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FURTHER EXPERIENCE IN THE EFFECT OF THE SIMULTANEOUS LIGATION OF BOTH INTERNAL ILIAC ARTERIES FOR HYPERTROPHY OF THE PROSTATE GLAND.

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FURTHER EXPERIENCE IN THE EFFECT OF THE SIMULTANEOUS LIGATION OF BOTH INTERNAL ILIAC ARTERIES FOR HYPERTROPHY OF THE PROSTATE GLAND.[1]

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FOR many years the subject of the radical cure of hypertrophy of the prostate has been under discussion, and that with good reason. The troublesome retention of urine, resulting in almost every instance, sooner or later requires relief. When the patient has become tired of using the catheter or unable to enter the bladder with the same the surgeon will be called upon to bring help. He now can try to treat the trouble symptomatically or he can strive for a radical cure. In other words, he either will establish permanent drainage, in order to eliminate the worst symptom, "retention," and thus improve or even cure other dependent symptoms, or he will perform an operation with the outspoken purpose to reduce the size of the prostate gland, and thus remove the obstacle to the outflow of urine at the neck of the bladder. Suprapubic drainage has been wonderfully improved lately. The method of Witzel, who establishes an oblique canal through the wall of the bladder by burying the

[1] Read before the Section on Genito-Urinary Surgery of the New York Academy of Medicine, December 11, 1894. The publication of this article has been purposely delayed. The author wanted to gather, if possible, some more personal experience with reference to the value of the operation in question. As no suitable cases, however, were encountered, in which this mode of procedure was applicable, the article is now published as read fifteen months ago.

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tube in the latter by an ingenious mode of stitching, makes a water-tight fistula from the beginning.[1] Prolonged suprapubic drainage will, however, only very exceptionally influence the size of the hypertrophied prostate gland. In almost every instance the patient has to wear the permanent catheter for the remaining part of his life. If he fails to be clean, when changing the tube, he will infect or reinfect his bladder and often also the generally dilated ureters also the pelvis of the kidneys, etc.

Therefore, if there be a way of reducing the size of the hypertrophied prostate and therewith re-establishing the normal outflow from the bladder, this way should be proposed after careful consideration of the given case.

That this is feasible by surgical interference only is self understood.[2]

Multiple are the operations proposed for attacking the swollen prostate.

Omitting consideration of prolonged drainage of the bladder with a very large tube through the median incision, with or without prostatotomy and overstretching of the prostatic urethra, a treatment which, in my estimation, can produce a passing favorable effect only, we can divide the operations devised for the purpose into two classes.

(1) Those in which the operation attacks the gland directly.

(*a*) Through the urethra.

A groove is burned into the gland with the help of a galvano-cautery porcelain burner (Bottini).

(*b*) By the sacral route, so-called lateral prostatectomy (Von Dittel).

[1] The operation was originally devised and performed for making a gastric fistula, Centralblatt für Chirurgie, 1891, p. 601. See also Willy Meyer, "Recent Methods of Gastrostomy for Stricture of the Œsophagus," American Journal of the Medical Sciences, October, 1894.

[2] Lately, English, of Vienna, studied the influence of the internal use of prostate-tablets (made from the gland of bullocks) on the hypertrophied prostate in nine patients (Wiener klinische Wochenschrift, 1896, No. 4, p. 66). The results have not yet been striking: treatment is continued. So far he saw less frequency of micturition, especially during daytime; smaller amount of sediment and albumen in the urine; less trouble in emptying the bladder. English, therefore, proposes to try this palliative treatment in patients who have yet little trouble and no residual urine.

(*c*) Through the suprapubic incision.

The gland, especially its middle lobe, is nipped away piecemeal with the rongeur forceps, or a wedge is cut out with scissors, or it is destroyed with Paquelin's cautery or the galvanocautery.

I omit perineal prostatectomy after the median incision, no doubt a most uncertain operation.

(2) Those operations in which we try to reduce the blood-supply of the swollen organ, and by that means cause atrophy. This can be done—

(*a*) Indirectly, by removing the testicles (Lannois, Ramm, Haynes, White).[1] This explanation of the curative influence of castration upon the swollen prostate gland—namely, the permanent removal of "the frequent, intermittent, active hyperæmia of the genital system, which is produced by the presence and secretion of the testicles by nervous reflex"—seems to me the most plausible one. I have mentioned it before.[2]

(*b*) Directly, by ligating the arteries which feed the prostate, —that is to say, simultaneous ligation of both internal iliac arteries (Bier's operation).[3]

It is this latter procedure which I am going briefly to consider in this communication from personal experience.

