

use today and the way that this energy is deployed on the prostate for the tissue effect that is desired. Only then will we be rewarded with the best clinical outcomes without repeating the failures of the past. As we approach the turn of the millennium, although the modern applications of electrical energy have shown initial promise, only time and careful study will tell us if they are destined to be the next major watershed in the continuing onslaught against the prostate.

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est stages ; *b*, a nuclear plasmosoma, probably driven by the sectioning knife out of the nuclear cavity ; *c*, a chromatolysed nucleus in the same cell with a coarsely reticulated molluscum corpuscle *h*, *d*, a coarsely granuled molluscum corpuscle *e*, the same but intermediate in characters and development between *a* and *d* ; *f*, a coarsely reticulated molluscum corpuscle in an epithelial cell whose nucleus is pushed to one side ; *g*, a fully formed molluscum corpuscle with the eosinophilous substance arranged in a thread-like manner through it. Corrosive sublimate preparation— $\times 600$.

Fig. 5 represents the origin and development of the molluscum corpuscles in the epithelial cells. In *a* and *b* they are observed as plasmosomata passing out from the nuclei, and in *c-k* the changes are shown in them which are described in the text ; *m*, molluscum corpuscle ; *n*, nucleus ; *o*, cell protoplasm. In *m* is shown the disintegration of the nucleus. Corrosive sublimate preparation— $\times 1,200$.

Fig. 6. Three nuclei of the lowermost epithelial cells of a molluscum, with plasmosomata exhibiting amœboid shapes. Corrosive sublimate— $\times 1,200$.

Fig. 7. Drawn from the epithelial downgrowth *b* of a section of the same series as that shown in Fig. 3—*c*, corium ; *a*, plasmodium-like amœboid mass, evidently fixed in the act of migrating from a nuclear cavity, the chromatin of which, *n c* and *c m*, is still recognizable as masses of varying size. Corrosive sublimate preparation— $\times 1,200$.

NOTES ON THE SURGERY OF THE PROSTATE (1)

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THE following clinical notes are based upon the observations furnished by the accompanying cases. They are presented with the belief that bladder surgery, particularly in the past six years, suggests these principles :

First.—That a large per cent. of cases of prostatic cystitis which are not susceptible of relief by the well-known methods of palliative treatment can be more or less permanently relieved by surgical interference.

Second.—That perineal and supra-pubic incision are the two methods best calculated to accomplish the results sought.

Third.—That neither one of these operations is suitable in all cases and that both may sometimes be required.

Fourth.—That the objects of a radical operation should be the removal of the mechanical obstruction to urination, and to secure drainage and rest for the bladder.

Statistics thus far show that partial or complete restoration

(1) Read September 24th, 1891, at the fifth annual meeting of the American Association of Andrology and Syphilography, at Washington, D. C.

of bladder function has followed in over two-thirds of the reported cases of removal of mechanical obstructions caused by prostatic growths, and seem to furnish occasion for careful study of all cases of prostatic enlargement accompanied by the usual symptoms, with a view to determining what cases are amenable to surgical relief, and what are the best means of solving the mechanical problems involved.

It is scarcely necessary to refer to the fact that at the time many prostatics apply for treatment, the mechanical obstruction is by no means the most serious condition present. Resultant renal disease, loss of muscular power and thickening and diminution in size of the bladder, render more or less futile both palliative and radical efforts at relief in such cases. Temporary drainage and rest are obviously the chief advantages to be gained where degeneration of its walls has destroyed the bladder's contractile power, and in such cases the removal of mechanical obstructions is of benefit chiefly in facilitating the use of the catheter and removing causes of bladder irritation.

Case No. 5 in the following list illustrates this fact. After removal of an anterior horse-shoe-hypertrophy at the vesical orifice and a demonstration both by digital examination at the time of operation and inspection of the inside of the bladder with the cystoscope passed through the perineal wound three weeks after operation, it was shown that there was no intra-vesical obstruction remaining, yet voluntary urination was not restored. The work of Belfield, McGill, and others, may, however, fairly be claimed to have demonstrated the possibility of more or less complete restoration of bladder function in a large per cent. of cases formerly condemned to the catheter, and to have proven the fallacy of previously entertained views as to the pathology in a majority of these cases. Dr. Belfield, (who performed the first supra-pubic operation for removal of prostatic obstruction,) shows by statistics that in the majority of instances "the failure to evacuate the bladder is due in no wise to degeneration of the vesical muscles, but solely to the mechanical obstruction offered by prostatic growths," also that the enlargement of the prostate commonly regarded as "senile" hypertrophy is not limited to advanced life, and that the obstruction is usually of such form as to admit of removal.

