A NEW COMBINED ELECTRO-CAUTERY INCISOR FOR THE BOTTINI OPERATION FOR PROSTATIC OBSTRUCTION.

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Although the electro-cautery operation was brought out by Bottini as far back as 1876, it was not generally adopted until 1897, when Freudenberg presented to the profession a greatly improved instrument, and followed it up by numerous convincing articles. During the past four years this operation has been performed very extensively, and we are now in a position to stop a moment, look over our results, and discuss the shortcomings of the operation, as well as its merits.

Freudenberg's large collection of operated cases probably shows very accurately the value of the procedure. The statistics are as follows: 752 cases, in which the result was good in 86½ per cent., a failure in 7½ per cent., and the mortality between 4 and 6 per cent.

These figures, if correct, undoubtedly show much better results than can be claimed for any other operative procedure. Castration, while peculiarly effective in a certain class of cases, has been woefully unsatisfactory as a routine procedure, and has justly been relegated to the list of operations historically interesting, but practically valueless.

Prostatectomy thoroughly performed is undoubtedly an operation of great value. There is no question that the statistics as to the value of this operation are entirely misleading, for many reasons; principally because in most of the recorded cases (and in all until recently) the operation was entirely inadequate—merely a nipping off of the most evident intravesical projections, leaving the equally important parts of compression in the deep urethra untouched. There is no question, however, that a thorough removal of the entire gland, which can generally be easily accomplished by enucleation with the finger, is a very successful operation, and entirely satisfactory when perfectly accomplished.

There are, however, several varieties of prostate which are unsuitable for this operation, principally the small and the sclerotic varieties. This, however, is not the principal objection, but the fact that in the majority of instances we are confronted with patients too old and too feeble to safely undergo the shock of a satisfactory prostatectomy. It is for just this class of cases that the Bottini operation has proved such a blessing, and has achieved really wonderful results. On account of the success of the cautery operations in the otherwise hopeless cases, it has become more and more the question whether it should not become the method of choice in all manner of cases. Since there are, however, a certain number of failures (10 per cent. or more) and a certain mortality (between 5 and 8 per cent.) shown by the Bottini operation, it still remains questionable whether it should replace prostatectomy, especially in younger patients. To settle this point more extended investigation is necessary. It also behooves us to study the causes of failure and fatality in the Bottini operation, with a view of finding means of obviating both as far as possible.

Among the causes of death besides uremia, shock, sepsis, etc. (presumably unavoidable), we find recorded several not unavoidable reasons, principally from improperly placed or too lengthy incisions. In the first

category are deaths from the cautery blade burning its way into the rectum, due, as has been shown by Freudenberg, to the fact that the beak of the instrument became caught in a postretal pouch, which is separated by only a short space from the rectum. In the same class are those fatal cases in which the entirely useless anterior cut was made and penetrated (as might have been expected) into the space of Retzius. In the second category are a number of cases in which the operator has rashly made his incisions too long, resulting in the rupture of the urethra in front of the prostate, and sometimes fatal hemorrhage from division of perineal vessels.

The statement of certain writers that incisions of 4.5, 5 or 6 cm. in length were often necessary to remove the obstruction is absolutely without pathological substantiation, and undoubtedly liable to lead to a great many serious blunders in the profession. Very rarely, even in the very largest hypertrophies, should an incision over 3.5 or 4 cm. be made, first because it is unnecessary, and secondly because it is dangerous. Deaths from any of the causes outlined above are preventable, and should in the future be eliminated from the statistics.

In Freudenberg's statistics, after excluding the fatal cases (4.2 per cent.), we find 92 per cent. improved, 55 per cent. cured, 37 per cent. definitely improved, and 8 per cent. failures. Why should there not be a greater uniformity of results? Is the operative technique, or the instrument at fault? Turning to the instrument, we find the one of Freudenberg much preferable to that of Bottini, as has been very frequently pointed out. But there are several very evident weaknesses in even the former instrument. In the first place, since there is the greatest difference as to size, shape and condition among hypertrophied prostates, it is unreasonable to expect one single cautery blade to be suitable for all. An incision which is sufficiently deep for a medium-sized hypertrophy may be wholly inadequate for a very large one, and positively dangerous for the small fibroid forms. Then, again, one lobe is often very greatly enlarged while another is only slightly so. Are we, then, to give each the same depth of cautery incision? I have in my collection of autopsy specimens several prostates with small but very obstructive middle lobe enlargements, where the ordinary Freudenberg and Bottini instruments would have penetrated beyond the capsule and perhaps into the rectum.

It is very evident, then, that an instrument with several easily interchangeable blades of graded sizes would be a decided improvement.

There are two other defects in Freudenberg's apparatus which, while apparently trivial, are of considerable importance. The first is in the shape of the beak of the instrument as now constructed. The traction necessary to hold the beak up against the prostate during an operation will often pull it into the urethra. This is due to the fact that the beak meets the shaft at such a wide angle (or at such a slope—see Fig. 7) that even moderate traction causes it to ride over a median bar (for example) and slip into the prostatic urethra. The dangers of this accident are not small. Indeed, it has occurred several times, and has been responsible for several deaths, the cause being division of the membranous urethra, extravasation, hemorrhage, etc. In order to be certain that the beak of the instrument is against the prostate, and has not slipped into the urethra, Freudenberg has wisely advised that a finger be inserted into the rectum to determine its location before an incision is begun.

