

THE USE OF RADIUM AND THE PUNCH OPERATION IN DESPERATE CASES OF ENLARGED PROSTATE

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IN the treatment of cases of prostatic hypertrophy one is frequently confronted with severe complicating conditions which require most careful study and treatment before an operation to cure the obstruction to urination can be carried out. The kidneys are so frequently injured by long standing back pressure that the phthalein test shows in more than 40 per cent. of the cases an impairment requiring drainage for a more or less protracted period and forced water by mouth to restore them to a sufficiently good condition for operation. The heart is also frequently involved as a result of the renal lesions, but both kidneys and heart usually improve rapidly on appropriate preparatory treatment so that perineal prostatectomy can be carried out without danger.

The ordinary valvular lesions and moderately severe myocarditis are usually not sufficient to contra-indicate perineal prostatectomy, though care should be taken both in the preparatory care of the patient and in choice of anæsthetic—which should be ether in such cases. A quick operation and thorough packing of the wound to prevent loss of blood is sufficient to carry them through safely. It is often amazing to see how well they convalesce and in not a few instances the heart is benefited by the removal of a focus of infection in the prostate. Occasionally we meet with very severe cardiac conditions which do not clear up or improve sufficiently under careful hospital treatment to warrant the risk of a serious operation. Such cases usually go unoperated and unrelieved, and it is with the idea of furnishing a new means of curing such cases of urinary obstruction that I am presenting the following case:

The patient arrived at the hospital in desperate condition. An enlarged prostate with 1300 c.c. residual urine had led to great impairment of the kidneys, and severe degeneration of the heart which was in such bad condition that the patient came near death several times during the nine months of treatment which he underwent. It was evident early that a serious operation was out of the question. Anæsthesia

also would have been too dangerous, and various cardiac experts who saw him agreed that a major operation would kill him.

We therefore determined to attempt to cause atrophy of the prostate and shrinking of the intravesical lobes by simple means—radium and fulguration—and the history will show that this was remarkably successful. But as the obstruction to urination still persisted, it was finally decided to carry out a “punch operation” through the urethra to remove the obstructing collar which remained at the prostatic orifice. This was entirely successful—no further catheterization was required and normal urination has been restored—now of eight months’ standing.

Along with this has come a wonderful betterment of his general health, but as the details are important both to surgeons, internists and pathologists, I will give the history of the case in full.

CASE HISTORY.—H. M. H. (No. 4413), aged fifty-three, single, admitted June 2, 1915, complaining of frequent and painful urination, and at times incontinence, fluttering of heart, weakness, nausea and vomiting.

Family History.—One sister had cancer.

Past History.—Scarlet fever, diphtheria and mumps as a child. Measles at the age of thirty years. Pneumonia four years ago. No history of tonsillitis, but for the past five years has had shortness of breath, palpitation and fluttering of the heart on going up stairs and on arising in the morning. No pain and no oedema, but considerable nausea often associated with vomiting. Suffers greatly from dyspepsia and often has severe gastric crises. No history of lues or urethritis.

Present Illness.—About five years ago began to have difficulty and frequency of urination. The obstruction has slowly grown worse, and during the past year the frequency of urination has increased greatly and of late there has been occasional incontinence. For four weeks he has suffered considerably with pain in the bladder, strangury, and, during the last two days, with hæmaturia. His general health has been greatly impaired. He has much dyspepsia, stomachic distress, nausea, vomiting, cardiac irregularity, palpitation and loss of weight. At present he voids urine from 2 to 7 times at night and very frequently in the day, often associated with urgency, burning and pain on urination, and hæmaturia. He has never been catheterized.