McGill's statement that "prostatic enlargements which give rise to symptoms are intra-vesical," does not appear to hold good in all instances. Undoubtedly this is very generally correct, but it is certainly also true that in cases with hypertro-

phied tissue projecting into the prostatic canal such enlargement may not only be the cause of urethral and vesical irritation, but also interfere seriously with the introduction of instruments. This was shown in No. 4 of the following series. It also seems quite reasonable that the great size the rectal tumor sometimes attains may be the cause of irritation of the bladder and prostatic urethra in the absence of distinct intra-vesical growths, particularly where there is co-existing constipation of the bowels. The amount of residual urine, and bladder urethral irritation occasionally produced by a mass of hardened feces in the rectum, in the absence of prostatic or other disease, is indicative of the possibilities of a constantly present rectal mass, such as is so often found where there is general prostatic enlargement. Clinical evidence, however, indicates that the intra-vesical growths have been present in almost all cases operated upon and that such growths, usually by their modification of the contour of the distended bladder and mechanical interference with perfect emptying of the same, are the chief cause of the symptoms which we usually meet.

Digital and ocular examination seem necessary to the determination of the condition of the inside of the bladder, whatever method of operation is decided upon. If it is possible to determine beforehand which operation, perineal or supra-pubic, will afford an opportunity to best examine the inside of the bladder, we have gone far toward securing the data necessary to the selection of the form of operation best suited to individual cases. In trying to determine beforehand we have no means of securing positive evidence, but there is already accumulated sufficient experience to afford valuable indications in the selection of the operation probably best suited to individual cases.

First.—It appears in the very valuable collection of one hundred and thirty-three cases by Dr. Belfield¹ of operations upon the enlarged prostate, that the perineal operation is safer than the supra-pubic. The rate of mortality by the supra-pubic incision is 16 per cent. and by the perineal 9 per cent.

Second.—Inability to reach and explore the bladder by a perineal opening is said to exist in 30 per cent. of all cases.²

Third.—Where it is possible to reach and explore the bladder by perineal incision, it is generally not possible to do so with the same thoroughness as by a supra-pubic incision.

Fourth.—Where there is an elongated prostatic urethra, it

¹ See American Journal of the Medical Sciences. Nov. 1890.

² McGill, Watson.

is generally associated with a rectal tumor of large size, and the increased length of the prostatic urethra and the consequent increased perineal distance is approximately indicated by this fact, and by measuring the distance with a catheter from the meatus to the point where urine is obtained. A large rectal tumor was accompanied by an elongated prostatic urethra in all of the following cases.

With a greater degree of safety by the perineal method, it seems generally desirable to give it the preference in cases where there is not a large rectal tumor and probable elongation of the prostatic urethra, with the expectation of being able by over-stretching the prostatic canal to make digital exploration of the bladder, and to remove or divide obstructing growths with scissors, knife or cautery. In five of this series of cases, viz., Nos. 1, 3, 6, 10, and 12 there was not a large rectal mass and it was possible to explore the bladder with the finger, and to inspect it and the prostatic canal quite well through the large tube which was used. In one of the remaining seven cases the perineal operation was preferred, because the bladder could be made to hold but two ounces. In two, a supra-pubic and a perineal opening was made. In one of these two a perineal opening first made failed to afford access to the obstructing intra-vesical growths and the upper opening was consequently made. In the other one of these two cases a supra-pubic opening was made and intra-vesical growths removed, but inaccessible urethral obstruction being felt, an opening was made below. In the remaining cases the high operation would have been preferable, but a perineal opening was made either because the condition of the patient imperatively required the least possible surgical injury, or for other reasons stated. Perineal opening afforded sufficient access to secure division of the so-called prostatic bars and collar shaped growths, and moderate sized projecting masses either by the scissors, knife or cautery in the five cases referred to. It is generally necessary to remove the projecting divided ends in these cases to secure perfect patency of the vesical orifice. The writer has not met with any distinct pedunculated middle lobe growths in the cases operated upon, but found one several years ago in a post-mortem upon a patient where no operation had been made. A perineal opening would have afforded good opportunity for its removal. It has, in those where this method seemed applicable, afforded easy access to other forms of hypertrophy, such as prostatic rings, bars, almond and other shaped growths at the vesical

orifice, and ridge and nodular formed tissue in the prostatic canal.