I have carefully followed this practice for the past two years, and have thus prevented several accidents, for in numerous instances have I found that a little steady traction (as in an operation) would draw the beak into the urethra. But this safeguard is not always sufficiently accurate, for while it is comparatively easy to feel the tip of the instrument turned downward toward the trigone, one can not often feel the beak with sufficient certainty when the instrument is turned to make a lateral cut, as one of my own cases demonstrated to my sorrow. (Freudenberg's instrument was being used.) The forefinger of the right hand was inserted into the rectum, and the tip of the beak definitely located to be in the bladder. The rotation was made for a lateral cut, and with the finger still in the rectum

cal construction and easily remediable by bringing broader areas into contact, was one which frequently led to great trouble both on account of the heating of the handle and the insufficiency of the electrical current which reached the cautery knife.

Recognizing more and more during two years' work with Freudenberg's instrument the drawbacks referred to, and especially, feeling the need of blades of different size, the writer finally consulted the Kny-Scheerer Co. of New York,¹ during April, 1901, with reference to the construction of an instrument which would, if possible, fill all the requirements. After considerable experimentation we have produced, we believe, a satisfactory instrument, the construction of which is thoroughly explained by the accompanying cuts.

Figure 1.

traction put upon the instrument to draw the beak up snugly against the prostate. The beak was not felt to slip into the urethra, but before beginning the cautery incision another careful examination with the finger (which was kept in the rectum during the entire operation) was made and did not reveal any slipping of the beak. Despite all these precautions (which happened to be unusually carefully taken in this case) an incision of 3.5 cm. was followed by a gush of blood from the

Figure 2.

meatus, and a perineal section done under cocaine revealed a ruptured membranous urethra, and extravasated blood behind the triangular ligament. A timely operation saved his life, but it brought very forcibly to my mind the need of a beak which would not slip into the urethra, one more nearly at right angles to the shaft.

The other defect, at times quite disagreeable, was that the handle of the instrument would often become so greatly heated as to burn the hand of the operator, and sometimes to prevent his turning the contact screw to break the electrical current. Examination soon showed that this was due to bad contact. This connection was made by a flat surface coming against a cylinder, resulting in a linear contact, insufficient to conduct the high current necessary to heat the instrument without itself getting hot. This defect, while merely one of mechani-

As seen in the illustrations, the form of Freudenberg's instrument is adhered to (Fig. 1), the only changes being in its having four interchangeable blades, a beak of different angle, a connecting handle with more extensive contact surfaces, and a few minor changes in construction. By a very simple device, the simple elevation of a sliding bar on the rotary wheel, one blade may be removed and another inserted (Figs. 2 and 3). The sliding bar working on a spring holds the rod contain-

Figure 3.

ing a blade firmly attached to the screw mechanism by engaging the circular groove near its outer end (Fig. 4). We have had four blades constructed as shown in Fig. 5. The smallest having an elevation of .8 cm., the second 1.2 cm., the third 1.7 cm., and the fourth 2.1 cm.

Figure 4.

Blade No. 3 corresponds to the one usually found in Freudenberg's instrument, and is the one most generally used, while No. 2 is useful in small hypertrophies, and No. 4 for the very large. Blade No. 1 (the smallest) was constructed mainly to complete the set, and with-

1. My thanks are due to Mr. Charles Farner, mechanician, for valuable help.

out any idea of much practical value. I have been surprised, however, to find it very useful in several cases, which will be given in detail further on.

The change in the shape of the beak has been of very great comfort. The new beak (Fig. 6) can not possibly slip by the prostatic orifice into the urethra with all the outward traction which may be put upon the instrument during the operation, whereas with the Freudenberg instrument (Fig. 7) one must be constantly on his guard lest this occur. The right-angled character of the beak does not make it any harder to introduce, in fact it seems to ride over a high median bar with greater ease, having more the shape of a prostatic catheter.

The changes made in the attachment handle of the conducting cable, as shown in the diagrams, consists merely in bringing larger surfaces in closer contact. These have completely done away with the disagreeable overheating of the contact screw, which constantly occurred before.

Figure 5.

During the past five months I have used this instrument on sixteen cases, and have amply proved it to be practical, and one, I think, that has overcome many of the defects to be found in Freudenberg's instrument.

We will give in abstract a few illustrative cases, but before doing so it may be well to state the measures we take to determine before operation the size, shape and character of the prostatic enlargement, and consequent selection of the blade to be used, and the length of the cuts.

