OPERATIONS FOR PERMANENT ENLARGEMENT OF THE CONTRACTED BONY PELVIS IN WOMEN

By John Osborn Polak, M.D., and George W. Phelan, M.D.,
Brooklyn, N. Y.

DURING the past few years many contributions have appeared in foreign journals on the subject of permanently increasing the size of the contracted female pelvis; in fact, so much has been written on this subject, that we have felt that the status of the procedure should be determined, and to this end we have reviewed the literature, and shall attempt to correlate the several suggestions, and place them in a consecutive manner, with our personal comments, before the profession, so that as obstetricians we may be able to give them their clinical value.

The obstetrician is but the ally of Nature in her effort to save two human lives. Every labor is a physiologic process which is dependent for its outcome on the efficient cooperation of three factors, namely, the powers, the passenger and the passages—each of which must be normal or relatively normal—in order that the patient may have a normal labor. Conversely, therefore, any defect in any of these factors will bring about an abnormal labor.

The passages of the bony pelvis are one of these factors; hence, the progress of labor may be arrested at the pelvic brim by contraction of the inlet, or at the pelvic outlet by decrease in the length of the outlet diameters. In the consideration of the methods which have been, or which may be, employed to increase the bony inlet and outlet, absolute contraction of the pelvis is excluded from the discussion.

In this review we will confine ourselves to a consideration of the methods for increasing the inlet of the rachitic flat, the simple flat, the justominor and the high assimilation pelvis, with its false promontory; for it is the short conjugata vera in these types which causes the relative dystocias at the brim.

At the outlet, funnel pelvis, with its narrow ischiopubic arch and deep symphysis or forward displacement of the sacrum or coccyx, or both, make up the chief causes for arrest; while dystocia from funnel pelvis with its narrow bisischial is relatively common. The most infrequent arrest at the outlet, in the course of labor results from forward displacement of the sacrum, or the coccyx or both.

It is to the correction of these obstacles that our attention is

directed. Forward displacement of the sacrum is not necessarily complicated by a funnel outlet, i.e., by a contracted bisischial diameter, though it may be associated with it. In this complication the posterior sagittal diameter is so decreased in length, that the head after reaching the pelvic floor fails to be expelled because of the obstruction presented by the forward displacement of the sacrum and coccyx. No difficulty is encountered in the progress of labor until the head reaches the pelvic floor, but here the arrest is complete. Postural methods for lengthening both the bisischial and the posterior sagittal diameter of the outlet have been suggested, and given clinical trial. The exaggerated lithotomy posture of Schmitt widens the space between the ischial tuberosities, while Klein suggests increasing the anterior-posterior diameter of the outlet by 1 cm. or more by turning the patient on her side and flexing her thighs on the abdomen, and her legs on the thighs—practically placing her in the right or left Sims' position, and allowing delivery to take place in this posture. However, in those cases where the joint between the sacrum and coccyx is ankylosed, or where there is any considerable forward displacement of the lower portion of the sacrum as a whole, posture will fail to sufficiently increase the outlet and permit delivery. In this class of cases, the outlet can be increased by sawing through the sacrum transversely as has been suggested by Eymer.[1] This operation produces a false joint and allows the severed portion of the sacrum with the attached coccyx to recede at the moment of expulsion unless the forward displacement is too pronounced, when the entire pelvic girdle may be enlarged by pubic section.

The technic of Eymer's procedure is as follows: He saws through the front of the sacrum from behind, severing it transversely a little above the point of forward flexion, which point has been previously determined by rectal examination. With the patient lying on her right side, with her thighs flexed, a small longitudinal incision is made through the skin and overlying-fat and fascia on the left side near the sacral border, and just above the point of anterior flexion; then with the finger in the rectum, the osteotomy needle is carefully conducted across the front of the sacrum through the loose connective tissue lying behind the rectum and brought out at a corresponding point on the right side of the sacrum, where it is cut down upon and a saw fitted to its eye which is drawn back through the opening on the left side. With the saw in place, lying across the front of the sacrum, a few sawing movements separate the bone, and this allows sufficient recession of the sacrum and coccyx to permit the escape of the head. If the technic is properly carried out there is but little bleeding, which can readily be controlled by simple compression. When the bleeding has been arrested, the wounds may be closed with sutures.