In four cases marked diminution in the size of the rectal tumor has followed puncturing the lateral lobes with a small curved galvano-cautery point. The latter was used through a Ferguson's rectal tube introduced through the perineal opening, and inspection was aided by reflected light from a head mirror. The punctures were made to the depth of one-half to three-quarters of an inch and from two to six in number. Definite location of the desired point of insertion of the cautery may be obtained by digital and ocular examination. A small straight tenaculum passed along the finger secures the objective point, and the tube then passed into the wound over the tenaculum, the secured mass can be more fully exposed by being drawn into the mouth of the tube. In the cases thus treated no ill ef-



fect has been observed. Prolonged drainage was used and the small resultant slough occasioned no inconvenience.

How much of the diminution in size of the rectal mass was due to the removal of congestion by rest secured by drainage, it is difficult to estimate. The tube usually employed at the time of operation was three-quarters of an inch in diameter and four inches in length. Smaller tubes of similar shape have been used in two instances in the removal of slight hypertrophies discovered in the prostatic canal after drainage had been continued for several days. Cocaine anaesthesia was employed in these two cases.

The use of the cautery in this manner would seem to be restricted to small salient growths, and to a limited extent in the reduction of general enlargement of the lateral lobes by puncture.

It seems quite as feasible as its somewhat similar use in the removal of nasal growths. The cautery is more easily and definitely manipulated than the knife or scissors in the removal of almost all growths about the vesical orifice through a perineal

opening. More experience in its use may extend the limits of its application, but it does not appear suited to growths of large size. In these cases it has fortunately occurred that no growths of considerable size were met with at the vesical orifice, and probably the cautery would have proven inadequate to their removal had they been found. It is manifestly not equal to other methods at the surgeon's disposal in operating through a supra-pubic opening.

The violent inflammation attending its too free use in the removal of nasal hypertrophies, would appear to suggest its limitations in prostatic surgery.

The method employed in the following cases to secure final closure of the wound after drainage by the perineal opening, has made it possible to use a tube almost indefinitely. Prolonged drainage was used in several of them, and in numerous instances following perineal operations for other causes. It has been maintained without reference to the possible formation of a permanent fistula, and this objectionable sequel has not occurred in a single instance. In a patient suffering from a tubercular pyelitis and cystitis a fistula persisted for some weeks, but finally closed. In this case the perineum had formerly been honeycombed by fistulous tracts following perineal abscesses. No openings were present at the time of the operation, but the amount of cicatricial tissue following their former existence, made it probable one might remain after prolonged use of a tube. In No. 1 of this table a catheter was used eighty-one days, and in No. 9 for ninety-two days.

Closure of the opening was secured by thoroughly curetting the granulating channel and removing all cicatricial tissue at its external orifice. Stitches were inserted where the orifice was large. Cocaine anæsthesia was used. A dry absorbent dressing was applied, and the urine drawn by catheter for three or four days. The use of a steel sound in the urethra facilitates the operation and makes it easy to locate the urethral end of the tract. In addition to small curettes, a dental burr of large size insures perfect denudation.

A brief summary indicates that where death followed perineal incision the danger would not have been lessened had the supra-pubic opening been employed. One died from immediate shock and one from uræmia ten days after operation. In one where combined incision was made, death was from shock. In these three cases death would have occurred in a short time from existing pathological conditions had no effort at surgical relief

been made. The presence of stone in case No. 7 did not seem to be an influence in the result. Rectal distention with a six ounce bag was attended by pronounced arterial depression and respiratory disturbance. In two other patients where the writer did supra-pubic cystotomy for causes other than enlarged prostate, the use of the rectal bag had to be discontinued as in case No. 7, because of the shock it produced. In case No. 5 the fatal termination from renal disease was five and one-half weeks after, and not due to the operation.

Residual urine was present in varying quantities in the cases operated upon. Its amount was greater where there was a large rectal tumor present. It was not found after recovery in but two instances, viz.: Nos. 8 and 9, and then in small quantity. However, all were not subsequently examined to determine the amount of residual urine present after recovery. In No. 9, relief seems chiefly due to removal of stone, but the enlarged prostate had undoubtedly favored the formation of stone. The average age of the patients was sixty-two and one half years and but three were under sixty-five.