I take it for granted that the members of the section are acquainted with Bier's original article on this procedure, also, probably, with a brief article of mine which deals with the same subject, and appeared in the July issue of the ANNALS OF SURGERY, 1894.

On April 8, this year, I presented to the New York Surgical Society my first patient on whom I had performed the operation under discussion.

[1] Since December, 1894, the following substitutes have been proposed for this operation: unilateral orchidectomy; double ligature, and division, evulsion, subcutaneous incision of the vas deferens.

[2] ANNALS OF SURGERY, 1894, Vol. XX, p. 50.

[3] I was astonished, when reading Dr. White's thorough and most valuable article, "The Results of Double Castration in Hypertrophy of the Prostate," ANNALS OF SURGERY, July, 1895, to find, in his compilation of the various procedures of surgical treatment of the hypertrophied prostate up to 1895 (pp. 33–35), Bier's operation not even mentioned.

CASE I.—Man, aged fifty-five years, very fat, syphilitic, repeated gonorrhœic infections; absolute retention for six months; severe purulent catarrh and atony of the bladder; bilateral pyelitis. Operation October 5, 1893.

Left side; patient on his back. Incision five to six inches long, slightly convex outwardly from a point about two fingers below the tip of the eleventh rib to a point corresponding to the junction of the middle and outer third of Poupart's ligament. Internal iliac artery easily reached.

It was difficult, however, to expose it conveniently for splitting its sheath. The latter was done with a curved scalpel, which had been handed and used by mistake. Hæmorrhage, when surrounding the vessel with the aneurism needle. Division of the artery. Repeated trials securely to ligate the proximal cut end of the artery, and thus check a stubborn hæmorrhage coming from the same, failed. Clamp put on and left in place for safety's sake on proximal *and* distal end of the artery. Partial closure of wound at both ends by buried catgut sutures, layer by layer. Loose tamponade around forceps.

For the operation on the right side, patient was transferred upon a table permitting of Trendelenburg's posture. Incision down to the peritoneum, the patient being in horizontal position. When dividing the transversalis fascia the tightly-adherent, very thin peritoneum is injured in two spots. The very small wounds are sewed up at once. The wound having been sufficiently deepened to the parietal peritoneum in its entire length, the pelvis of the patient was raised to an angle of about seventy degrees. Access to the vessels thereby greatly facilitated. Yet, on account of the direct descent of the internal iliac into the true pelvis, after its branching off from the common in this case, the two ligatures could not be placed in proper distance in order to divide the artery between them. Two stout catgut threads were therefore tied around the internal iliac artery about one inch apart, trusting to the occlusion of the vessel by thrombus. No division of the artery. Wound closed entirely without drainage, stitching layer by layer. Primary union of wound on right side. Clamps removed on left side on the fifth day. On the twelfth day after the operation secondary arterial hæmorrhage. This came, as it was found at the subsequent operation, from a necrosed spot in the anterior wall of the *external* iliac artery caused by pressure of the forceps, which, as stated, had to be left in place. Ligating of the common iliac artery with silk close to the aorta, catgut having cut

the arterial wall repeatedly, and of the distal end of the external iliac artery with catgut. Loose tamponnade of the large wound. The ligature of the common iliac caused gangrene of the toes and a part of the metatarsus, which latter necessitated partial amputation of the forefoot. The large wound in the groin healed slowly by granulation.

(*a*) "Result of the operation," as far as the size of the prostate is concerned.

Six months after the operation the prostate on rectal palpation is almost normal in size. The length of the urethra, which was twenty-three and a half centimetres before the operation, has been reduced to twenty-one and a half centimetres.

(*b*) Functional result of the operation with reference to micturition.

Twelve hours after the operation the patient began to pass urine, two ounces, in a very fine stream, voluntarily, for the first time within six months. During the following fifteen days he frequently voided small quantities through the urethra, but also had to be catheterized. Eighteen days after the operation he commenced to pass larger amounts at a time with a satisfactory stream ; largest quantities on October 25, —550 cubic centimetres. He urinated every one to two hours. On October 26, three and a half weeks after the operation, 130 cubic centimetres having just been voided, the catheter withdrew 730 cubic centimetres of residual urine. Two days later 225 cubic centimetres were voluntarily passed at 1 A.M., 110 at 3 A.M., and at 5 A.M. the catheter withdrew a full quart of water. The muscular power of the bladder evidently was greatly reduced (atony). Yet continuous retention did never set in again, after the operation had been performed. As soon as the foot had healed, and the patient began to walk about, he regained better power over the bladder. On April 28, when leaving the hospital, patient was able to hold his urine two to four hours, and then pass ten to twelve ounces in a forcible stream. Still the bladder, when tested, always showed a residual urine of 300 to 750 cubic centimetres. I am convinced that atony was the only cause of the patient's inability to completely empty the viscus.

