

THE ÆTIOLOGY OF UTERINE PROLAPSE AND CYSTOCELE.

By GIBBON FITZGIBBON, M.D., F.R.C.P.;
Gynæcologist to the Royal City of Dublin Hospital.

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THE subject of uterine prolapse and cystocele is one upon which a great deal has been written, and still new operations are constantly being described, involving the removal of the uterus, the distortion of parts, and even the complete obliteration of the genital tract. There is surely some method by which the structures that normally support the uterus and vagina can be restored to functional activity and at the same time leave the organs which have to be supported intact, in approximately normal position, and possibly capable of functioning, and some operation which can be adopted as the all-round basis of the surgical cure of the condition.

The majority of the cases of prolapse are met in women who have born children; the prolapse is the result of damage caused by the passage of the foetus through the pelvis. In this act there must be some structure, which before labour was capable of supporting the uterus, rendered incapable of doing so subsequently. The probability is, that it is the same structure which is damaged in all or almost all the cases.

Prolapse occurring in nulliparous women is probably due to the same defective structures, but there has been no cause of laceration, and therefore must be due to some

congenital defect of the supporting structures. This places these cases in a different category, as the supporting structures, even though not injured, are incapable of supporting the uterus, and any operation is subject to the doubt, whether the tissues can be made capable of doing what they have already proved incapable of.

That the perinæum and that part of the levator ani muscle which is torn with the perinæum have no part in the support of the uterus is made evident by the fact that these structures may be extensively lacerated and this, even when of long standing, has no evident effect upon the level of the uterus. Laceration of these structures leads to rectocele, in which the rectum bulges forward and downward into the vulva, stretching the posterior vaginal wall in its lower half, but leaving the upper half and the posterior fornix unaffected. The condition is completely cured by a plastic operation upon the levator ani muscles and the perinæum and the parts restored to their normal condition.

On the other hand, there are numerous cases of prolapse of the uterus where the cervix comes down to the vulva, or even the uterus is completely extended, yet the perinæum and levator ani are intact, showing that some other structure is responsible for the maintenance of the uterus and the levator ani cannot replace it. These facts definitely prove that the structures which support the lower half of the posterior vaginal wall have no part in the support of the uterus, and therefore may be excluded in looking for the cause of prolapse of the uterus, which must be damage to some structure above the level of the levator muscles.

The structure which is next met with in the pelvis above the levator muscles is the visceral or endo-pelvic

layer of pelvic fascia, and as I believe this is the main, if not the sole support of the uterus and bladder, I wish to give a very full description of its attachments and relations.

The pelvic fascia as shown by Cunningham (1) is a direct continuation of the abdominal fascia, which is easily demonstrated as a continuous sheet lining the interior of the abdominal cavity and placed between the muscles and the peritoneum. The relative position of the pelvic fascia is identical, and the visceral layer passes inwards from the pelvic walls upon the upper surface of the levator ani and forms a complete fascial diaphragm to close the pelvic outlet. It springs in front from the back of the symphysis and the pubic ramus, about the level of the junction of the lower and middle thirds of the symphysis. From here it runs under the bladder; it surrounds the urethra, and is intimately connected with the base of the bladder, upwards along the walls of which it sends numerous fibres, as well as others downwards along the urethra. The fascia passing under the base of the bladder is closely connected with the anterior wall of the vagina, and is continued backwards to be attached to the supra-vaginal cervix, where it helps to form the anterior vaginal fornix. This part of the fascia is very definite and usually described as the "anterior true ligaments of the bladder." It binds the bladder and the urethra firmly to the posterior wall of the symphysis.

The next part of the pelvic fascia springs from the pubic ramus and the white-line, just at the level of the top of the obturator foramen, and from the inner surface of the ischial spine, it runs inwards above the levator ani muscles towards the vagina, bladder, cervix and rectum, and divides it into the vesical, vesico-vaginal, recto-

vaginal, and rectal layers. The posterior part of the fascia here surrounds the rectum and follows its walls as the rectal layer, at the same time giving some support to the upper part of the posterior vaginal wall where that is in relation to the anterior wall of the rectum, and this part constitutes the recto-vaginal layer. The anterior portion of this fascia is stronger and thicker than the rectal portion, and constitutes the vesico-vaginal layer. As it runs inwards towards the viscera it divides into numerous layers and becomes intermixed with loose connective tissue, which makes the demonstration of the whole of the fascia almost impossible close to the viscera; nevertheless, the continuity can be shown and the different layers followed, to loose themselves upon the walls of the viscera, or to join the fascia of the other side. It is connected to the sides of the bladder and continuous with the anterior fibres of the fascia which pass under the base of the bladder. It passes across the pelvis between the anterior vaginal wall and the base of the bladder, and is attached to the cervix uteri and the lateral vaginal fornices, above which it passes to reach the cervix and to become continuous with the recto-vaginal layer between the posterior vaginal fornix and the rectum and below the posterior *cul-de-sac* of peritoneum. The attachment of the fascia to the viscera is shown by Cunningham (2) in a dissection on the male, and the same relations of the fascia to the viscera exist in the female, the vagina and cervix uteri taking the place of the prostate.