TABULATED LIST OF CASES.

No. 1, Mr. W. K., age 65. Bladder symptoms for two years. Wholly dependent on catheter for past two months. Catheter used every hour or every two hours. Very slight enlargement shown by rectal examination. Prostatic bar divided by perineal incision December 31, 1889. Drainage used eighty-one days because of recurrence of pain on temporary removal of tube. Recovery with restoration of bladder function. Now almost two years since operation and no return of symptoms. Urinates naturally once in three to five hours in day time and does not have to empty the bladder at night.

No. 2, Mr. L., age 80. Cystitis of several years standing, now violent in character. Rectal tumor quite large. Patient's general condition bad. Perineal operation January 15, 1890. Bar divided. Bladder difficult to reach. Death on third day. Never fully rallied. (Post mortem showed much such a specimen as Plate No. 1 in Operative Treatment of the Enlarged Prostate, by Watson.)

No. 3, Mr. —, age 70. Severe cystitis from gonorrhœa of six months standing accompanied by prostatic obstruction. Bladder would hold but a small quantity of urine, a part of which was expelled every ten to twenty minutes. Rectal tumor small. Perineal operation and prostatic collar divided April 29, 1891. Drainage fifty days through perineal tube. Recovery. Bladder now empties itself completely, but patient has to urinate every two or three hours.

No. 4, Mr. J. S., age, 74. Complete retention. Catheterization now impossible. Rectal tumor of large size. Perineal opening made May 14, 1890, and drainage until May 26, 1890, when a supra-pubic opening was done, owing to extreme length of prostatic urethra and inability to complete operation by perineal opening. Pear shaped hypertrophy found on examination through supra-pubic opening. V shaped piece removed with scissors. Ridge like and modular hypertrophies felt through perineal opening in prostatic urethra, obstructing access to the bladder, were removed by galvano-cautery through a small cylindrical rectal speculum. Cautery punctures also made into lateral lobes. Prostatic urethra of large size, seemingly dilated by intra-urethral growths. Recovery with complete restoration of bladder function. Now sixteen months since operation. No return of symptoms.

No. 5, Mr. J. B., age 68. Wholly dependent upon catheter for ten months preceding operation. Cystitis well marked. Rectal tumor of large size. Operation by perineal incision June 12, 1890. (Patient preferred perineal operation.) An anterior horse-shoe-hypertrophy about the size of a small almond was found at the vesical orifice, and removed by the use of a hook shaped galvano-cautery knife through a cylindrical rectal speculum. The aperture through the tube used was three-fourths of an inch in diameter. Recovery but without restoration of bladder function. By digital examination at the time of operation and by inspection with the cystoscope three weeks later, it was shown that all intra-vesical obstructions had been removed. Patient improved for about one month after operation, when symptoms of uræmic poisoning supervened, and he died one week later, having been semi-comatose for two or three days preceding death.

No. 6, Mr. T. N., age 58. Cystitis had existed for one year previous to operation. Urination was very difficult and painful. Rectal tumor of medium size. There was in this case co-existing stricture of the membranous urethra, of small caliber, necessitating perineal section. Operation, May 28, 1890, by perineal incision. A prostatic collar with small opening at the vesical orifice was divided, and the retracted ends nipped off with scissors. Recovery with perfect restoration of bladder function. At this date—fifteen months after operation—there has been no return of symptoms.

No. 7, Mr. A. B., age 70. Cystitis severe. Patient has been wholly dependent upon catheter for several months. Rectal tumor of large size. Exploration of bladder with sound revealed a stone. Operation, November 28, 1890, by combined supra-pubic and perineal incision. On examination through the supra-pubic opening a conical shaped mass was found projecting into the bladder. V shaped section removed with scissors,

also a soft stone removed, size of a small walnut. Inaccessible urethral obstruction being felt a perineal opening was also made. Use of rectal bag was accompanied by arterial depression and respiratory disturbance. Death thirty-six hours later. Patient never fully rallied.

No. 8, Mr. A. A., age 69. Cystitis for two years. Urination now almost impossible. Use of catheter very difficult. Rectal tumor of large size. Operation January 21, 1891, by perineal incision. Prostatic collar divided and retracted ends burned off with the galvano-cautery. Several cautery punctures were made into the hypertrophied lateral lobes through the prostatic urethra. Recovery with almost complete restoration of bladder function. The supra-pubic operation was advised in this case, but declined by patient. The perineal distance was great, and it was with difficulty that the finger could be passed into the bladder.