Examination.—The patient is tall, thin, pale and feeble. The chest is symmetrical; percussion note hyperresonant, and breath sounds high pitched and rather harsh. Vocal fremitus normal and no râles present. Heart much enlarged. P. M. I. is seen

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11 cm. from M. S. L. in fifth I. S. R. C. D. extends 11.5 cm. to the left and 3.5 cm. to the right of the M. S. L. The sounds are rather clearly heard at apex, but extremely irregular, skipping a beat about every 9 or 10 beats. Many beats do not appear to reach the wrist. Over the base of the heart the sounds are pretty well heard and the A-2 seems to equal P-2 in intensity. Pulses are easily felt and appear synchronous, though many of the beats heard at the apex do not reach the wrist. The tension and volume appear rather low and artery wall is perhaps slightly thickened. Blood-pressure, 128-80.

Abdomen: Full, rather distended, with a high-pitched, tympanic note throughout. Liver dulness extends from fifth rib to 2 f.b. above the costal margin. Spleen is not felt, liver edge not felt. Kidneys not palpable. No masses nor tenderness.

Genitalia: Negative.

Rectal: The prostate is moderately hypertrophied, rounded, smooth, slightly indurated. Both seminal vesicles are slightly indurated.

Catheter: Residual urine 1300 c.c.

Cystoscopy: Both lateral and median lobes are enlarged. The median lobe is quite prominent and obscures most of the trigone. The bladder is markedly trabeculated, and on the left side the orifices of cellules and diverticula are seen.

Urine: Amber, acid, specific gravity 1010, no sugar, albumin a trace.

Microscopically: Red and white blood-corpuscles and bacilli.

Leucocytosis: 13,600. Phthalein test: appearance time, fifteen minutes; first hour, 12 per cent.; second hour, 15 per cent.; total, 27 per cent. Blood urea: 0.576 gramme per litre.

Clinical Impression.—The patient is a weak sick man with bad heart and impaired kidneys, due to great back pressure from enlarged prostate. Much gastro-intestinal disturbance. Needs very careful preliminary treatment, continuous catheter drainage, water in large amounts and cardiac therapy. Operation now absolutely contra-indicated.

Treatment.—Rest in bed, continuous catheter drainage, forced water. Digitalis p.r.n.

June 7, 1915: Patient much exhausted, heart weak, greatly troubled with abdominal distention. Phthalein test yesterday showed a marked drop; appearance time forty minutes, first hour, 2 per cent., second hour, 12.5 per cent., total, 14.5 per cent. (drop of 12.5 per cent.).

June 12, 1915: Slightly improved. Now taking digipuratum b. d. until 12 doses are taken. Cardiac condition better.

June 15, 1915: Comment, "Phthalein test not improving, heart

bad, anæsthesia and prostatectomy would surely invite fatal ending. It is therefore decided to try radium, with the hope that atrophy of the prostate and relief of obstruction to urination will result."

June 16, 1915: *First radium treatment*: 1709 mg. screened by lead covered with 3 inches of gauze and rubber tissue, applied over the perineum. Treatment carried out by Dr. Burnam for eight hours.

June 17, 1915: Patient somewhat exhausted. Pulse a little better. Blood urea improved, now .348 gm. per litre (drop from .576). Phthalein 21 per cent. for two hours.

June 19, 1915: Fulguration applied to middle lobe through cystoscope.

June 26, 1915: Retention still complete. Second fulguration.

June 27, 1915: Phthalein test: appearance time, twenty-six minutes, first hour, 5 per cent., second hour, 10 per cent., total for two hours, 15 per cent. Blood urea, .35.

July 3, 1915: Cystoscopy: The median and posterolateral portions of the prostate are distinctly smaller and are covered with a grayish slough. The left posterolateral portion is more prominent and is fulgurated to-day for five minutes.

July 4, 1915: Retention still complete. Fourth fulguration (median lobe).

July 5, 1915: *Second radium treatment*: 1709 mg. screened as before, applied over lower end of sacrum five hours, over suprapubic region five hours.

July 13, 1915: Retention still complete. Fifth fulguration of prostate.

July 20, 1915: The patient has been wearing a retention catheter up to this time. Retention still complete. General condition, especially heart, greatly improved. Phthalein test shows steady improvement since primary drop after insertion of catheter; is now: appearance time, thirteen minutes, first hour, 14 per cent., second hour, 19 per cent., total, 33 per cent. Blood urea, 0.36.