In the region of the lateral vaginal fornices and the sides of the cervix, where the uterine vessels approach the uterus, there is a very marked increase in the amount of fibrous tissue, in which the uterine vessels run. This

extra fibrous tissue forms a distinct fan-shaped band lying between the lateral vaginal fornix and the sides of the cervix in the plane of the broad ligament. This band has been described by Mackenrodt (3) as the transverse ligament of the cervix. It is part of the pelvic fascia and plays a part in the support of the uterus and vagina with the rest of the fascia from which it should not be dissociated. Hart (4) refers to this as the loose, fatless tissue, 0.8. inches thick, with abundant blood-vessels and lymphatics surrounding the lower portion of the uterus and upper portion of the vagina, and says it was first described by Virchow and called the "parametric tissue," and it is clearly shown by Freund in sections at the level of the supra-vaginal portion of the cervix.

This intermediate part of the endo-pelvic fascia between the ligaments of the bladder and the rectal layer is usually described as if it merely formed a sheet above the levator ani muscles, and the recto-vaginal and vesico-vaginal layers as though they passed between the viscera just above the fibres of the muscle, whereas the fascia is at a higher level in part than the levator muscle.

In sections through the female pelvis this part of the fascia does not show up distinctly, because the fascia is not in a distinct sheet, and when the fibres are divided they retract in the loose tissue and do not show on the surface, consequently the fascia is omitted in the region of the vaginal fornices, and the cervix and that part which can be demonstrated as a sheet by dissections, just above the levator muscles, is depicted as the whole of the vesico-vaginal layer.

Where the fascia springs from the pelvic walls it can be seen as a distinct sheet, but when it comes into relation with the viscera it loses the character of a sheet and

divides into various layers. The necessity for this is obvious when the dilatation required during parturition is considered. If the fascia remained a single sheet where it is pierced by the cervix and the vagina, the aperture would be incapable of dilatation, whereas by means of the fascial fibres separating and running at different layers the supporting power is not diminished and the dilatation of the aperture is possible.

The description of the fascia in Cunningham's "Anatomy," together with his diagrams, makes this perfectly clear. He deals with the fascia chiefly in the male subject, and refers to this description when describing the fascia in the female. He says, the rectum below the recto-vaginal pouch of peritoneum is in apposition with the posterior wall of the vagina, a layer of pelvic fascia, the recto-vaginal, alone intervening. His illustrations show this part of the fascia distinctly as well as the vesico-vaginal layer, except that the prostate is shown instead of the vagina, and he says the recto-prostatic fascia is called the recto-vaginal, and the vesico-prostatic fascia the vesico-vaginal. Cunningham (5) also describes the fascia in connection with the female pelvis as the endo-pelvic fascia, and divides it into an upper portion attached to the upper part of the vagina and cervix and in front of these passing between the vagina and bladder to reach the mesial plane and lose itself upon the walls of the viscera, while the lower layer is that part of the fascia which follows the levator ani muscle and is inserted into the perinæal body.

The relation of the viscera to the pelvic fascia is such that the bladder rests on the upper surface of the fascia in front. The vagina, owing to the backward and upward direction of its axis, passes through the plane of the fascia

at an acute angle, so that its anterior wall which is facing upwards and forwards is in relation to the under surface of the fascia at that part upon which the bladder rests. Behind this the fascia passes obliquely across the sides of the vaginal fornices and over the top of them, being attached to the cervix, and the posterior vaginal wall being longer than the anterior is continued back so as to pass through the plane of the fascia behind the cervix. In this way the vagina is almost altogether below the plane of the fascia, and has its attachment by fibres to the under surface. At the same time the fascia sends numerous fibres all over the vaginal walls. The cervix uteri definitely passes through the fascia, the vaginal portion being below; the supra-vaginal portion above the plane of the fascia, but owing to the oblique direction of the axis of the uterus, running forwards, there is a greater attachment of the fascia in front of the plane of the broad ligaments than behind, so that the vesico-vaginal layer practically forms a sling across the pelvis, attached to the sides of the cervix and upon which the uterus lies when antiverted, the fundus resting upon the upper surface of the bladder. The other ligaments of the uterus appear to be only concerned in the control of the fundus. The broad ligaments and the round ligaments can have no part in the support of the uterus, the latter with the uterus in antiversion are completely relaxed, the distance between their points of origin and insertion being considerably less than the length of the ligaments. The utero-sacral ligaments are more difficult to be definite about. They are situated at a higher level than the pelvic fascia, and from the direction in which they run they would draw the cervix upwards and backwards. From their nature they do not seem capable of supporting the uterus, and the fact

