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ELECTROSURGERY IN UROLOGY *

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Electrosurgery combined with modern cystoscopy has raised urology to a comparatively higher therapeutic as well as diagnostic level than was attained by other branches of surgery.

It has been said that the only difference between the general practitioner and the specialist lies in the instruments, and this was never more true than in the present instance where electrosurgery enables the urologist to perform an intraurethral prostatic resection. This is only one of the attainments, and we must review the relation of electrosurgery to urology at some detail.

Chancroid may be successfully treated by fulguration after the method advocated by Robbins and Seabury⁽¹⁾. A 10 to 20 per cent solution of cocain is applied directly to the ulcer, followed by a liberal application of a 25 per cent solution of cupric sulphate. The monopolar current with the vacuum electrode directs the spark over the lesion with special attention to its undermined edges. A grayish green discoloration covers the ulcer, which in a few days becomes a healthy granulating wound. The treatment may have to be repeated. The current is alleged to drive the copper ions into the tissues, destroying the infection. Where the vacuum electrode is not

available, a round needle electrode may be used. From a host of "cures" as numerous as those for gonorrhoeal urethritis, we now have at our command one that justifies such a designation.

The larger *verrucae*, the so-called venereal warts, respond readily to the spark from the monopolar current under local anaesthesia. The sensitive urethral caruncle in the female may be destroyed in the same manner.

Destruction of *epithelioma of the penis* by fulguration and radium has been advocated by Corbus⁽²⁾, Pfahler and Widemann⁽³⁾ and Kelly and Ward⁽⁴⁾, particularly in the earlier stage limited to the glans or coronal sulcus. Pfahler and Wideman have employed surgical diathermy in amputation of the penis in the more extensive conditions with little hemorrhage and without subsequent stricture of the urethral meatus. Metastatic inguinal lymph nodes are controlled in the same manner following x-ray therapy. Most urologists still rely on the scalpel in the radical operation for carcinoma of the penis and direct attention to prevent meatal stricture.

Stricture of urethra. While the golden urologic rule in the handling of strictures is to dilate when one can and cut if one must, electrosurgery offers a new means in those cases of non-dilatable urethral strictures, where it is possible to pass a filiform bougie. The

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patient is prepared as for the usual internal urethrotomy, and under caudal or general anesthesia, the filiform guide is passed through the stricture into the bladder. The electrode bougie as adapted by my colleague, Dr. Joseph C. Birdsall, after that described by Sarmiento⁽⁵⁾, of Mexico, is connected by its screw attachment and passed with the filiform as a guide until the stricture obstructs its passage. The current is applied and the stricture bored through or reamed out with little or no hemorrhage. At present there are three different sizes of bougie electrode with metal olives or tips, so that one may electrocoagulate the stricture to the desired size. A retention catheter is tied in according to the technic employed for internal urethrotomy, is removed in several days and followed by the passage of bougies or sounds to insure dilatation. There is not the tendency to contract down following electrocoagulation of a stricture that is experienced with simple divulsion.

Hypertrophy of verumontanum. Congestion of the verumontanum, hyperplasia or tumor are effectively controlled by the coagulating current through the cystoscope. In children with enuresis that does not respond to simple corrective measures and in the absence of any other pathologic lesion outside of an enlarged verumontanum, fulguration through an infant cystoscope often brings about immediate and permanent relief.

Vesical neck obstruction and prostatic hypertrophy. Electrosurgery plays its principal rôle in the relief of obstruction at the vesical neck, a procedure which has aroused great interest. Over a century ago, in 1830, Guthrie⁽⁶⁾ first described the "bar at the neck of the bladder," a condition, the pathology and treatment of which now constitutes one of the most debated questions. He devised an instrument of his own, which with that of Home⁽⁷⁾, Thompson⁽⁸⁾ and Mercier⁽⁹⁾ and others, was called variously the prostatome, the incisor, the excisor, the prostatolithotrite, or the kiotome. As there was no means to control hemorrhage, the method was discarded. In 1874, Bottini⁽¹⁰⁾ introduced his galvanocautery designed to act not merely on the mucous membrane, but to produce thermo-caustic destruction and incision of the enlarged lobe of the prostate. It was revived with the work of Albarran⁽¹¹⁾, who revolutionized the ancient anatomic conception of the obstructing bar. The instrumental era of