Three months ago the patient, who resides in the South, returned to New York and to the German Hospital. A wound on the outer side of his foot, firmly healed after he had left the city five months ago, had reopened. He had not used the catheter so far. He voided the urine about every two hours during the day and three to four

times during the night. The rest at the hospital acted unfavorably. The frequency of micturition increased, the quantity passed each time correspondingly decreased; retention again set in, when with slowly rising temperature an abscess formed in the left hypogastric region, caused by the silk ligature around the common iliac. The ligature was discharged with a large amount of pus. The wound is now, December 6, almost healed: prostate only very slightly enlarged. There is no doubt in my mind that the complications in this case have materially marred the result of the operation. Especially detrimental to a proper contraction of the atonic bladder wall must have been the suppuration in the retroperitoneal space; the abscess at its lower end presented a regular purulent pericystitis.

CASE II.—Man, aged sixty-three years; uneducated, deaf, very anæmic; hypertrophied prostate; absolute retention for three months as far as it could be ascertained. At time of admission bladder reaches the umbilicus. Mercier's elastic catheter refuses to enter the bladder. I succeeded with Trendelenburg's prostatic catheter sound, modified by myself. A slight hæmorrhage and some rise of temperature followed.

In view of the difficult catheterization and the social condition of the patient—he lived alone with his aged wife—I deemed it best not to establish a suprapubic fistula. Could I have had the chance to properly explain the pros and cons of the contemplated operation to the patient and his wife, I believe castration would have been my choice in this case. But under the circumstances the medico-legal aspect of this interference prevented me from doing so.

I therefore resorted to Bier's operation. On May 21, 1894, patient being in a slight Trendelenburg's posture of about 30 degrees, I cut down to the parietal peritoneum under aseptic precautions. It was apparent to everybody present how easily the peritoneum could be stripped from the transversalis fascia in this posture as soon as the latter had been incised by a small cut. Air was at once aspirated into the properitoneal space. Although there was not a particle of properitoneal fat, the finger of the left hand could be gently pushed forward under the fascia and the latter then divided on the same. I think this point of putting the patient into Trendelenburg's posture of about 30 degrees, when dividing the abdominal layers, is of importance. It certainly saves time and guards against injuring the peritoneum. If properly adhered to and carried out, it will prove of benefit in all operations where we have to enter the retroperitoneal space. As soon

as the peritoneum was exposed the pelvis was raised to an angle of about 75 degrees. Now all the retroperitoneal tissues, even those of the true pelvis, were easily accessible to my hands and eyes. The large vessels were not atheromatous as far as could be felt, but soft and elastic. As proposed in my former article,[1] I did not open the sheath for a greater distance in order to divide the artery between two catgut ligatures. I used silk and tied the artery only once after having opened its sheath. Not a drop of blood was lost during these manipulations. Sponging was not needed. The pelvis then was again lowered to the original angle (30 degrees), and the peritoneum allowed to drop back in its place. The wound was closed with catgut (continuous suture) layer by layer. Dressing with iodoform gauze and collodium. The same operation was at once done on the other side with equal satisfaction. There was not the slightest shock afterwards. Time of operation just one hour. Healing of the wounds ideal. No rise of temperature. On account of patient's deafness all inquiries must be made in writing. This made the after-treatment very annoying. On the third day after the operation the patient began to develop subnormal temperature without any apparent cause. This phenomenon increased in spite of suitable treatment. Patient died in a comatose condition seven days after the operation.

A very limited autopsy only was permitted. Primary union of the wounds; the internal iliac arteries did not show arterial sclerosis. However, one common showed an atheromatous, macroscopical deposit. Silk ligatures aseptically healed in place. On the one side no thrombus whatever in the artery on either side of the ligature. In the other one a thrombus three-quarters of an inch to an inch in length had formed in the afferent and efferent part of the vessel. It was adherent to the wall; it did not reach up to the bifurcation of the common.