Rectal examination: The prostate is distinctly smaller and less rounded.

July 22, 1915: *Intra-urethral applications of radium begun*: 103 mg. screened with a platinum capsule 2mm. thick (26-F. in diam.) inserted with a special instrument (Fig. 1), so that radium lay within the internal sphincter, and against the anterior surface of the median lobe. Duration of treatment forty-five minutes (held in place by adjustable clamp attached to table as shown in Fig. 2).

July 26, 1915: Patient up in chair two days and catheterizing himself. Œdema of legs and scrotum for first time.

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August 7, 1915: *Résumé*: Patient still has complete retention. Is able to void small amounts, but only after considerable straining. He is using a catheter at four to six hour intervals, removing between 400 and 500 c.c. On rectal examination the prostate is small, flat, soft, and one would not judge from the rectal examination that there was present any hypertrophy whatsoever.

Cystoscopic examination shows the bladder mucous membrane slightly congested, the trabeculations are well marked, particularly posteriorly, and to-day one can see the inter-ureteral muscle which, up to this time, has not been visible. Examination of the vesical orifice shows it slightly irregular, somewhat oedematous. On the right side in the region of the right lateral lobe there is present a well-developed, rounded lobule which evidently projects across the urethra at that point. Posteriorly the edge is small, and there is present only a median bar. On the left side a definite projecting lobe, which was present at previous examination, has apparently almost disappeared and the margin shows nothing but the irregularities which are due to oedema of the mucous membrane.

August 9, 1915: The patient was examined to-day, and the lobe on the right side fulgurated vigorously. Patient is going home this evening, and is to return again in about a month. Phthalein test: appearance time, seventeen minutes, first hour, 14 per cent., second hour, 17 per cent., total two hours, 31 per cent.

October 8, 1915: *Second admission*: Patient has been at home for two months. He has been catheterizing himself 4 to 6 times daily. Retention still complete. Patient very weak and nervous, suffers with frequent nausea and stomachic distress. Cardiac condition has become much worse, now very bad, heart action extremely irregular, pulse 140, irregular in force and rhythm. Apex in sixth interspace 14.5 cm. to left. Area of relative cardiac dulness extends 2.5 cm. to right in fourth interspace, and 15.5 cm. to left in fifth interspace. Sounds at apex cooing in character, second accentuated. No definite murmurs. Chest emphysematous, sonorous râles. Blood-pressure 120-85. Red blood-cells, 4,568,000. Hæmoglobin, 80 per cent. Blood urea, 0.564. Phthalein: appearance time, fifteen minutes, first hour, 12 per cent., second hour, 12 per cent., total, 24 per cent. Urine: cloudy, acid, specific gravity, 1016, albumin a trace, leucocytes, epithelial cells and bacteria.

October 20, 1915: Patient has been very sick, extremely weak, with persistent nausea and vomiting. Heart very irregular and weak. Right radial pulse almost imperceptible to-day. Left radial very irregular in force and rhythm.

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November 30, 1915: During the past month condition has been variable. For the last five days has received digipuratum grs. iii, twice daily. Heart action still quite irregular and rate at apex varies between 80 and 90. Blood-pressure 115/60. Stomach has improved greatly, is gaining in strength. Urinary condition unchanged, still wearing retainer catheter. Phthalein: 24 per cent. in two hours.

December 6, 1915: Pulse has varied between 68 and 80. Digipuratum grs. iii t.i.d. since November 30. To-day put on grs. iii b.d. General condition improved.

December 14, 1915: Heart much better. General condition fair. Pulse 70, beats forceful, all coming through to wrist now.

December 15, 1915: Retention still complete—inlying catheter. Cystoscope shows a small rounded middle (posterior) lobe, a small prominent anterior lobe, no enlargement of lateral lobes. Prostate per rectum flat, very little broader than normal.

December 16, 1915: Second intra-urethral radium treatment: 103 mg. applied for two and one-half hours in 3 positions in front of middle lobe as shown in chart (Fig. 3).