Besides a systematic general physical examination,

Figure 6.

noting particularly the condition of the arteries, a very careful local examination is made as follows: *Rectal examination*, noting: the size, shape and consistence of the prostate; the relative enlargement of the two lobes, the thickness of the prostate as revealed by the finger in the rectum, and a sound in the urethra (determining in this way the thickness of the hypertrophy in the median portion); the adnexa of the prostate, vesicles, glands, rectal mucosa, etc. *Bladder examination*: 1, with catheter, noting the location, depth and character of prostatic obstruction, with residual urine, the capacity of the bladder and its tonicity; 2, with the cystoscope, noting: (a) the size, shape, location and character of intravesical prostatic hypertrophy (especially as to the condition of the median portion, whether a bar or a rounded or pedunculated lobe, and its elevation

above the trigone (bas fond); the relative enlargement of the lateral lobes, etc.; (b) the condition of the bladder wall, as to trabeculation, pouch formation, diverticula, inflammation, ulcers, calculi, etc. 3. With searchers (in absence of a cystoscope), which by rotary movements may determine quite accurately the presence of a middle lobe; and the relative size of the lateral lobes, as also the presence of trabeculations, pouches, etc. *Urinary examination*; especially with reference to the character of the infection, besides the ordinary tests.

Having then determined as accurately as possible the conditions present, a plan of action is mapped out: as to whether a Bottini operation or a prostatectomy be preferable, and if the former, what blade should be chosen, in what directions should cuts be made, and what should be their length.

The following cases, including several forms of hypertrophy, give in detail the operation found applicable to

each and the length of blade chosen. They demonstrate, I think, the *raison d'être* of the new combined cautery incisor, and its practical value. The work with this instrument being of recent date unfortunately prevents our showing the ultimate result obtainable, as several months must generally elapse before the full effects of the operation are secured.

CASE 1.—J. N. M., aged 71, had been suffering with urinary trouble for 4 or 5 years. During this time urination became steadily more difficult and more frequent until he now voids every one and one-half hours, night and day.

Examination showed slight, but definite, enlargement of the prostate, which was much harder than normal, but not nodular. The cystoscope showed a small median transverse bar and a

Figure 7.

slight intravesical projection from the lateral lobes, but there was really very slight intravesical enlargement of the prostate. With a finger in the rectum a very slight increase in thickness over the normal was felt between it and the instrument in the prostatic urethra. The bladder, however, showed very definite effects of obstruction, viz., considerable trabeculation and pouch formation, a residual urine of 90 c.c., and a capacity of only 250 c.c. *Remark*: We evidently had to deal with the so-called small sclerotic prostate, furnishing moderate but definite obstruction and a bladder hypertrophied and somewhat contracted. The very slight enlargement and the small amount of prostatic tissue beneath the urethra made us afraid to use Freudenberg's instrument. A thorough prostatectomy would have been impossible, and as the case appeared to be in need of the Bottini operation, we persuaded the patient to wait until the arrival of our new incisor, so that we might use a smaller blade.

On May 31, 1901, a Bottini operation was performed with blade No. 2 of our instrument, which blade seemed to suit the case exactly. Three cuts were made: one posterior, 2 cm. long; and two lateral, the right 2.5 cm., the left 3 cm., at right angles to the posterior (see diagram). The instrument was used at a high heat; time, about 1 cm. to the minute; the operation done under control of a finger in the rectum. It was evident that a larger blade would probably have cut through the posterior capsule of the prostate.

The convalescence of the patient was as usual: difficult urination for the first few days and after that a gradual improvement. The ultimate result was a complete relief of prostatic obstruction, micturition free, residual urine nil.

CASE 2.—F. E. B., aged 34, presented himself on June 30, 1901, complaining of bladder trouble. The patient had had nocturnal incontinence of urine up to the age of 14, and after that he always voided urine much too often. Seven years ago cystitis developed, and a calculus was discovered and removed by suprapubic cystotomy. The fistula did not heal till eight months afterward, and cystitis has persisted ever since. On admission he passed his urine about 6 times a day, generally with pain referred to the neck of the bladder.

Examination.—Patient was a rather neurotic young man. The urine was cloudy, acid and contained phosphates, pus cells and bacilli. The prostate examined by rectum was slightly enlarged, considerably indurated at the upper end of each lobe. The seminal vesicles were both indurated and closely bound to the upper end of the prostate. The fluid expressed from the prostate and the vesicles by massage shows pus cells. A rubber catheter was passed into the bladder, but met some constriction of the prostatic orifice. The patient had just voided, but a residual urine of 220 c.c. was found. The bladder capacity was 500 c.c. The cystoscope showed a marked trabeculation of the bladder wall, a considerable thickening of the interureteral bar, and behind it a deep pouch in which was a considerable collection of sand and small calculi, white in color.

Examination of the prostatic orifice revealed a definite thickening of the median portion in the form of a transverse bar, and behind it a fairly deep bas fond. There was no intravesical enlargement of the lateral lobes, but the entire prostatic orifice was irregular and showed numerous granulations.

Remark.—Although the patient was a young man, he had unquestionably an enlargement of the median portion of the prostate, which was causing considerable obstruction to urination, as shown by the trabeculation and pouch formations in the bladder and the presence of 220 c.c. residual urine. The prostate was undoubtedly chronically inflamed, but the enlargement, while probably inflammatory in origin, was unquestionably causing trouble, and in our opinion demanded a Bottini operation. The prostate, however, was so small that it was out of the question to use the ordinary Freudenberg blade, so that patient was asked to wait until our instrument could be completed. In the meantime he was put upon bladder irrigations and given urotropin internally.