that in cases of prolapse they are found greatly elongated but not ruptured, showing that they fail and stretch when the weight of the uterus is thrown upon them, rather bears this out. There is no evidence that they are liable to damage during labour, and, therefore, why should they so frequently fail in their function after labour.

Retroversion of the uterus is sometimes stated to be a predisposing cause of prolapse, but there is clinical evidence that it is not necessarily the initial stage, and from the enormous frequency of cases of retroversion in which there is no prolapse, even where the retroversion has existed for a very considerable length of time, and particularly in those cases where it occurred after parturition, it may be concluded that the position of the uterus has no influence upon the supporting structures, and that retroversion in the early stages of prolapse is only a concomitant, and not a predisposing cause, although it is an ultimate development in all cases. Although I have stated that damage to the levator ani muscles has no effect upon the support of the uterus, they and the fascia have a correlated function. The levatores ani form almost as complete a sheet as the fascia across the pelvis, and these two sheets together form the pelvic diaphragm. The condition is exactly analogous to the abdominal walls, where we have a containing sheet of fascia supported by muscles externally. Under normal circumstances, and during ordinary movements of the body, there is a certain constant pressure varying between certain limits applied to the pelvic viscera. This strain is altogether taken up by the fascia, and, although constantly applied, has no detrimental effect upon its supporting power. Under normal circumstances the downward strain is increased, and even though very far short of the maximum that the fascia is

capable of sustaining, the muscles of the pelvic diaphragm come into action and temporarily support the fascia. Thus it can be seen that the pelvic fascia is essential to the support of the pelvic viscera, and without it prolapse must occur, while the muscles are not essential but additional safeguards, and in their absence it would be quite possible for no prolapse ever to develop. On the other hand, the dependence upon the muscles is shown in those cases of prolapse developing in old age in women who have never had any cause of laceration, nor any tendency to prolapse during vigorous life, and in whom the prolapse must be looked upon as the result of senile muscular atrophy, with probably increase of strain upon the fascia and consequent loss of muscular re-inforcement.

Lacerations occurring during parturition never could be sufficiently extensive to destroy the supporting power of the levator ani muscles. The parts of the muscles that are involved in perinæal lacerations are the anterior fibres which spring from the pubic bone and run backwards towards the rectum and perinæal body, across the sides of the vagina. Where there are the factors for the formation of a cystocele—viz., the rupture of the fascia between the base of the bladder and the anterior vaginal wall, it can develop without anything to control it when the perinæum is torn. It seems quite impossible for the posterior and higher portion of the levator ani muscles to be damaged during parturition, and, therefore, even in complete prolapse, the muscular element of the pelvic diaphragm where it supports the uterus is still intact, and the defect must be looked for in the fascia.

In the majority of cases of prolapse there are found lacerations of the cervix, which are not confined to the vaginal portion, but extend out and involve the vaginal

fornices. If these are examined it will be found that they nearly always take a curved direction when they reach the fornices, so that they partially encircle the cervix; they thus involve the attachment of the fascia to the fornices and cervix in a direction transverse to the fibres of the fascia. The degree of evident laceration is no guide to the extent to which the fascia is involved; the fascia may be extensively lacerated even where the cervix is intact. The result is that the fascial sling across the pelvis is interrupted, the fascial ends being only connected to the viscera by loose connective tissue which stretches before the constant strain imposed from above. The fascia is still there and the detached ends at their normal levels, but the uterus is able to pass down between them.

Besides laceration in the region of the vaginal fornices, laceration may occur in front of the cervix where the fascia bridges across the anterior fornix and passes between the anterior vaginal wall and the bladder, in which case the bladder protrudes between the edges of the fascia and forms a cystocele.

These two varieties of laceration may exist separately or together. When in the region of the lateral fornices alone, there results prolapse of the uterus with consequent inversion of the vaginal fornices, but there is no cystocele. The base of the bladder is still supported and the anterior vaginal wall relatively long. The prolapse is usually partial. When the anterior fascia alone is involved, the uterus and vaginal fornices retain their normal position, but the bladder prolapses, forming a cystocele, displacing the free edges of the fascia outwards and stretching the anterior vaginal wall. When laceration occurs in the two sites there is prolapse of the cervix and vaginal fornices as well as protrusion of the bladder, the

uterus comes down and the whole anterior wall of the vagina becomes inverted.

