

interstitial, or may, and in certain cases, probably does, involve the blood as a propagating medium.

3. The infection seems to be made effective primarily through constipation of mechanical origin.

4. The relief of the mechanical cause of the constipation with restoration of bowel function results in the cure of epilepsy in cases in which the infection is probably superficial.

5. The principle of immunization holds good in the treatment of cases in which the infection obviously lies deeper, in all of which autogenous vaccination may well be applied as a matter of routine.

This preliminary report in simple narrative form is submitted at this time in the hope that it may stimulate investigation at other hands along the same lines. In due season, I hope to lay the further details of my work before the profession. In the meantime I shall be grateful for the views of all practitioners whose experience has given them distinct opinions about the nature and treatment of a disease which has baffled science through the ages and the centuries.

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FULGURATION TREATMENT OF TUMORS OF THE BLADDER *

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It is now nearly five years since Beer made his preliminary report on a new method of treating neoplasms of the urinary bladder. During this time this method of treatment has been employed by surgeons in all parts of this country, so that it may be safely stated that for the treatment of papillomas of the bladder it has completely displaced all other methods of treatment in use prior to the introduction of this new form of therapy. This applies to the largest percentage of clinical cases. Occasionally a patient may be seen in whom cystoscopy cannot be tolerated, or, on the other hand, the bladder may be completely filled with papillomas, so that intravesical manipulation cannot be carried out. In this very small group of cases it becomes necessary to resort to suprapubic cystotomy, and to treat the tumors by fulguration through the suprapubic opening, or possibly by a resection of the tumor with sparking.

The results of this mode of treatment for bladder papillomas have been so uniformly successful that modern urinary surgery absolutely demands this form of treatment in these types of tumors. Although the method is not so universally employed in Europe as it is in this country, the results of its use are being reported more and more frequently and it is safe to assume that within a short time it will enjoy the wide application abroad that it does in America. Nothing has stimulated the general interest in the treatment of papillomas as has the use of the high-frequency current, which fact is evidenced by many recent publications dealing with this subject.

Synonyms.—One of the striking features of a review of the literature of this subject is the various names that have been used by different authors in their writings. Beer, in his original as well as subsequent

publications, refers to the treatment of these tumors by a "high-frequency current." The term "fulguration" has been used by many but is very frequently objected to, it being claimed that it is not a true process of fulguration. Thomas prefers the term "high-frequency desiccation," while high-frequency cauterization, electric cauterization, the bipolar spark, electric coagulation, thermopenetration and diathermy have been used by various authors. It can readily be seen that there is no uniform term describing this form of treatment in use at present.

Selection of Cases.—Of prime importance with this, as with any form of treatment, is the fact that its success depends on a careful, judicious selection of cases. This was early recognized by Beer, for in his second publication he stated that all cases should be studied microscopically and all malignant cases excluded from this therapy. In order to determine definitely the nature of the tumor, whether benign or malignant, it has been suggested that a small piece of the tumor be removed for histologic study by means of an operating cystoscope. *This procedure has been condemned by many as being not only unsatisfactory, but positively dangerous.*

It may not always be possible to obtain tissue for histologic study. Beer has suggested that "a careful and experienced worker will be able to decide from the lack of clinical result that he is dealing with a growth that does not respond; in other words, he is dealing with a malignant growth." This does not, however, hold true in each and every case, for it is quite possible that in a given case in which treatment was administered elsewhere and no result obtained, that a tumor may still be benign, or again because a tumor does not yield to treatment it must necessarily be malignant.

The best results have been obtained in papillomas of primary growth or in papillomas that have been previously operated on; that is, in cases with recurrences. These recurrences may be seen at the site from which the tumor was removed by a surgical operation; although not infrequently one sees these so-called recurrences in parts of the bladder remote from the primary growth, while the site from which the primary tumor was removed is free from neoplasm.

If one is dealing with such a case, it is questionable whether it can be called a "true recurrence," for, cystoscopically, there is no tumor at the site from which the former growth was removed. Under such conditions one should look on these as true new tumors.

In former writings, these so-called recurrences were explained as being the results of inoculation due to faulty technic at the time of operation. Statements were made attributing these recurrences to careless wiping with sponges, as well as to careless manipulation of retractors. In a case recently reported it was stated that the recurrences were found in that part of the bladder wall which had been covered by the retractor. These technical errors can be eliminated in cases in which the high-frequency current has been used.

In cases of recurrences, in which a suprapubic operation had been performed, and the recurrences are found in parts of the bladder other than that from which the tumor was removed, one must consider the possibility of having overlooked a small tumor at the time of operation.

* Read at the joint meeting of the Chicago Medical and Chicago Urological societies, Jan. 13, 1915.