No. 9, Mr. I. S., age 71. Five years previous dependence upon the catheter. Its use now necessary every hour. Cystitis severe. Rectal tumor of large size. Bladder capacity about two ounces. Large soft stone present. Operation, March 20, 1890, for stone only, by perineal incision. After removal of stone by crushing through the perineal opening an anterior-horse-shoe-hypertrophy could be felt at the vesical orifice, but no attempt was made at its removal, because of the length of time already consumed in removing the stone and the patient's failing condition. This hypertrophy was purposely caught in the jaws of the lithotrite and crushed. It was impossible to pass the finger into the bladder, owing to the great perineal distance. Operation upon the prostate was deferred indefinitely. Patient subsequently declined to have it done owing to improvement following operation for stone. Thirteen months later the stone having reformed, another operation was done for its removal by perineal incision, and at the same sitting finding the perineal distance greatly diminished and being able to pass the finger into the bladder, there was removed with the galvano-cautery as much of the growth at the vesical orifice as could be reached. More of this growth was subsequently burned off through a tube, and punctures made into the lateral lobes. Drainage used ninety-two days after last operation. Restoration of bladder function followed the first operation, but more or less cystitis remained. After second operation same result followed. Removal of the stone is to be largely credited for relief obtained. The supra-pubic operation would have been desirable in this case, but for the extreme smallness of the bladder.

No. 10, Mr. T. D., age 48. Slight cystitis and irritation of the membranous and prostatic urethra had existed for three or four years. There was a complication of deep urethral stricture

of medium calibre. Rectal tumor small. Prostatic collar and stricture divided January 3, 1891 by perineal incision. Recovery with great improvement.

No. 11, Mr. L. C. S., age 71. Cystitis for one year. Quite severe for past three months. Patient's general condition very bad. Rectal tumor large. Operation by perineal incision June 16, 1891. A half almond shaped hypertrophy was removed from the vesical orifice by the scissors. Perineal distance long but finger could be passed into the bladder by a little effort. Patient died ten days later of uræmia. Supra-pubic operation would have been better in this case, but owing to the patient's objections and my belief that the perineal was somewhat safer, the latter was done.

No. 12, Mr., B. age 48. Bladder symptoms two years. Two or three recent attacks of retention. Rectal tumor of small size. There were co-existing strictures of the deep urethra and a small encysted stone at the vesical orifice. Operation by perineal incision September 12, 1891. Strictures and prostatic collar divided and stone removed. Patient thus far doing well.

NOTE.—Feb. 13, 1892. Since this paper was read the writer removed (on Oct. 13, 1891), a right lobe in a patient aged seventy (Mr. F.), and both right and left lobes in Case No. 9 of the above table by a median perineal incision. A superficial incision was made with a knife, dividing the mucous membrane covering the lateral lobes in the prostatic urethra and the glandular tissue was removed piecemeal by digging it out with the finger. Counter pressure was used by inserting the two first fingers of the left hand into the rectum. Immediate and marked diminution in size of the rectal tumor was observed. In the case Mr. F. restoration of bladder function followed when the tube was removed five or six weeks after the operation. He had been wholly dependent on catheter for six months. In case No. 9 the perineal opening was made to remove soft stone which had reformed. In view of the experience afforded by the case of Mr. F., operated upon ten days before, an effort was made to remove both lateral lobes and was accomplished in the same way as in Mr. F.'s case. Case No. 9 did well for a time, but began to lose appetite and to have a slight temperature one month since and continued to decline until one week since, when he died. Death occurred three and one-half months after the operation and the post mortem showed a suppurative pyelitis, and there were three small soft stones in the bladder. The removal of the lateral lobes through the medio-lateral or medio-bilateral opening has not heretofore been attempted so far as the writer is aware. It involves some danger of impairing the integrity of the prostatic urethra but possesses the advantage over Dittle's operation of giving access to the bladder for drainage and removal of growths about the vesical orifice and also gives good opportunity to remove the lateral growths. They cannot be removed whole, but can be enucleated in pieces with the finger. It seems evident that no method yet devised offers the advantages afforded by supra-pubic opening in the great majority of cases.