These different conditions should be clearly differentiated; they are all the result of laceration of the fascia, but the site of laceration is different. They are analogous to abdominal hernias through scars. The recognised method of curing these hernias is to clear the edges of the fascia and unite them directly, and if this is done it does not matter how the other tissues are dealt with. Exactly the same condition prevails in the cases of prolapse of the uterus and cystocele, except that the organs which become displaced have a definite position to which they should be returned, and are attached to the fascia, whereas the contents of an abdominal hernia have only to be returned anyhow to the abdomen and the sac obliterated.

I believe almost all cases of prolapse and cystocele can be dealt with on these lines. There is no difficulty in reaching the fascia at the sides of the cervix and above the lateral fornices through an anterior colpotomy incision when the bladder is pushed up from the front of the uterus and well out to the sides, so as to clear the fascia above the lateral fornices, and by stripping the anterior wall away from the bladder at each side of the vertical incision. The old operation of anterior colporrhaphy and colpo-perinæorrhaphy was most unsatisfactory, but occasionally resulted in cures even in pronounced cases. I believe these cures were effected upon the lines suggested above. In taking away the anterior flap of vaginal mucous membrane the incision was made sufficiently far out to reach the pelvic fascia and enough was caught in the sutures to reconstruct the pelvic sling.

In the present-day operations for prolapse, especially the Schauta-Wertheim type, there is one common feature,

the high amputation of the cervix, which is nominally done to reduce the size of the cervix and considered essential for success, although it must be admitted that numerous cases have very small atrophic uteri and proportionally small cervical portions. The amputation is done well above the vaginal level, and the stump is covered by the vaginal flap. I believe it is absolutely impossible to amputate the cervix as described without reaching the pelvic fascia, and the curative results are due to the inclusion of the fascia with the vaginal mucous membrane in covering the cervical stump. As for the interposition part of the operation, it only relieves the cystocele and does so by using the uterus to hedge the gap in the pelvic fascia; it has no part in supporting the cervix and is ineffective in the absence of independent means for doing this. It has the disadvantage that it necessitates future sterility, and although this only affects a small number of cases, if they do not agree to it, the only alternative is palliative treatment or an operation which will only give relief for a short time. As a result of failure with the Schauta-Wertheim operation there has recently been suggested a form of hysterectomy, the author (6) of which says the inter-position operation is very efficient in the relief of partial prolapse with extensive cystocele, the best results being obtained in cases under forty years of age; it should not be adopted in the third and fourth degrees of prolapse. These cases are to be treated by hysterectomy, the broad ligaments are to be united in the middle line and the free edges stitched close to the urethro-vesical junction, so as to compel the bladder to rest on the broad ligaments. In this operation the bases of the broad ligaments where they are separated from the cervix are firmly united together, and this, I

believe, is the part of the operation which really cures the prolapse of the vaginal fornices, and without which the elevation of the bladder would have no effect. It is again a reunion of the pelvic fascia, which, if done without removing the uterus, would be equally effective in curing the prolapse.

What I wish to emphasise in connection with these operations is that the one common item is plastic work in the region of the lateral fornices and cervix, but that the importance of this is not recognised, and credit for what is effected by this is given to other parts of the operations which are not essential, while many of the unsatisfactory results are due to non-appreciation of what is the essential part of the operation in cases of prolapse.

The lines upon which I suggest prolapse and cystocele should be treated were pointed out by Alexandroff ten or more years ago, and advocated by Hastings Tweedy (7), but they have not been followed or recognised by the profession, with the result that the surgical treatment remains unsatisfactory, and is chiefly upon lines which involve the interference with the function of child-birth, and is, therefore, unsuitable for an important class of cases—the younger women—still in the child-bearing period of life, and probably desirous of having more children.

CONCLUSIONS.

1. Prolapse of the uterus and cystocele are due to damage of the pelvic fascia in the region of the lateral fornices and in front of the cervix.

2. Prolapse of the uterus must be clearly differentiated from cystocele; they may exist separately or be continued.

3. Laceration of the perinaeum and levator ani muscles have no part in the production of prolapse. It allows an increase of cystocele where there is the primary defect.

4. Retroversion of the uterus has no tendency to produce prolapse.

5. Prolapse of the uterus and cystocele are analogous to abdominal hernias through scars, due to defective union of the fascia.