December 27, 1915: Third intra-urethral radium treatment: 103 mg. in thin brass capsule surrounded by rubber catheter (Fig. 4), one hour in deeper portion of prostatic urethra and one hour in anterior portion of prostatic urethra, as shown in chart.

January 17, 1916: Fourth intra-urethral radium treatment, with rubber catheter as before, one hour with radium within internal sphincter.

January 24, 1916: Fifth intra-urethral radium treatment, as before, one and three-quarter hours at vesical orifice, and one hour in anterior half of prostatic urethra.

February 21, 1916: *Résumé*: During the past eight months the patient has had two massive doses (1709 mg. each) of radium applied from the back and front; five intra-urethral treatments with 103 mg. at a position against the middle lobe or within the internal sphincter seven hours, and in the anterior half of the prostatic urethra two hours; five fulgurations to the middle and lateral lobes at the vesical orifice.¹

As a result the prostate has decreased greatly, but complete retention of urine persists. The kidneys are markedly improved as a result of the catheter drainage, but the cardiac condition, though much improved, is still much too bad to consider any form of prostatectomy under an anæsthetic—the unanimous opinion of consultation of medical and surgical examiners.

¹In later cases I have used intrarectal treatments of radium in addition to the intra-urethral, as shown in Figs. 12, 13, and 14.

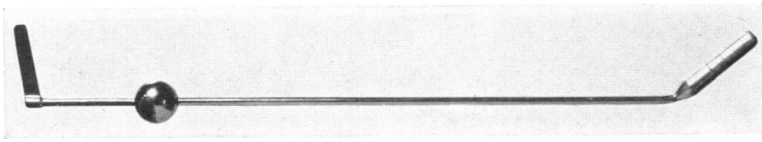


FIG. 1.—Instrument for introduction of radium in platinum capsule into urethra or rectum.

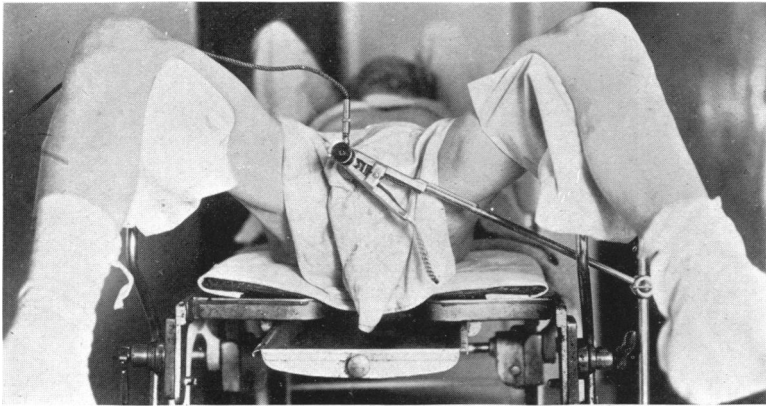


FIG. 2.—Showing retention clamp attached to table holding radium in desired position in urethra or bladder. (In this photograph the tubular radium instrument carrying the cystoscope was employed.)

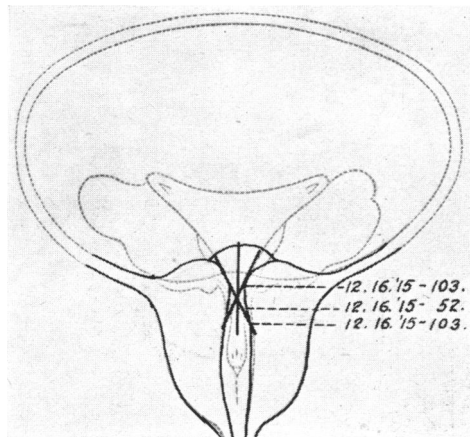


FIG. 3.—Chart showing second radium treatment given December 16, 1915, and milligramme hours in each place.