Comment.—This procedure appeals to us as a rational one, but one, with an extremely limited indication, to be used only in those extreme forward flexions of the sacrum and coccyx which produce outlet arrest. The advantage of this operation lies in the preservation of the strong posterior ligaments and muscular attachments which remain after section through the bone has been made. The retention of these ligaments permits the formation of a hinge joint and allows recession at the moment of expulsion.

It would seem to us that resulting permanent enlargement from this procedure is questionable, for unless the union which results is a ligamentous one (and this is unlikely) osseous repair will take place in the usual manner and the pelvic outlet will not remain enlarged.

In these days of careful mensuration it is hardly possible for these higher degrees of forward displacement of the coccyx and sacrum to pass unobserved and not to be recognized until outlet dystocia occurs; but should this be the case, this operation has a definite indication.

Enlargement of the brim, actually lengthening the conjugata vera, has been obtained clinically for many years by simply placing the patient in the Walcher position. Unfortunately except in the very minor degrees of disproportion the amount of gain is not sufficient to allow engagement and, therefore, more radical methods are necessary.

Since Sigault[2] first suggested symphysiotomy in 1768, section of the bony pelvic girdle has been looked upon as a possible means of permanently enlarging the female pelvis.

Pubiotomy was advocated by Aitken in 1775, but it was not until 1830 that Stoltz of Strassburg perfected the operation of pubic section by using the chain saw to sever the bone.

In 1891 Gigli[3] published the description of his saw (a roughened steel wire) which he had invented for the purpose of cutting through the bones of the pelvic girdle.

Bonardi in 1897 performed the first pubiotomy with the saw. Since that date the operation has had a more or less checkered career until now it is seldom done, except in the Clinics at Leipsic, Munich, Glasgow, Paris and Baltimore; for it has been shown that the operation has an unavoidable mortality and morbidity.

In 1904, through the publications of Gigli, Van de Velde and Doederlein, pubiotomy took the center of the stage, and for about five years hundreds of operations were performed both here and abroad. It supplanted Gigli's hebosteotomy and symphysiotomy which had been rejuvenated by Galviati and Morisani.

In spite of many successful results ischio-pubiotomy is no longer practiced. Severance of both the pubic and ischial ramus was no easy operation, and was frequently attended by extensive damage to the nerves and vessels as well as to the contiguous soft parts, resulting in injury to the vagina, urethra and bladder, the formation of fistulas and disturbances in locomotion.

Both in this country and abroad, pubic section as introduced by Gigli, and perfected by Doederlein, has superseded all other methods for enlarging the female pelvis during labor; for not only is it simpler of performance, attended with less mortality and risk, but it is also attended with fewer complications and difficulties.

In addition to the immediate effect which pubiotomy has upon the pelvic diameters, both at the brim and at the outlet, some degree of permanent enlargement may actually take place in the diameters of the brim, the cavity, and in the transverse diameter of the outlet. Such permanent enlargement has actually been observed, for the resulting union is almost always a ligamentous character especially when the section through the bone has been made in an oblique direction.

Williams[4] has demonstrated that a pubiotomy done on both sides

has actually increased the pelvic diameters and permanently enlarged the pelvis to such a degree that spontaneous labor has subsequently occurred through the previously pubiotomized pelvis. Unfortunately, injury to the subpubic ligament or its partial severance will permit a degree of vesical and urethral prolapse which is not controllable, neither is it correctable by any of the operations for reconstruction of the anterior vaginal wall, so far devised. This of itself we believe to be such an unfortunate sequel that bilateral pubiotomy is seldom justified.

Comment.—In present day obstetric practice pubiotomy has but a limited field, for with our better appreciation of antepartum mensuration and the aseptic conduct of labor, by following the progress of mechanism with abdominal and rectal touch, fewer cases are potentially infected and cesarean section has, in this country at least, taken its place.

Pubiotomy can never be considered as an elective procedure unless we purpose enlargement of the pelvis; impacted occipitoposteriors, mentoposteriors arrested in the cavity—with the child alive and the cervix fully dilated, or unrecognized outlet contraction—with the head at the vulva—make up its chief indications.

In 1912 Rotter and Schmidt[5] advocated enlargement of the contracted pelvis (where such contraction was confined to the brim as in the rachitic flat, the simple flat, and the high assimilation pelvis with its false promontory) by the removal of a portion of the projecting sacrolumbar promontory, instead of by section through the pelvic girdle.