6. The cure of the condition can be effected by reuniting the fascial diaphragm across the pelvis.

7. The fascial diaphragm can be reposed without interfering with the function of the uterus or dislocating the bladder.

8. The condition can be treated in exactly the same manner before and after the menopause.

9. Atrophy of the uterus has no influence upon its support.

10. Amputation of the cervix other than the removal of an hypertrophied lacerated vaginal portion is not necessary.

REFERENCES.

- (1) Cunningham. Manual of Practical Anatomy. 1896. Vol I. P. 555.
- (2) Cunningham. Manual of Practical Anatomy. 1896. Vol. I. P. 549.
- (3) Mackenrodt. Archiv. of Gyn. 1895. XLVIII. Pp. 393, 421.
- (4) Hart and Barbour. Manual of Gynæcology. 1897. P. 51
- (5) Cunningham. Manual of Practical Anatomy. 6th edit.
- (6) Mayo. Uterine Prolapse with associated Pelvic Relaxation. Surg. Gen. and Obs. 1915. Vol. XX. 3.
- (7) Tweedy. Curative Operation for Procerdentia Uteri. Jl. Obs. and Gyn. of Brit. Emp. 1905. Vol. VII. 5.

DR. ALFRED SMITH said the importance of a torn levator ani muscle in the production of prolapse should not be lost sight of. The levator ani, which is the muscle opposed in its

action to the sphincter ani, and which dilates the latter, being torn, the sphincter cannot dilate normally; a stool therefore meets this muscle contracted and, the pressure still continuing, the contents of the bowel bulge out the rectum into the lumen of the vagina, producing a rectocele. In doing this the posterior vaginal wall is drawn down, and it in turn pulls on the cervix. Cystocele occurs as a result of damage to the anterior wall during delivery. So great is the desire to save the perinæum in forceps and other difficult deliveries that the tissues beneath the symphysis are subject to much dragging and pressure. Prevention is better than cure. Hence our method of safeguarding the perinæum may have to be modified.

DR. HASTINGS TWEEDY congratulated the President on the careful and painstaking manner in which he had demonstrated the importance of the endo-peritoneal tissue. His address has made it impossible to hold fast our old faith as to the influences which compelled the uterus to remain fixed in its anti-flexed position. We can believe no longer in the theory of abdominal pressure, either positive or negative, in the efficacy of the peritoneal folds, so called ligaments, in the power of the pelvic triangles or in the levator muscles as means of sustaining the uterus. The point so well brought out by our President is that the one and only factor which counts in preventing prolapse of the uterus is this endo-peritoneal tissue, and whether the latter is derived from the parametrium or from the pelvic fascia seems to be a matter of secondary importance.

SIR WILLIAM SMYLY joined in congratulating the President upon his paper, and thought the Section should be grateful to him for the labour he had bestowed upon it. He believed that the successful treatment of this troublesome condition depended upon a clear knowledge of its anatomy, and especially upon the restoration of the connective tissue and fascial supports; but so far as his experience had carried him he doubted the possibility of restoring the fascia which supported the bladder, and he would still resort, at any rate in women who had passed the menopause, to interposition of the uterus between the bladder and vagina, whilst in those who were likely to have more children he had found vaginal

suspension a useful compromise. With regard to the uterus itself he had no doubt that it was maintained in its position by the strong fibrous tissue at the base of the broad ligaments.

DR. SOLOMONS said that the number of operations required to cure prolapse depended on the conditions present. He found it necessary usually to perform anterior colporrhaphy, with pushing up of the bladder, high circular amputation of the cervix, shortening of the utero-sacral ligaments, posterior colporrhaphy and perinæorrhaphy with some form of operation to cure the retroversion. It seemed to be difficult to determine whether these utero-sacral ligaments had any bearing in causing prolapse; it was certain, however, that they were strong bands which, when separated and brought in front of the uterus, acted as most efficient splints. He thought it would be a good move if operators who had opened the abdomen, after performing this operation, would say in what condition they found the utero-sacral ligaments. He would be glad to hear of a cure of a severe prolapse where the utero-sacral or lateral pelvic ligaments were not shortened. He did not consider that the interposition operation should be done before the menopause.

DR. GIBSON agreed with the President regarding the importance of the pelvic fascia in the support of the uterus and bladder. He believed, however, that when the fascia was ruptured and had stretched sufficiently to allow of prolapse, it could not be considered capable of preventing further prolapse when it was repaired, as the President suggested. He believed that the fascia would continue to stretch. He did not know of any cases of complete prolapse which had been cured by repairing the fascia. Neither did he believe that large cystoceles could always be cured by anterior colporrhaphy, even when the most extensive suturing of the tissues under the vaginal wall was carried out.