fig. 1, *a*), smooth muscular fibers, and blood-vessels. The walls of the arterioles and small arteries in the stroma were generally thickened (Fig. 1, *b*); in some the lumen was diminished, while in others it was expanded. This condition would naturally disturb the nutritive supply to the gland, and tend to produce a capillary engorgement.

Second, the Falloppian tube presented no special abnormity.

Third, the most marked pathological changes were found in the substance of the broad ligament, the pampiniform plexuses, and their tributaries. The pampiniform plexus was in a

state of marked congestion, the walls of the vessels were thickened, and their course was unusually tortuous. That this en-

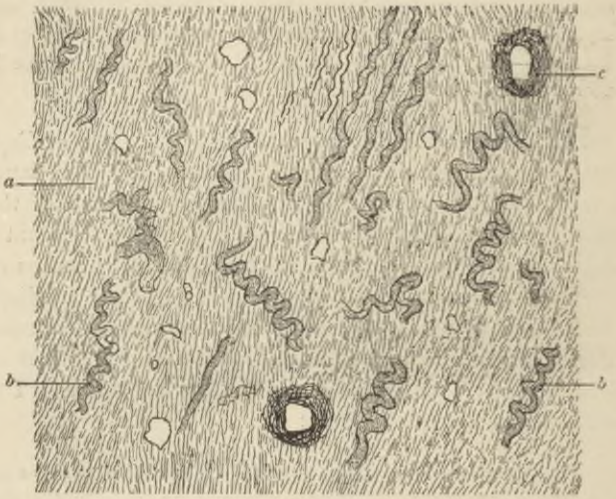

FIG. 1.—*a*, ovarian tissue; *b*, *b*, blood-vessels; *c*, an arteriole.

gorgement was of long duration is sustained by the condition of the capillaries, which were found, upon microscopical examination, to be enormously distended and filled with blood in a state of partial pigmentary degeneration (Fig. 2, *b*), indicating considerable duration of the stasis. Under ordinary circumstances the capillaries collapse and can not be distinguished from the fibrillated connective tissue in which they are imbedded, unless an artificial injection is made, or they are distended by blood as the result of an acute or chronic congestion. Had the congestion been acute in character the capillaries would have been distended with red and white corpuscles, which could be readily recognized as such. But in this case it was difficult to make out the corpuscles, but the vessels were very much distended by the blood-pigment matter, showing clearly that the engorgement was of long duration or chronic in nature.

The walls of all the veins were thickened and their course was quite tortuous, as we commonly see in varicose conditions (Fig. 2, *d*). The walls of the arteries were very much thickened; in some the lumen was contracted (Fig. 2, *e*), in others it was expanded (Fig. 3, *b*). This condition would naturally cause an irregular pressure to be maintained in the capillaries, and act as an element in producing the capillary engorgement (Fig.

FIG. 2.—*a*, fibrous tissue of the broad ligament; *b*, dilated blood-vessel filled with blood-cells; *d*, convoluted blood-vessel; *e*, an arteriole.

3, *c*), which, together with the chronic congestion of the veins, explains the stagnation and pigmentary degeneration in the capillaries. The sections were made by Dr. Crowell, and the drawings made from them by Dr. George G. Van Schaick represent very accurately the great capillary congestion and thickening of the blood-vessels.

[Signed] WILLIAM H. PORTER, M. D.

CASE IV.—Mrs. D., aged fifty, married thirty-two years, four children, one miscarriage. Matured at fifteen; regular,

flow normal. All labors normal. Had suffered from profuse leucorrhœa and obstinate constipation. Locomotion painful.