On Sept. 13, 1901, examination showed considerable improvement in his cystitis, but the urine was still purulent. There was still 220 c.c. of residual urine present. Cystoscopic examination showed an improvement in the inflammation of the mucous membrane, and much to our surprise the considerable mass of small calculi which was previously found had disappeared. A very careful search was made with the cystoscope, but no calculous deposit could be found anywhere. There was still present the definite transverse median bar with a pouch behind it, and the bladder wall was still trabeculated. Accordingly the Bottini operation was performed, using blade No. 1 and making a single posterior cut through the median bar 2 cm. in length. There was some hemorrhage following this cut. After the operation the patient experienced considerable discomfort for a few days, but since then his condition has continued to improve.

It was intended to make three short cuts (see diagram) through the median bar with the small blade, but a burning out of some of the electrical connections in the hospital after the first cut had been made prevented the others being made.

Now two months have elapsed since the operation, his condition is much improved and the residual has dropped to 150 c.c. Unless this disappears soon we shall make the two other cuts through the median bar as originally intended.

CASE 3.—G. T. H., age 73, admitted Sept. 9, 1901, complaining of prostatic hypertrophy and catheterism. Urinary difficulty began soon after the age of 50, but did not get severe until about 1 year ago, when micturition became quite difficult, and the patient had to get up two or three times at night to urinate. About 10 months ago he had to resort to a catheter, which he has used ever since, being unable to void any urine naturally. He has had several attacks of inflammation of the bladder, and both testicles have been the seat of abscesses during the last 6 months. He now catheterizes himself regularly three times a day, and suffers very little discomfort, but the passage of the instrument is often quite difficult.

Examination.—Strong, healthy-looking man, arteries slightly thickened, small nodules in both epididymes. Prostate markedly enlarged, about the size of a large orange, left lobe much larger than the right. The median furrow is deflected towards the right. The upper end of the prostate is hard to reach. The consistence is smooth, soft, not tender. Urine is acid 1014, not very cloudy; microscopically, numerous pus cells and bacilli.

Cystoscopic examination showed a very marked intravesical enlargement of the left lateral lobe, considerable enlargement of the median bar, and a lesser enlargement of the right lateral lobe, with a small rounded mass between the two lateral lobes in front. There was a very deep bas fond behind the prostate, and the bladder was very much trabeculated and inflamed. The blade of the Freudenberg instrument would have been perfectly suitable for this case.

A Bottini operation was done under chloroform, blade No. 3 being chosen. This blade is of the same size as Freudenberg's.

The posterior cut was 3.25 cm. long, right lateral cut 3.25 cm. long, left lateral cut 3.5 cm. long (see diagram). The operation was done under the control of the finger in the rectum. Hemorrhage moderate and patient in splendid condition at end of operation; 1000 c.c. submammary infusion of salt solution was given as a prophylactic against uremia.

The patient made a rapid convalescence, required catheterization only three or four times after the operation, and very soon began to void urine naturally. His condition since then has steadily improved, until now the interval between urinations is every two hours during the day and longer at night. His general health has improved wonderfully, he has gained 12 pounds in two months, and will apparently get a good result.

CASE 4.—E. W. S., age 63, admitted Sept. 13, 1901, complaining of enlarged prostate catheterism. Urinary trouble began four years before with difficulty and frequency of urination, which at times had become so bad he had to use a catheter. For the past three months has had to use catheter three times a day, and has not been able to pass any urine naturally. For the last four years the patient has suffered from diabetes mellitus, which has been somewhat controlled by dieting.

Examination.—Large, healthy-looking man. The rectal examination showed a very large hypertrophied prostate, left lobe apparently larger than the right, consistence firm, but not nodular. Urine removed by catheter was acid, slightly cloudy, contained both albumin and sugar, and under the microscope showed pus cells and bacilli. After six days of diabetic diet there was barely a trace of it to be found. A rubber catheter entered the bladder with difficulty. The bladder tonicity was

only moderately good, and the capacity about 500 c.c. The cystoscope showed a marked intravesical enlargement of the left lateral lobe, which projected into the bladder as a large rounded tumor, a moderate enlargement of the median portion, and a very slight enlargement of the right lateral lobe. Behind the prostate was a very deep bas fond in which the ureters could not be seen. The bladder was considerably trabeculated and inflamed.

September 19, 1901, Bottini operation was made, under cocain and morphia. On account of the considerable size of the prostate, blade No. 3 was used, and as the left lateral lobe was much larger than the right, a much longer incision was made on that side. The posterior median cut was 3.5 cm. long, the left lateral 3.5 cm., and the right lateral 2.5 cm. (see diagram). Time taken, 1 cm. to 1 minute. Instrument was used at a white heat. There was very little hemorrhage following operation, and very little pain caused, the anesthetic being very efficient. Immediately after the operation the patient voided urine naturally, and has never been catheterized since. For the first few days there was considerable vesical spasm.

On Oct. 2, 1901, thirteen days after the operation, the following note was made: Patient now passes his urine about every two hours in a large stream and without pain. There is no dribbling; residual urine 140 c.c.; urine, acid, quite purulent, pus cells and cocci present. Sugar is still present in considerable amount.

In a letter dated Nov. 5, 1901, the patient reports that he had not used a catheter since operation, that he urinates once during night and four times during the day, that his residual urine is less than 50 c.c., that micturition is free, and the vesical inflammation greatly improved.