These authors had in mind the permanent enlargement of the female pelvis, and advocated this procedure as a prophylactic measure for succeeding postoperative labors—in other words, they suggested this as a procedure which was to spare the woman who was affected with a deformed pelvis, the necessity of repeated operations at delivery, by permanently increasing the size of the bony girdle to a point sufficiently large to permit of spontaneous birth.

Rotter increases the length of the conjugata vera by resection of the promontorium, and suggests the following technic:

With the patient in a high Trendelenburg position, a longitudinal incision is made through the abdominal wall in the median line from the umbilicus to the pubis, exposing the pregnant uterus, which is eventrated and held forward while the intestinal loops are pushed upward toward the diaphragm and kept there with well placed gauze pads. The sigmoid is grasped and drawn to the left exposing the promontory. Next a longitudinal incision is made through the peritoneum and subperitoneal fatty tissues over the promontory, the median sacral artery is tied above the body of the last lumbar vertebra; the accompanying veins are also isolated and ligated. When this has been done the promontory is covered only with the crura mediales of the diaphragm, the anterior longitudinal ligament and the thin periosteum. It is not, however, necessary to cut these structures for they may be separated from the front of the promontory by blunt dissection.

With these tissues retracted, the next step consists in using the chisel on the body of the last lumbar vertebra which measures from 3 to 3.5 cm. The chisel must be very finely ground and slightly con-

cave. A piece of from 1.5 to 2 cm., which is a flat ovoid and consists of a part of the last lumbar vertebra, the upper part of the sacral vertebra and the intervertebral ligament, is removed. The hemorrhage is inconsiderable and may be stayed by pressure. When it is controlled, the soft parts are reunited over the bony wounds, the uterus replaced and the abdomen closed.

It is claimed that by this procedure, the true conjugate may be lengthened by 1.5 to 2 cm., and in the case of the rachitic flat or high assimilation pelvis, the brim can be converted into a normal or approximately normal one.

The indications for this operation are found where the fault lies in the line of the conjugata vera due to the prominence of the lumbosacral joint. The lowest limit which justifies employment of this procedure has been set at 7 cm., and it is claimed by the originator that the technic is very simple. The bony wound is small, and the prognosis for primary healing good, while the firmness of the spinal column is not decreased.

He further claims that the operation has a wide field of usefulness in increasing the size of the brim in the flat pelvis, and as a prophylactic or elective operation, where previous deliveries have resulted in stillbirths, craniotomies, or operative deliveries.

Comment.—Several questions naturally arise in the minds of obstetric surgeons:

1. Does resection of the lumbosacral promontory weaken the spinal column?
2. Does permanent enlargement actually follow this operation?
3. Is it technically simple?

Seitz says that the number of cases treated in this manner has not encouraged him to follow the procedure. He operated upon 10 cases and found that extensive callous formation was the consequence, and that elongation of the conjugata vera was again diminished by this callous production. His conclusion is that resection of the promontory is a grave operation and its prophylactic effects on succeeding labors seems to be problematic. To the reviewer the procedure does not seem technically to be a difficult one. Intervention of this type is, after all, of some importance, for it can be done only in the early months of pregnancy, or at the time of doing a cesarean section for pelvic obstruction. It thus complicates by protracting the operation, and exposes the patient to the difficulty of controlling hemorrhage from the cut bone, as well as to a greater danger from infection.

We feel sure that here in America, where section has been perfected to a degree that has reduced the mortality to less than 1 per cent—and where the public has been educated to repeated deliveries by section—that it will be difficult to gain consent for an operation that does not assure permanent safety by positive increase of the conjugate and at the same time increases the operative risks of section.

The third suggestion that has been made by Costa[6] for increasing the size of the pelvis, is that of partial symphysectomy or excision of the upper part of the pubic symphysis. The author states that stenosis of the pelvis is, in a great number of cases, confined to the true conjugate and that by excision of the upper part of the pubic symphysis the obstacle to labor is removed.