Functional Result.—Patient voided his urine in a fine stream a number of times during the night following operation, also on the following days. Retention did not set in again.

CASE III.—Man, aged sixty-five years; syphilitic; prostate uniformly enlarged; its upper edge can be reached by rectal palpation; length of urethra, twenty-two and a half centimetres; retention for two weeks.

July 19, Bier's operation in the posture as described above.

[1] ANNALS OF SURGERY, 1894, Vol XX, p. 49.

Right Side.—The large vessels having been exposed, it was seen that the common and external iliac arteries were slightly atheromatous but pulsating. The internal iliac artery, of the size of an ordinary lead-pencil, appeared to be in a state of pronounced arterio-sclerosis. Its pulse could not be seen nor could it be felt. The silk ligature, after having been thrown around the vessel, did not break the calcareous shell of the latter's wall in spite of my steady, strong pull. Having my former experience, the hæmorrhage, in mind, I now, I fully confess it, did not venture to force my way through. The vessel thus remained untied. The ligature was left in place and the wound hermetically sealed.

Left Side.—Exactly the same condition; common and external iliac artery pulsating; internal iliac presenting a cord, which did not change its calibre whatsoever. In order not to have done the work entirely in vain, I this time ventured to pull on the silk ligature with sudden short jerks. To my delight the hard adventitia gave way; the artery was successfully tied. Hæmorrhage did not set in. Suture and dressing of the wound as usual.

I regret to-day that after this experience I did not at once reopen the wound on the right side and perform the same manœuvre in tying the vessel. The operation would then undoubtedly have been successful on both sides, and the patient most probably better off than he is to-day. As it were, only the left internal iliac was tied.

I wish to emphasize here that the internal iliac arteries were by no means thrombosed. This was shown by the ligature on the left side, which deeply constricted the vessel. There merely was such an exceptionally marked arterio-sclerosis that the pulse as such had ceased. The calcareous shell in its tight grasp around the vessel was stronger than the heart's action of the patient. Time of operation fifty-five minutes. The wounds healed kindly without the slightest reaction. Patient was up and about on the fourteenth day after the operation.

The functional result of the operation, however, was *nil.* Regular catheterization was required. When after four weeks no improvement with reference to micturition had taken place, I gave in to the patient's earnest demands, and established a suprapubic fistula according to Witzel's method. It proved to be water-tight from the beginning, and functionates very satisfactorily up to date. Patient removes the stopper on catheter every three or four hours and empties

the viscus. Since the end of September a small quantity of urine can be voided through the urethra. On October 29 he passed in my presence twenty-five cubic centimetres through the normal channel and per catheter 125 cubic centimetres. (Proportion = 1 : 5.)[1]

But what appears to be, in spite of the functional failure of the operation, of the greatest interest and, I believe, of importance, is the fact that on rectal examination the left lobe of the prostate is almost one-third the size of the right one. On the left side the internal iliac artery had been successfully ligated. This phenomenon—the decrease in size—was already well marked four weeks after the first operation; it is still more pronounced to-day. It proves that the ligation of the internal iliac artery really caused atrophy of the respective side of the prostate gland. Under the 9th of December he writes me from a town in Pennsylvania, where he lives, that he now passes "very much water through the penis."

In reviewing the many questions which present themselves as a matter of fact, on considering this new and fascinating operation, I shall pick out a few only, trusting that the discussion may bring out yet others.

(1) Does simultaneous ligation of both internal iliac arteries deserve a place among the operations for the radical cure of the hypertrophied prostate gland?

The result of my three cases, just related, with reference to the radical cure of the trouble, I fully admit, is far from being brilliant. One patient was only partially improved; one died of unknown cause, just seven days after the operation; the third has not been improved at all. However, in order to be just, it should not be forgotten that the first case was a complicated one from the beginning, the secondary hæmorrhage, the long confinement to bed on account of the nutritive changes in the foot following ligation of the common iliac, recurring within the last weeks, the formation of the retroperitoneal abscess due to the fact that the

[1] October 29: the vesical fistula is absolutely water-tight. Now nine ounces can be filled into the bladder, the patient standing, and not a drop escapes along-side the catheter. The bladder when being stretched to this extent empties itself through the urethra at short intervals. Two ounces can be held in the bladder when the catheter is removed and there is no leakage from the fistula. If more water be poured in it runs out.

silk ligature had to be left behind in the depth of a suppurating wound, all these annoying accidents naturally must interfere with the functional result. Yet I believe that after a while it will be found that the operation has not been done in vain. If in this case somebody wants to find fault, it should be with the operator, but not with the method. Whether in my second patient the operation was the immediate cause of death I should not venture to decide. I for my part believe it was not. Perhaps the narcosis or the catheterization before the operations had more to do with the fatal issue than the operation itself.