CASE 5.—J. P. A., age 71, was referred to me by Dr. Finney on Sept. 28, 1901. The patient gave a very long urinary history, which began with difficulty in micturition 11 years ago, when a stone was found and removed by a surgeon through a suprapubic opening. For two years following this he had a suprapubic fistula, which was finally cured by his taking up catheter life in 1895. Castration was then done by another surgeon, and several weeks later another suprapubic to remove another stone. During the next year the stones reformed and were crushed by a third surgeon. After that he was free from pain for a while, but had to use a catheter. Stones soon appeared again, and during the next twelve months four separate litholapaxies were done. In 1897 still another surgeon did a suprapubic operation and removed stones, and at the same time removed by means of the rongeur forceps a moderate-sized median lobe which was still present (despite the castration). After this operation, for the first time the patient was able to go without the use of the catheter, but micturition has been too frequent.

Status Presens.—Patient on admission complained of irritation of the bladder. He urinated every two hours during the day and twice during the night, but had no pain or discomfort during urination. Rectal examination: The outlines of the prostate were easily made out, and a little larger than normal. In the median line the prostate presented a slight but distinctly abnormal rounded mass. The lateral lobes were apparently much atrophied and sloped away from the central mass, which replaced the median groove and notch. The whole diameter of the prostate was half as large again as normal, the consistence of the lateral lobes soft and flabby. Urine was acid, 1022, containing pus cells, bacilli and cocci.

Cystoscopic examination: Rubber catheter met an obstruction about 7 inches from the meatus, but a silk one was passed with ease. Patient had just voided, but 320 c.c. of residual urine was found in the bladder. Cystoscope showed two fairly large stones in a pouch behind a considerably hypertrophied interureteral bar. The mucous membrane of the bladder was much inflamed, but not markedly trabeculated, and there were no ulcers to be seen. Examination of the prostatic orifice

showed a small but definite transverse median bar behind which there was a shallow bas fond. There was no intravesical enlargement of the lateral lobes to be seen, and there were no sulci between the lateral lobes above, nor between them and the median bar.

Remark.—The castration had removed the enlargements of the lateral lobes, but the median lobe persisted, after that. The removal of this through a suprapubic opening allowed the patient to urinate without the use of a catheter, but there still remained a definite transverse bar at the median portion (the base of the middle lobe) which continued to act as an obstruction, 320 c.c. of urine remaining in the bladder after micturition. It was evident that after litholapaxy a Bottini operation should be done to remove this obstructing bar, but the amount of tissue felt beneath the instrument in the urethra was so slight that it was decided to use the smallest blade of the incisor.

On Oct. 17, 1901, under cocain and morphia, litholapaxy was done, and followed by a Bottini operation. The crushing and evacuation of the stone was easily accomplished after placing the patient in the Trendelenburg position. The largest stone was one inch in diameter. All fragments were sufficiently crushed at the first introduction of the lithotrite, to be removed by evacuation afterward. After all debris had been removed, the bladder was washed clean, cocain again inserted into the bladder and urethra, washed out after three minutes, and a Bottini operation performed. For this purpose blade No. 1, which in this case was 8 mm. high, was used. Three cuts were

made through the median bar, each 1.5 cm. long, one cut being in the median line posteriorly, the other two cuts were made at angles of about 50 degrees to the median cut (see diagram). The operation was done with the forefinger of the right hand in the rectum pushing the prostatic bar into the angle of the beak of the instrument. This was done because it was feared that the length of the beak in the bladder would so depress the trigone and bar of the prostate that the knife would not penetrate it for its full depth.

The patient stood the operation well; anesthesia quite good; very little hemorrhage. He was unable to void his urine afterward, and had to be catheterized three times in the next 24 hours. When seen a week after the operation he was voiding urine quite freely and the residual had dropped from 320 to 150 c.c. and he was already feeling greatly improved. He attended his office on the fourth day after the operation.

Condition one month after operation: Steady improvement, residual now 125 c.c., sometimes more. Bladder is still large and weak in tone, but condition improving.

November 21, 1901, bladder capacity is 400 c.c., tonicity considerably improved; residual, however, 175 c.c.

CASE 6.—J. A. B., age 70, admitted Oct. 18, 1901, complaining of enlarged prostate and catheterism. His urinary trouble began ten years before with difficulty and frequency, which soon became so aggravated that he began the use of a catheter, which he has used continuously up to this time. For the past seven years he had been unable to void any urine naturally, and when admitted passed a catheter about every two hours during the day and about every three hours during the night, using a very large rubber catheter. Examination showed a very large, hard prostate and a considerable dilatation and lengthening of the urethra just in front of the prostate. The cystoscope revealed a moderate-sized stone in a pouch behind the prostate, and a very much inflamed and trabeculated bladder. There was present a considerable intravesical outgrowth of the prostate, which appeared as a collar-shaped enlargement, both lobes and the median portion being hypertrophied, the left projecting farthest into the bladder. Behind the median bar was a deep pouch. The bladder capacity was rather small. The urine, which was obtained always by catheter, contained many red blood-corpuscles, pus cells and bacilli, and was acid in reaction.