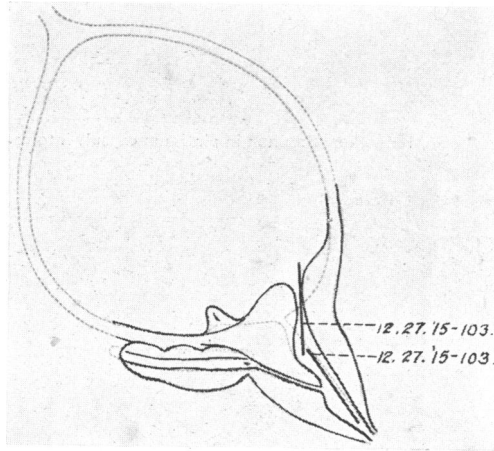


FIG. 4.—Chart showing third radium treatment on December 27, 1915.

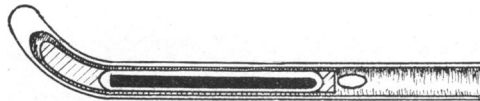


FIG. 4a.—Showing sectional view of rubber catheter carrying radium in glass tube surrounded by metal tube with coude curve to inner end.

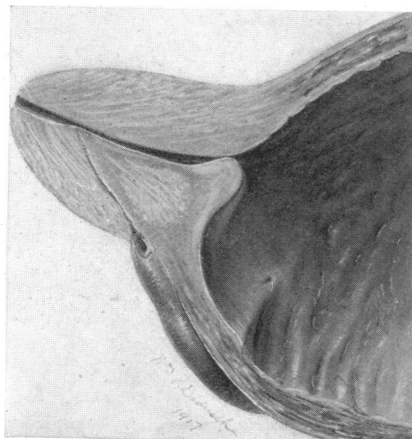


FIG. 5.—Showing obstructive bar remaining at neck of bladder after radium treatments.

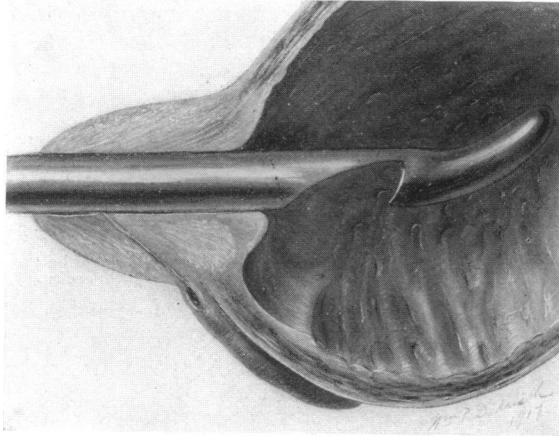


FIG. 6.—Median bar excisor or punch instrument introduced into bladder, cutting inner tube withdrawn allowing fluid to escape, showing that the instrument is in the bladder.

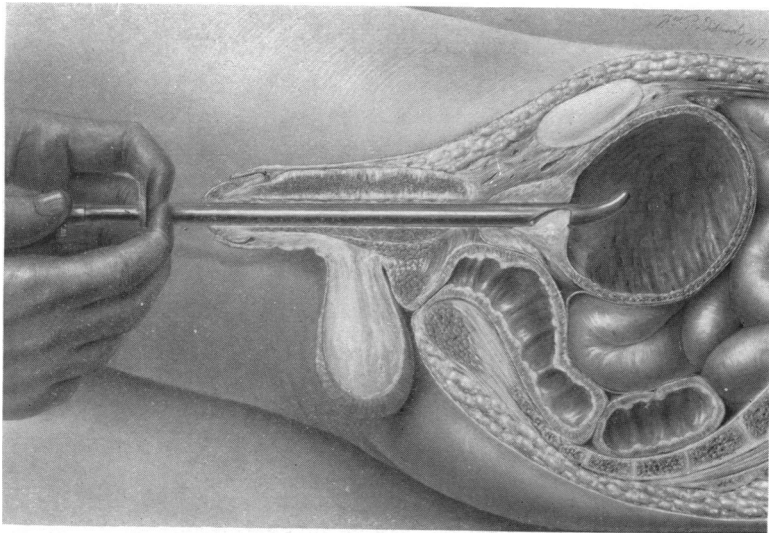


FIG. 7.—Instrument withdrawn until the median bar is entrapped in the fenestra, when the inner cutting tube is quickly pushed inward to excise the bar.