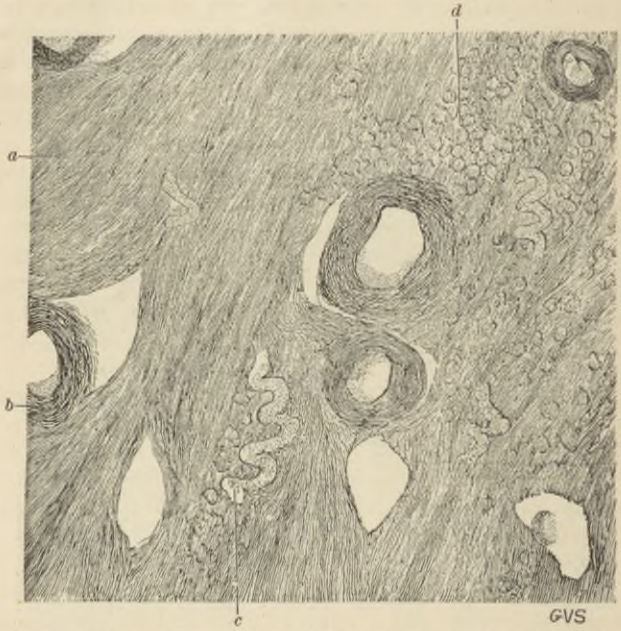

FIG. 3.—*a*, fibrous tissue; *b*, ligament, longitudinal cut; *c*, convoluted blood-vessel; *d*, fibrous tissue cut transversely to the axes of the fibers.

Menopause one year previous to my seeing her. Had been under the care of three different physicians for local treatment during the past two years. Complained of constant pain in the left side and back and across the abdomen. When she lay in bed this pain would at once disappear; half an hour after her taking the erect position it would reappear in the same spot. She had suffered so much that she was ready to do anything for its relief. I saw her first at my office, April 5, 1888. Examination showed thickening and tenderness on the left side only. The urinary analysis revealed some pus cells, but no albumin or

casts. She was put upon the use of a strictly milk diet, with directions to drink freely of distilled water as well. These directions she faithfully carried out. She entered the hospital April 15th, when the urine was again examined, with negative results, with respect to albumin and casts, but there were still some pus cells. No evidence of cystitis existed, and the small number of pus cells was accounted for by the presence of some large crystals of oxalate of lime. I hesitated about giving her an anæsthetic under such circumstances, but afterward decided to do so, and on April 20th did the operation and removed the varix from the left broad ligament. Digital touch along the ureter to the kidney did not reveal any abnormity, still, on the fourth day after the operation, the pus cells in the urine began to increase until quite a number were present, and yet no pain or irritation about the bladder attended their presence; neither was there elevation of temperature or pulse, both having become normal, on the second day after the operation. The wound healed kindly and she returned to her home in sixteen days, with directions to watch the condition of her kidneys.

Note.—A letter from her, dated July 27, 1888, states that she has gained flesh, and has no pain through the back, but that the urine still contains some pus.

I do not consider this case an entire success, but the points of interest in it are the character of the pain caused by standing, the fact that it was entirely relieved by lying down, and the rapid increase of pus in the urine after the administration of an anæsthetic, its appearance being unattended by elevation of temperature or pulse.

My paper is already much longer than I intended, and the subject too great for me to attempt to touch upon all the conditions which may bear relation to it, but before summing up there is one point to which I wish to draw attention.

At the reading of this paper I raised the question as to what the influence of varicocele might be upon the ovary.

Then I had not received the report of the result of Professor Porter's examination of the specimens, and could only reason from analogy, believing that if a varicocele in the scrotum would in time produce atrophy and loss of function in the testicle (which is a well-known fact), the same condition of constant increased blood-pressure in the venous circulation of the ovary must necessarily produce analogous changes in that organ, which would cause a train of symptoms such as I have endeavored to describe and have demonstrated by operative measures to actually exist; and the result of the microscopical examination by Dr. Porter confirms the opinion I then held, while the drawings made from the mounted specimens are positive evidence of the changes which had taken place. Hence, to sum up—

1. It is my belief that varicocele in the broad ligament is not a rare condition.

2. That it is produced by long-continued congestion; arrest of uterine involution, from whatever cause, and chronic constipation being the most important factors in its production.

3. That it may exist and be mistaken for so-called cellulitis or salpingitis unless careful rectal examination of the broad ligament is made.

4. That it will produce changes in the structure and function of the ovary similar to those produced in the testicle, causing atrophy of its stroma, and interference with the proper development of the ova to such an extent as to produce cystic degeneration of it and consequent sterility.

5. That when the varicocele has existed for some time, or for a sufficient length of time to have caused a permanent dilatation of the veins, local treatment by counter-irritation (with Churchill's tincture of iodine), cotton tamponing, pes-

sary support, or local depletion will be of no permanent benefit.

6. That the result of a radical operation for its removal in the four cases reported, although not sufficient to make the operation a justifiable one in all cases, is strong evidence in its favor, even though the woman has passed the menopause.

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