On Oct. 23, 1901, litholapaxy was done under chloroform. The operation was begun under cocain, but chloroform had to be used on account of pain. The largest diameter of stone

grasped by the instrument was 2 cm. The crushing and evacuation were both difficult on account of the great hemorrhage caused and the trabeculated condition of the bladder. Patient stood the operation well and was very much more comfortable afterwards, but still required catheterization.

On Oct. 26, 1901, a Bottini operation was done under cocain, 4 per cent., and a hypodermic of $\frac{1}{4}$ gr. of morphia. Blade No. 3 was chosen as the proper size for all of the cuts, of which three were made, one posterior through the median bar 2.75 cm.

long, a right lateral 2.5 cm. long, left lateral 3 cm. (see diagram). The duration of cuts was about 1 cm. to 1 min. and a high heat was used on the blade.

There was very little hemorrhage following the operation, and immediately afterward the patient voided urine.

Patient made a rapid convalescence, voiding his urine freely immediately after the operation and never after required catheterization, although he had led a catheter life for seven years.

On Nov. 7, 1901, 12 days after the operation, he reported that he was rapidly improving, that he passed his urine once every three hours without any straining and was free from pain. A catheter passed four weeks after operation finds no residual urine, and the cystitis considerably improved.

CASE 7.—J. M. D., age 73, admitted October, 1901, complaining of hypertrophy of the prostate and catheterism. Urinary trouble began about seven years ago with difficulty of urination. A little later retention of urine became complete. He then began to use a catheter, and has had to use it ever since, never being able to pass any urine. He has remained in fairly good health, has had very little inflammation of the bladder, and now has to pass a catheter about every four hours, twice during night. Increasing difficulty in introducing the instrument of late has driven him to the operation.

Examination.—Large, healthy-looking man, arteries slightly thickened, heart and lungs apparently normal. Small hydrocele of right side. Prostate very much enlarged, about the size of a moderate-sized orange, lateral lobes about equally enlarged, contour round, smooth, consistence hard. Seminal vesicles indurated, but not nodular. A rubber catheter met obstruction $9\frac{1}{2}$ inches from meatus. The bladder capacity was 400 c.c., tonicity rather poor. Urine acid, slightly cloudy, and contained pus cells and bacilli. The cystoscope showed a very markedly trabeculated bladder with numerous small pouches. Behind the prostate was a very deep bas fond in which the ureters could not be seen. There was considerable inflammation of the mucous membrane. Both lateral lobes and the median portion were very much enlarged, presenting a large collar-shaped intravesical hypertrophy around the urethral orifice, which projected well out into the bladder cavity. Growing from the upper portion of the lateral lobes, especially the left, were numerous small villi, which floated in the fluid but caused no hemorrhage. There was no ulceration of the surface of the prostate.

October 28, 1901. Bottini operation, cocain and morphia. Blade No. 3 was chosen. Four cuts were made, one in the median line posteriorly across the median bar 3.25 cm. long, one right lateral cut 3 cm. long. Through the left lobe two cuts were made, one lower oblique at an angle of about 75 degrees to the median posterior cut 3.25 cm. long, and an upper oblique cut at an angle of about 130 degrees to the posterior median cut also 3.25 cm. long. The direction of these cuts is best shown in the accompanying diagram. Patient stood operation well. There was very little hemorrhage, and anesthesia was quite good. Time occupied was about 1 cm. to 1 min. For the

first 24 hours after operation the patient voided urine with considerable ease, after that it became more difficult, the bladder becoming irritable and catheter had to be used for six days. After that patient began to void without the use of a catheter.

Condition three weeks after operation: Patient voids about every hour, but sometimes two and one-half hours elapse between urinations. The vesical inflammation is improving, and its capacity increasing gradually. The catheter on which he depended for seven years has not had to be used for two weeks.

On November 21, 230 c.c. of urine was voided at a time with an interval of two and a half hours. Urination was fairly free, stream large. Residual urine was 10 c.c.

December 13, patient voids urine about six times in 24 hours, in amounts varying from 150 to 210 c.c.

CASE 8.—S. M. A., age 56, admitted Oct. 28, 1901, complaining of frequency of urination. His prostatic trouble began two and a half years before with difficulty of urination. Since then micturition had become gradually more frequent and difficult, and one year before he had begun the occasional use of a catheter. On admission he complained of a dull pain at the beginning of urination, which occurred every two or three hours during night and day. He had suffered considerably with inflammation of the bladder.

On examination patient was found to be a man in fairly good health. The prostate on rectal examination was found to be slightly enlarged, soft in consistence, contour smooth and round, and both lobes of about the same size. The seminal vesicles were not indurated. The urine was cloudy, specific gravity 1017, pus cells and bacilli were present in considerable number. A rubber catheter passed with some difficulty, owing to obstruction in prostatic urethra. Residual urine 185 c.c. (another examination three weeks later showed a residual of 375 c.c.). The bladder capacity was between 500 and 600 c.c.; tonicity fair. Cystoscope showed a small median bar which joined, without intervening sulci, with two very slight intravesical enlargements of the lateral lobes. Behind this median bar was a definite, but not very deep, bas fond in which the ureters lay rather close up to the prostate. The interureteral bar was considerably enlarged and behind it was a rather deep pouch. The posterior wall of the bladder was very greatly trabeculated, and between some of these trabeculae small round and oval openings were seen which connected with extravescical pouches. About 1 inch behind the left ureter a very considerable diverticulum with a large round opening into the bladder was seen, and the cystoscope was introduced into this for some distance, and a cystoscopic examination of the diverticulum made. With a finger in the rectum and the cystoscope in the urethra the amount of prostatic tissue between them was found to be very little thicker than normal; more than in Cases 2 and 5, but much less than usual in prostatic enlargements.