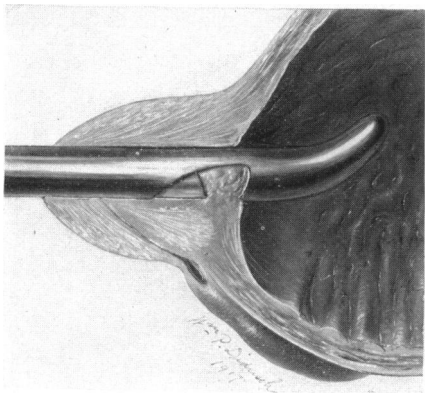


FIG. 8.—Cutting tube half way through median bar.

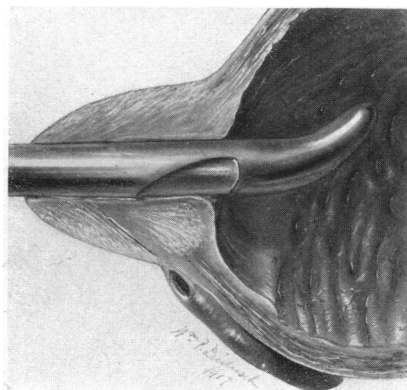


FIG. 9.—Cutting tube pushed home, completely excising bar.

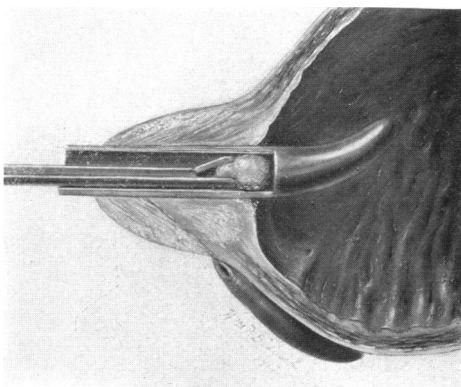


FIG. 10.—The excised bar grasped in tube with intra-urethral forceps previous to removal.

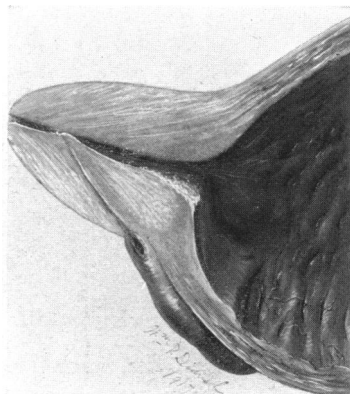


FIG. 11.—Result after excision of bar.

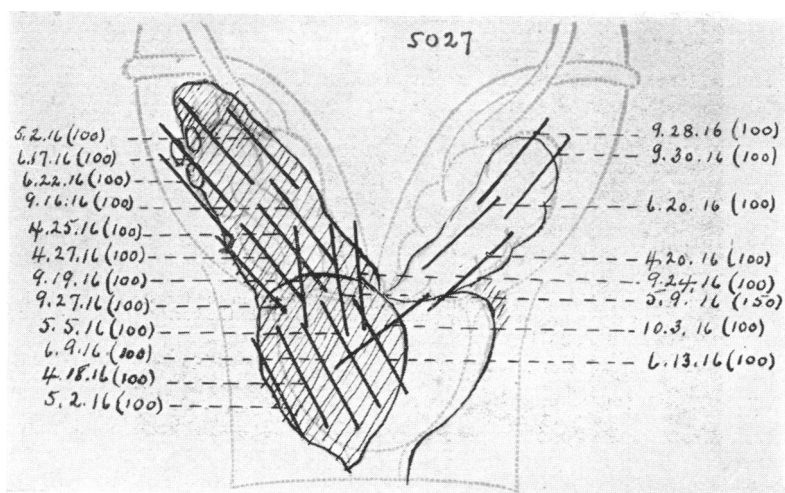


FIG. 12.—Chart of rectal treatments given in a case of carcinoma of the prostate and vesicle.