endoscopic prostatic resection was inaugurated in America by the so-called punch operation or punch prostatectomy. Young⁽¹²⁾, in 1913, gave the impetus with his punch to the evolution of new instruments with improved visual systems, and to the introduction of the high frequency current which makes it possible to cut the offending tissue and to coagulate in water under direct vision through the sheath of the endoscopic tube without removing the instrument. Young's punch was a "cold" punch which bit a piece of tissue from the vesical neck without visual supervision. Hemorrhage was difficult to control in all cases, so much so, that many urologists were afraid to use it, and it was usual in our clinic to perform a suprapubic cystotomy to have the punch under direct vision so that hemorrhage could be controlled. A spiral electrocautery was introduced to arrest hemorrhage in 1927. Caulk, in 1920, developed a cautery punch whose practicability and efficiency made a widespread impression. In order to burn the tissue properly and prevent hemorrhage, the procedure must be done slowly under low heat. At first there was no visual supervision, but this has been added now. In our clinic, Dr. Jos. C. Birdsall has modified the instrument by enlarging the fenestrum and by employing the cutting current, with satisfactory results. As this procedure may be used under infiltration anesthesia, it is rapid and produces but little hemorrhage, it is our choice for fibrotic bars and vesical contractures, though the author has advocated its use also in prostatic hypertrophy, regardless of size.

Meanwhile, mechanical improvements of the visual system had been made, and McCarthy⁽¹⁴⁾ brought out his panendoscope which permitted larger instruments to be passed through the sheath and a fore oblique lens. The high frequency current in the apparatus has been "stepped up" so that a cutting under water became available and a coagulating current could be obtained without change of instrument. It is essential for electrosurgery to have an instrument capable of providing these conditions.

Braasch⁽¹⁵⁾, Bumpus⁽¹⁶⁾, Collings⁽¹⁷⁾, Stern⁽¹⁸⁾, Davis⁽¹⁹⁾, Day⁽²⁰⁾, Rose⁽²¹⁾, Kirwin⁽²²⁾ and others have contributed instruments which have certain additional advantages. In the Day punch the tissue is electrodesiccated before excision, while the Kir-

win appliance has a rotary motion. Good results are obtained by skilful manipulation of the instrument most familiar to the operator. Under caudal, sacral, spinal or general anesthesia, multiple bites are taken at the obstruction and the hemorrhage is controlled under direct vision. This accomplishment which relieved the patient of a cutting operation and shortened the hospital stay, was received with acclaim. While the method seemed particularly adaptable to fibrotic bars, contractures at the vesical neck, tags following prostatectomy and malignant tumor of the prostate, hypertrophy of the prostate of the median and lateral lobes, have been included. Vesical complications accompanying hypertrophy indicate suprapubic operation. It takes more than the average cystoscopist with improved technic to accomplish the desired result. The patient should be as carefully studied as for the radical operation, but the procedure is not as shocking, so that those patients unsuitable for radical operation safely withstand resection. Again, the patient who refuses to consider a radical operation rarely objects to intraurethral resection. There may be reaction following this procedure out of proportion to the severity of the resection, and there have been complications such as hemorrhage, requiring cystotomy for control, opening of the rectum, and the like. The procedure may have to be repeated to relieve obstruction when sufficient tissue is not removed at the first resection.

The extreme views on resection are those that employ it for all forms of vesical neck obstruction, hypertrophy of prostate, and the like, to those who use it rarely. Young, Squier, Davis propound the question: Why resort to what may be only palliative procedure, when by radical operation the mortality is 3 per cent or less?