The rectal examination and cystoscopic examination both showed only a slight enlargement of the prostate, but the considerable residual urine and the marked evidences of obstruction as shown by the trabeculation and pouch formation in the bladder wall made it evident that there was considerable hindrance to urination. The prostate was so small that prostatectomy would have been very difficult, although the patient was in splendid shape for any operation, and the ordinary Freudenberg instrument would undoubtedly have been dangerous to use on account of the danger of penetrating the capsule of the prostate. Blade No. 2 of our instrument appeared to be the proper size to be used, with cuts not longer than 2 cm.

On Nov. 20, 1901, a Bottini operation was performed under cocain and morphia. Blade No. 2 was used in accordance with the cystoscopic and rectal examinations as stated above; five cuts were made as shown in the diagram. One median posterior and two oblique on each side, one at an angle of 75 degrees to the median posterior, and the other at an angle of 120 degrees. Each cut was made 2 cm. in length. Patient stood operation well. There was very little hemorrhage from the cautery cuts. The catheter was not required after the operation.

On the day following the operation there was a temporary suppression of urine, which was relieved by subcutaneous infusions and digitalis.

December 13, patient has done well. Urine is voided freely, often 300 c.c. at a time. Residual urine, 0. Condition is improving. Result is excellent.

SUMMARY.

Reviewing the eight cases reported in full above, we find four cases (3, 4, 6, 7) in which blade No. 3 was used. All of these were fairly large hypertrophies of both lateral lobes and median portion, and were suitable cases for Freudenberg's instrument.

In two cases (1 and 8) blade No. 2 was used. In both of these the prostate was very slightly larger than normal, as shown by rectal, instrumental and cystoscopic examinations, but in both of these cases there was

Figure 8.

marked evidence of obstruction and the cases urgently needed operation. In both cases, however, incisions made with Freudenberg's instrument would probably have penetrated beyond the confines of the prostate, but the operations were performed safely with blade No. 2 of our instrument.

In two cases (2 and 5) blade No. 1 was used. In both the obstruction was caused by a very small median bar, associated with complete atrophy of the lateral lobes (after castration) in one case and lobes of normal size in the other. In these cases the amount of tissue

Figure 9.

beneath the instrument was so small that we feared to use even blade No. 2. In another case (not here reported) the enlargement consisted in two very large lateral lobes, associated with a complete absence of median bar, the urethra skirting the posterior surface of the prostate and the amount of tissue between the rectum and a sound in the prostatic urethra being very small. In this case we used blade No. 3 for the lateral lobes and blade No. 1 for the posterior cut.

I have not as yet used blade No. 4, and hardly think it will often be necessary except to attack a single very great hypertrophy of one lateral lobe. I have, however,

seen several tremendous general hypertrophies in which it would have been necessary.

As to the efficacy of the Bottini operation, of which I was myself at first very skeptical, my experience (now of 41 operations) forces me to testify decidedly in its favor.

In 41 cases I have had 3 deaths, all men in very bad condition before operation, and 2 with pyonephrosis. Fifteen patients were over 70 years of age, 3 over 80, and among these there have been no deaths, and all but one have been cured of the prostatic obstruction. Of 13 patients who had to use the catheter, there is only one

Figure 10.

who still requires it, and this one is considerably improved. Some of my cases are of too recent date to show the ultimate results, and these I will reserve for a later publication. I am still, however, of the opinion (from an experience of 15 prostatectomies) that in certain cases, *e. g.*, men between 45 and 60, in good condition, and with easily enucleable enlargements, a complete prostatectomy is a very safe operation, and certain as to lasting results, though I must say the effects of the

Figure 11.

Bottini operation seem to be also permanent. Time, careful study of cases (especially with the aid of the cystoscope) and long-continued observation after operation can alone determine the applicability and the limitations of the principal operations for the treatment of prostatic hypertrophy.

In closing the paper I can not too strongly urge that the Bottini operation should be performed in accordance with the character of the prostatic obstruction as found by exhaustive examination as previously outlined. There is no doubt but that a perfunctory performance of the operation with one blade for all cases, and one cut

directed posteriorly and one laterally on each side, while perfectly satisfactory in a large number of cases, is insufficient in some and dangerous in others.

As shown by the writer in another paper,¹ when a decided median lobe (more or less pedunculated) is present, the ordinary operation is entirely inadequate. as the posterior cut will generally pass to one side of the median lobe and leave it to continue its obstructive work—see Figs. 8, 9, 10.² If, however, the cuts be so made as to pass obliquely across the base on each side of this projecting lobe,³ I have shown that this lobe may be dropped back out of the way (Fig. 13) and a rapid atrophy induced by thus cutting off most of its blood supply (as in diagrams, Figs. 11, 12, 13). This has been abundantly proved in five cases, some of which were entirely unaffected by the usual three incisions and the prostatic obstruction immediately removed by the incisions described above.