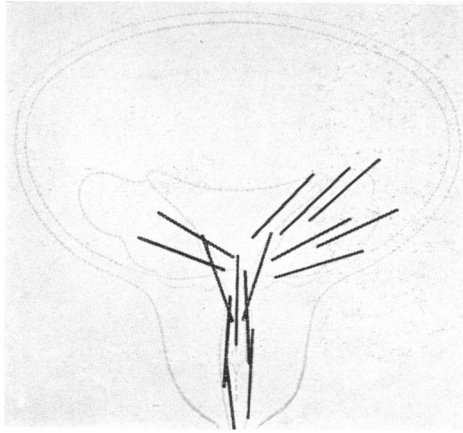


FIG. 13.—Chart showing the transvesical and transurethral treatments given in case illustrated in Fig. 12.

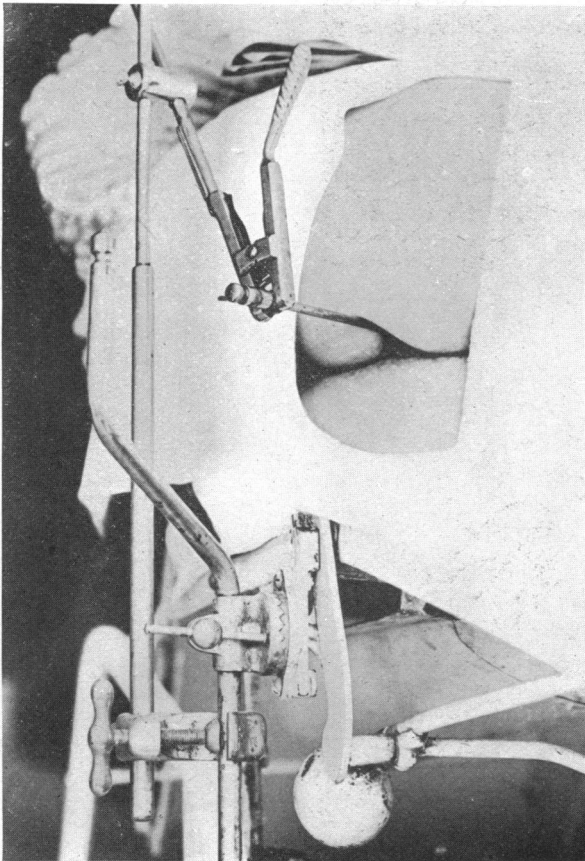


FIG. 14.—Showing rectal treatments, radium held against prostate by retaining clamp. (Patient lying on left side.)

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The prostate is found to be about normal in size on rectal examination, and the cystoscope shows that the obstruction present is entirely at the vesical orifice, consisting of a small lobule which is directed anteriorly and to the right, and a fairly broad median lobe—the lateral lobes not being enlarged now. With finger in rectum and cystoscope in urethra the median portion is moderately increased in thickness and there is a firm collar around the shaft of the cystoscope at the vesical neck which is easily palpable.

Deductions.—It seems probable that a *punch operation* would remove this obstruction at the vesical orifice and be sufficient to restore normal urination. Plans are accordingly to be made to carry this out.

These were delayed by an acute "cold" accompanied by renewed cardiac disturbance.

Operation (March 13, 1916) (Young).—Novocaine 4 per cent. in posterior urethra, opium suppository in rectum, punch operation (Figs. 5-11), 8 cuts in all directions around prostatic orifice, commencing with an anterior cut in which a mass of tissue about 1 cm. in diameter was removed. The tissue masses removed by the lateral and posterior cuts were somewhat smaller, with the exception of the right anterior cut which apparently removed the lobule previously seen in that location with the cystoscope. There was very little hemorrhage—the clots were easily evacuated with a syringe through a large catheter which was fastened in urethra.