Costa claims that the operation which he suggests is not only an

easy one, but is quite harmless because there are no organs in the immediate field that one might fear to injure. It can be done entirely outside of the peritoneum during the course of pregnancy, or when the woman is in labor. He describes his technic as follows:

He exposes the prevesical space of Retzius through a Pfannenstiel incision just above the upper pubic border, with the patient in the Walcher position. The recti are retracted and their tendons cut diagonally just above their pubic attachment for 1 cm. on each side. Compresses are then carefully placed to protect the bladder and peritoneum, so as to expose the upper border of the pubic symphysis from pubic spine to pubic spine. With a heavy scalpel a transverse incision is made through the periosteum at the highest point on the posterior surface of the symphysis from one spine to the other, and the periosteum dissected off from the posterior face of the symphysis for half its height. After this is done a piece of bone and cartilage is excised obliquely with a heavy scalpel, from above downward and from before backward, to almost half the height of the symphysis. This exsection should include the retropubic protrusion which must be removed to derive the best advantage from the operation; 1 or even 1.5 cm. of bone may readily be removed without weakening the pelvic girdle, for the strong ligamentous attachments are anterior and below the symphysis. The operation not only increases the length of the conjugata vera, but the joint becomes more elastic. It is really a delicate determination to remove enough bone to secure lengthening and elasticity without causing fracture. The operation can be performed during pregnancy or even when the patient is in labor. When employed during labor, the best time for its performance is when the dilatation of the cervix is complete. Delivery should be spontaneous.

In 1922 Costa[7] suggested the combination of his symphysectomy with subcutaneous symphysiotomy to limit the degree of separation of the pubic bones at the time the head passes through the pelvis. The lower limit for symphysectomy is 7.5 to 7.8 cm., while when it is combined with symphysiotomy, the indication may be extended to a conjugate of 7 cm. This rule only applies to pelves contracted in their anterior-posterior diameters.

Costa has done partial symphysectomy on seven women with no mortality. All of them were out of bed on the eleventh day, with no postoperative complications. Costa summarizes his results in the following conclusions:

(1) Partial symphysectomy is a simple operation; (2) There is no danger of hemorrhage; (3) It can be done during pregnancy without disturbing its course; (4) It leaves a depression, so that the pelvis remains permanently enlarged, which is important for later births; (5) It can be done during labor, even after waiting until it is seen whether the presenting part succeeds in overcoming the stenosis; (6) It gives a prolongation of the conjugata vera which can be evaluated at from 2.5 to 3 cm.; (7) It allows the bending of the fetus and the anterior parietal bone and makes the mechanism of the delivery easier in a flat pelvis; (8) It does not leave any disturbance in walking, or other inconvenience.

Comment.—The attractive point in his operation is that it is simple, extraperitoneal, can be done in the presence of fever, and while enlarging the anterior-posterior diameters, does not endanger adjacent

structures. It may come into competition with cesarean in the potentially infected case of parietal presentation where the cervix is fully dilated.

Another suggestion for enlarging the female pelvis by a pelvioplastic method was made by Brugnatelli and Verga[8] in 1914. This method consists in a free autoplastic transplantation of half of the pubic symphysis. The symphysis is cut horizontally and divided into two parts, the upper piece is resected and used for transplantation between the ends of the separated pubic bones after a symphysiotomy is made. The wedge is kept in position with two metallic sutures, and the pelvis immobilized. This operation has been performed on dogs, but fortunately not on the human being, for not only is the procedure attended with technical difficulties but may cause unforeseen trouble when attempted on the living.

CONCLUSIONS

Review of the foregoing procedures shows: (1) that the female pelvis may be permanently enlarged by section of the pubic bones, resection of a portion of the symphysis and resection of anterior portion of the promontorium;

(2) That all of these measures carry with them a definite mortality and morbidity;

(3) That with the exception of pubiotomy, clinical experience is too limited to justify their general employment and finally;

(4) That until we have additional data as to the fate of permanent enlargement and an improved mortality in these procedures—cesarean section will be accepted as a more rational selection.

REFERENCES

(1) *Eymer, H.:* Zentralbl. f. Gynäk., 1923, xlvii, 98. (2) *DeLee:* Principles and Practice of Obstetrics, p. 943. (3) *DeLee:* Ibid., p. 943. (4) *Williams:* Am. Jour. Obst., July, 1911, lxiv, No. 1, p. 106. (5) *Rotter, H:* Zentralbl. f. Gynäk., 1912, xxxvi, 385 and *Schmid, H. H.:* München. med. Wchnschr., August, 1912, No. 34, p. 1846. (6) *Costa, R.:* Zentralbl. f. Gynäk., 1921, xlv, 200. (7) *Costa, R.:* Ann. di ostet. e ginec., 1922, xliv, 393. (8) *Brugnatelli and Verga:* Folia Gynecologica, 1914, lx, 195.