Figure 12.

Figure 13.

The cases outlined above serve to show the selection that may be made in some forms of hypertrophy as to the size of blade to use, and as to the length of incisions, their number and direction. No two cases are alike, and each should be a study unto itself.

As a rule the usual three incisions—one posterior and two lateral—are entirely sufficient for most cases; especially those of moderate hypertrophy, where with more incisions the danger of causing a slough, too large to be passed per urethram, is considerable. The same rule applies to middle lobe cases; unless the median enlargement is considerable the single posterior incision should be preferred as free from all chance of completely amputating the median lobe, and leaving it to act as a foreign body in the bladder.

In the choice as to the length of incision and the size of the blade to use there is considerable latitude and it should always be based on a careful study of the conditions present, and controlled by rectal touch.

1. Monatsberichte der Urologie, December, 1900.

2. To be more explicit: Fig. 8 shows the Y-shaped urethra, which is present in these middle lobe cases, and Fig. 9 shows how a metal instrument that has been introduced into the bladder will pass to one side the middle lobe, and not remain on top of it. Fig. 10 illustrates a case in which I performed the usual Bottini operation with no result, and a subsequent suprapubic cystotomy showed the posterior cut on one side of the middle lobe as shown in Fig. 10.

3. This is accomplished by the following maneuvers: introduce incisor, draw beak up against anterior portion of the prostatic orifice, rotate instrument 180° (hugging the prostatic orifice all the while). This will bring beak into sulcus to one side of middle lobe. Carry the rotation 45° further and beak will lie obliquely across the base of the middle lobe, ready for the first cut, Fig. 11. By reversing these movements the cut on other side of middle lobe may be similarly performed, and then the two lateral cuts made, Fig. 12. The result is shown in Fig. 13, a diagram from an autopsy specimen.

Prize for Essay on Hypodermic Use of Morphin.—Dr. J. B. Mattison, Medical Director of Brooklyn Home for Narcotic Inebriates, offers a prize of \$400 for the best paper on the subject: "Does the Habitual Subdermic Use of Morphia Cause Organic Disease? If so, What?"

LICHEN PLANUS HYPERTROPHICUS.*

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There are a number of names for this affection: Lichen simplex chronicus circumscriptus; lichen verrucosus, lichen corneus, etc., most of which are appropriate to this morbid process. In the last two decades it has been the subject of lively discussion, inasmuch as some cases of this description do not yield to the administration of arsenic, others do not show any typical lichen papules, but only the verrucous patches are characteristic of this disease and hence there arises serious doubt whether in these cases we have really to deal with a true lichen-planus process or with an atypical form of mycosis fungoides—A. Neiser, Deutscher Dermatologen Congress, 1894—or with a lichenization of a localized pruritus in the sense of Brocq. Thus further, Kaposi has named cases of this appearance keratosis verrucosa papillaris.

Now, this question as to the identity of these with lichen planus has lately been answered in the affirmative, after consideration of their clinical and anatomic features.

In view of the rare occurrence of this form of lichen planus, I wish, in the course of my remarks, to cite cases which will partly illustrate the subject in question and besides bring out some pertinent points.

Symptoms.—The affection is characterized by rounded or bean-like, oblong, irregularly outlined plaques of a bluish-red, brownish-red or violet color. They are flat, warty elevations sharply defined and their surface bears numerous whitish, or grayish, bran-like, firmly adherent scales; besides, there are on the surface deep point-like and larger depressions into which horny plugs are implanted. The consistence of these lesions is quite firm and they are elevated to half an inch and free from hair. Neither spontaneously nor on pressure is pain felt, but there is severe itching and especially so on the site of the patches. Besides these, there are sometimes found brown pigmented spots and atrophied areas.

In certain of the cases typical lichen papules are seen in the neighborhood of the hypertrophied lesions, or on other parts of the body, besides corresponding lesions on the mucous membrane of the cheeks in the form of white nodules or tender white reticula. In other cases no elementary lesions whatever are found. The seat of the affection is, in the majority of cases, the anterior and, to a lesser degree, the lateral aspects of the tibia, and especially the middle third. Sometimes varicose veins are present. Inasmuch as the lesions show a tendency to aggregation and frequently a band-like arrangement in the direction of the long diameter of the limb, there may exist a relation to certain cutaneous nerves. Regionary glands are sometimes found to be enlarged.

This affection mostly occurs in males over 40 years of age. Its course may be very chronic. Thus, Lion describes a case of a female patient, 43 years of age, in whom it had existed since childhood, and showed besides the hypertrophied areas typical lichen papules. The diagnosis is not difficult for those who have seen a case, inasmuch as all the cases present much the same appearance.

Diagnosis.—It must be differentiated from the fol-

* Read at the Fifty-second Annual Meeting of the American Medical Association. In the Section on Cutaneous Medicine and Surgery, and approved for publication by the Executive Committee of the Section: W. T. Corlett, L. Duncan Bulkley and W. L. Baum.