March 14, 1916: Patient had very little shock from operation. There was very little post-operative bleeding,² and the heart action remained as good as before. *The catheter was removed in thirty hours, and in a short time urine was voided naturally.*

March 15, 1916: No reaction. Voiding urine freely in amounts from 100 to 300 c.c.

March 18, 1916: Continues to improve. Catheter not required. Patient walking about ward.

March 28, 1916: Now two weeks since operation. Convalescence has been remarkably smooth. No cardiac attacks. Has not required catheter since day after operation. *Is now voiding normally, as much as 400 c.c. at a time. General condition excellent. Patient discharged.*

June 15, 1916: Patient returns for observation. He reports continued improvement in every respect. Heart giving very little trouble. Retains urine four hours, voids large amounts each

² I now use a "kephalin" coated catheter and thus induce quick hæmostasis. See paper by H. L. Cecil, *J. A. M. A.*, —, 1917.

time. Urination normal. Bladder apparently empties itself perfectly. Prostate about normal in size, but slightly indurated. Result excellent.

Pathological Report.—By Dr. Howard Cecil. Path. No. 2350. The tissue removed by the anterior cut is 1.2 cm. wide. It contains a small amount of glandular tissue. This section is marked 1. The left anterior cut is 1.5 by $\frac{3}{4}$ cm. This also contains glandular tissue and the section is marked 2. The left cut is about 0.5 cm. in diameter and this section is marked 3. The left posterior cut is 1.2 cm. by 0.5 cm. wide; it contains glandular structure and is marked 4. The posterior cut is 2 by 1 cm. in diameter; it contains what seem to be definite spheroids and is marked 5. The right posterior cut is 1.5 by 1 cm. and is marked 7. The right anterior cut is 2 by 1 cm., the largest of all of the cuts; it contains a fair amount of glandular tissue and is marked 8.

The entire mass shows a definite hypertrophy, but there does not seem to be such a marked amount of connective tissue, though it is fairly hard.

The sections are very similar in appearance and show the following changes: The tissue is extremely rich in epithelial tissue that has undergone a marked degeneration. The section stains a deep blue with hæmatoxylin. In the acini there are large colloid areas of degeneration. The acini themselves are greatly shrunken, the cells are irregular, generally large, but in places small. The stroma itself has been greatly changed; the cells are vacuolated and the protoplasm has practically all been destroyed. The spheroids here are represented by masses that are very much smaller than normal and definitely encapsulated. There is some epithelial tissue which has undergone a definite colloid change represented by poorly staining blue homogeneous material which, under high power, shows that there is a definite network within the colloid material.

Remarks.—The effects obtained by radium in this case have been duplicated now in several other cases at our clinic—a remarkable shrinking of the hypertrophied gland, with the peculiar tissue changes above described—but also without complete relief of obstruction, which generally has remained unchanged, so that radium alone is apparently not a cure for prostatic hypertrophy. The fact that the “punch” operation has been so eminently successful in removing the obstruction remaining after radium treatment at the vesical neck shows a wider use for this procedure which we have heretofore reserved for non-hypertrophic obstructions at the vesical orifice, bars, valves, contractures and congenital obstructions which form so large and troublesome a group of cases.

By means of specially devised instruments, to be used through the rectum, urethra and bladder (Figs. 12-14)—the latter with a cystoscope inside it—it has been possible to get really remarkable results in many cases of prostatic carcinoma—relief of obstruction to urina-

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tion, disappearance of enlargement, pain and hæmaturia. But the field is too new and the cases too recent to be discussed here. Suffice it to say that in radium we undoubtedly have a therapeutic agent of great value in urology and with improved apparatus, larger amounts of the element (we expect in the future to use 600 mg.) and systematic study of a long series of cases, many brilliant results should be obtainable.

This report serves to show that with radium the hypertrophied prostate may be made to atrophy so that a minor operation will suffice to restore normal urination. The long duration of treatment, however, suggests that it be confined to cases with severe complicating conditions which preclude perineal prostatectomy, although the latter may be ranked as a benign operation, having a mortality now under 2 per cent.