In my third case the artery was successfully tied on one side only. However, the case is of the greatest importance for properly estimating the value of the operation. There had been a uniform enlargement of the entire gland before the operation. Four weeks later a marked palpable atrophy of the left lateral lobe has taken place already, whereas the right of course still presented its original size. This phenomenon becomes gradually more pronounced. This fact gives, in my estimation, the ligation of the internal iliac artery its firm place among the radical operations for the relief of this trouble. It also proves that even in marked arterio-sclerosis of the respective vessels, ligature is feasible and effective. It will be of weight to add here that in two of Bier's cases a very marked decrease in the size of the prostate could be demonstrated a couple of weeks after the operation.

(2) Can we apprehend that the reduction in the size of the gland will be permanent?

I would answer, unhesitatingly, "Yes." The two internal iliac arteries alone feed the gland. There are, of course, capillary anastomoses with other arteries, so as to prevent gangrene of the respective parts. But this communication with other arteries through the capiliary system will never throw such an amount of blood into the gland as to cause again swelling of the meanwhile atrophied organ. To a doubtful mind further observation of cases thus operated upon has to prove this assumption.

(3) Is the operation a difficult and serious one?

Answer.—The operation is not at all a difficult one if per-

formed in the various angles of Trendelenburg's posture, as described above. It can be well performed on both sides inside of one hour. If we use silk instead of catgut, one ligature will suffice to a permanent occlusion of the vessel. The artery need not be cut between the two ligatures. Secondary hæmorrhage is thus excluded. If left in an aseptic field, the silk ligature, being aseptic itself, will no doubt be encapsulated, without giving rise to an abscess in the future. The wound should never be drained but closed entirely by buried sutures (continuous), stitching layer by layer. In order to facilitate this part of the operation, I found it of advantage to make the wound slightly funnel-shaped, the two ends of the incisions in the different layers of the abdominal wall can then be well seen. By thus sealing the wound, a ventral hernia will be avoided.

(4) Shall the operation be an extraperitoneal or a transperitoneal one?

I should decidedly answer, "Extraperitoneal," in spite of doubling the incision. It must be remembered that in almost all the cases which will, perhaps, be subjected to this kind of operation, we have to deal with older, often very stout, subjects with fatty degeneration of the heart, etc., who bear intraperitoneal interference not as well as younger persons.

(5) In which cases is the operation advisable?

I believe the operation is indicated in all cases of hypertrophy of the prostate where absolute retention is of recent date and marked dilatation with atony of the bladder has not yet set in, and where we seem to be justified to strive for a radical cure. In such cases the operation certainly stands the comparison with biting away or cutting out portions of the prostate after suprapubic incision, for it leaves the parts in their normal anatomical relation and removes the obstruction at the neck of the bladder in the simplest way: by producing progressive atrophy of the organ which causes the obstruction. It also keeps the generally older patients in bed for only ten or fourteen days, the wounds healing by primary union under the first dressing. The wounds which open bladder or urethra for attempting a radical cure of the hypertrophied prostate do *not* heal *per primam*, and keep the

patients in bed for a number of weeks. Hypostatic pneumonia is the threatening foe.

In view of the brilliant functional results after castration, also after resection or division of the vas deferens, I should say to-day (time of publication), "Bier's operation seems to be indicated only in patients below the fiftieth to sixtieth year with absolute retention of urine due to the hypertrophied prostate, who are tired of catheter-life, but who refuse to lose one or both testicles, and also are unwilling to become sterile, in spite of the probability of an otherwise undisturbed power of sexual intercourse." The surgeon may well, at times, be confronted with such a case.

If a patient with hypertrophy of the prostate is satisfied to have his testicles removed (or vasa deferentia resected), or, if not that, to wear the catheter in a suprapubic, though watertight, fistula for the remainder of his life, I should, of course, not persuade him to have Bier's operation done on him, so much the more not as there are, on account of the relative youth of the operation, no observations yet at our disposal which prove that the atrophy will be a permanent one.

In conclusion, I should say that the operation seems to me to fully deserve a fair trial by surgeons in general.