Bladder

Beer⁽²³⁾ revolutionized the treatment of benign papilloma of the bladder, when, in 1910, he introduced fulguration through a cystoscope. Previously, the rapid recurrence after surgical removal not only at the original site, but also in the line of the scar, produced so much despair among surgeons that they hesitated to operate. Various types of intraurethral electrodes may be used, the common type being that of Bugbee⁽²⁴⁾, and while the unipolar current was employed in the beginning, the bipolar current with the larger in-

active electrode beneath the buttocks is more effective and generally used. As there is a marked tendency of these tumors to recur, frequent cystoscopic observation after destruction will permit the detection and destruction of any "buds" before they attain any great size. These tumors are potentially malignant and the destruction in the earlier stages lessens the possibility of malignant degeneration. The method is used as a therapeutic test for benignancy as those tumors which do not respond to the current quickly are probably malignant.

Most urologists agree that carcinoma of the bladder is best treated by excision or resection. In the majority of cases, however, the tumor is unfavorably situated, or the disease too far advanced for radical procedure. The destruction of the tumor by surgical diathermy following a suprapubic cystotomy has produced palliative results which in some cases have extended over a five year period. I⁽²⁵⁾ reported the results of that procedure as compared with those of other methods in our clinic, in 1928, and we know of nothing better as a palliative today.

The papillary type of carcinoma responds best. Some urologists, when the entire tumor can be visualized through the cystoscope, destroy this type of tumor by cystoscopic fulguration, but if it is large, it is best attacked through a cystotomy. The large inactive electrode is placed beneath the buttocks, and using one of the various types of interchangeable electrodes or tips, depending upon the size and position of the tumor, a strong coagulating current is used. The coagulated tumor may be curetted away, and the destruction of the tumor is carried beyond the base, when possible. The use of radium following such a procedure is a matter of personal choice, many advocating it, but it has not been effective in our hands.

Prostate

Carcinoma of the prostate may be attacked in the same manner as a palliative procedure. It may be accomplished by cystoscopic destruction of the obstruction or by suprapubic and perineal exposure. The results are bad and radium has been more effective in these cases.

The cure of chronic prostatitis is long drawn out and particularly difficult to accomplish in some cases. While medical diathermy is the treatment of choice in acute prosta-

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titis unattended by suppuration, in chronic prostatitis medical diathermy has not produced nearly as brilliant results, so that digital prostatic massage is still generally employed. Thompson⁽²⁶⁾ has advocated the treatment of various prostatic and posterior urethral lesions by electrocoagulation or incision with electrocautery, and with Cook⁽²⁷⁾ has reported a series of cases. Removal of prostatic calculi by transurethral methods has been recorded by Michel⁽²⁸⁾ and incision of large subacute abscesses of the prostate by Multhaus and Curtis⁽²⁹⁾. Heitz-Boyer⁽³⁰⁾ states that as early as 1920, he was opening by various intra-urethral methods prostatic and urethral diverticulae, which he often found in patients with chronic prostatitis of many years' duration.

Kidney and Ureter

As a polycystic kidney is a congenital, bilateral condition, hemorrhage or other symptoms which demand surgical intervention are to be managed by the method described by Rovsing⁽³¹⁾, that is to open and destroy the multiple cysts by electrocautery. Electrosurgery in the form of the "radio knife" has been employed instead of the scalpel.

With the smallest diameter of the ureter at the uretero-vesical meatus, many small renal calculi in transit become lodged there. Their passage may be hastened if the ureteral orifice be enlarged. While this may be accomplished satisfactorily by cutting the orifice with cystoscopic scissors, severe hemorrhage may occur, requiring cystotomy for control. The enlargement of the orifice may be accomplished by cystoscopic fulguration with a specially designed meatal electrode. It is inserted so that the active portion comes in contact with the orifice at about 12 o'clock and using a bipolar current, the opening is enlarged to the desired size.

Conclusion

It is seen in this era of scientific progress, that a place in the practice of urology must deservedly be awarded to electrosurgery as having revolutionized surgical urology. It is significant that in the poll for outstanding contributions in urology conducted by Caulk in the American Urological Association, electrosurgery was awarded 2nd and 5th positions.

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