TECHNIC

The patient is prepared for cystoscopic examination. The bladder is distended with boric solution. A ureteral catheterizing cystoscope is passed into the bladder, and a fulguration catheter is introduced through the catheter channel into the bladder. The tumor, or one of the tumors, if there are multiple growths, is located and the catheter passed forward to the tumor. The method of applying the current is variable. Some plunge the wire directly into the substance of the tumor, while others prefer to leave a small gap between the end of the wire and the growth. I have worked both ways, and it does not seem to make much difference in the results.

Two types of current have been employed, the unipolar or Oudin, and the bipolar or D'Arsonval. If the bipolar current is used, one pole is connected with the fulguration catheter and the other terminates in an electrode, the placing of which depends on the location of the tumor. If the tumor occupies the base of the bladder, a large flat plate may be placed under the buttocks, or an electrode may be placed in the rectum, whereas, if it occupies the upper wall of the bladder, a large flat plate is placed over the suprapubic area. I have always used the portable apparatus made by Wappler, and it has given very satisfactory results.

One of the former difficulties in carrying out this procedure was the inconvenience caused by the melting away of the insulating cable, so that after a certain amount of treatment it became necessary to withdraw the cable and cut off the end. This inconvenience has now been overcome by the use of the fulguration catheter, the end of which is made of bone. The cable being placed on the inside of this catheter also makes it easier to manipulate, and insures better insulation.

Portion of the Tumor to Which One Should Begin Making Application.—In small growths there is but one course to pursue, and that is to begin at the periphery. These small papillomas, if they are thoroughly sparked, require but one or two treatments for their complete removal. In very large growths, it might be desirable to adopt a different mode of procedure, namely, to apply the current directly to the pedicle of the tumor in the endeavor to free the tumor from its pedicle. If this procedure is successful, one accomplishes at one sitting the same result that would require numerous treatments if one began sparking at the periphery. Even in large tumors, however, it is often impossible to locate the pedicle definitely, and, consequently, this procedure cannot be carried out, so that starting at the periphery is the method most frequently used. With the object in view of accomplishing the same end-result, namely, the removal of the growth in one sitting, some surgeons prefer to use a snare when dealing with large pedunculated tumors. Then, after the major part of the tumor has been removed, the high-frequency current is applied to the base or the remainder of the tumor.

The current is controlled by means of the foot switch. When the current has been turned on one can see bubbles emanating from the tumor and rising to the top of the bladder. At the same time there is a blanching of the tumor, so that the entire part of the tumor which has been treated becomes white, and its cystoscopic appearance is changed.

The Element of Pain.—This depends almost entirely on the pain incident to cystoscopy, for not infrequently one sees patients who will not tolerate instrumentation of any kind. If cystoscopy is well tolerated, this element in the production of pain is eliminated. The amount of pain can be further reduced by the use of some local anesthesia in the urethra.

The Pain Incident to the Treatment.—As long as the high-frequency current is applied to the periphery of the tumor, the patient has no pain. When most of the tumor has been removed, so that only its base remains to be treated, pain is quite frequently complained of. The same applies when the end of the fulguration cable touches the mucous membrane of the bladder. When the technic is carried out perfectly, it is rare that patients complain of pain, and I have made it a rule that, when working at the periphery of a tumor, should the patient complain of pain, something is wrong with my technic or apparatus, and I aim to find and correct the cause.

Duration of the Treatment.—The duration of treatment is variable. In large growths one can spark from three to five minutes, especially as long as one is working away from the base of the tumor. It occasionally occurs, in highly nervous and sensitive patients, that one can make only one or two applications of short duration at each treatment.

Number of Treatments.—The number of treatments depends, in part, on the duration of each individual sparking. In the tolerant patient, one very often accomplishes more in one or two sittings of long duration than in half a dozen or more sparkings of short duration in the intolerant patient. As an average, three or four applications usually suffice.

Complications.—Another interesting fact obtained from a review of the literature on this subject is that nothing but good results are to be found. I have not been able to find one untoward result recorded in the literature at my command. This surely speaks well for this form of treatment, especially when one considers that the reports are the result of a new method of treatment and are recorded from men in all sections of the country. Doubtless, as time goes on, those who have had untoward results and undesirable complications will publish them, thereby preventing similar experiences in the hands of others. Unfortunately, we are prone to report our successful cases, and not to mention our bad results. If a new therapeutic measure has limitations, or if it is not free from danger in its application, it should be our aim to report the bad results, complications and limitations, in order to be better able to judge of the true value of its therapeutic merit as well as to avoid undesirable complications in our future work.

Treatment as a Hemostatic.—Many of the papilloma cases have, as their only symptom, hematuria. This may be of long or short duration, continuous or intermittent. Not infrequently the high-frequency current stops the bleeding permanently, so that after the first sparking the urine clears up and remains free from macroscopic blood. Several authors have recommended its use as a hemostatic, advising a careful search for the bleeding point and the application of the spark directly to it. In the cases of carcinoma in which the high-frequency current was used through the cystoscope, I was unable to see any definite hemostatic action.

Fragments of Tumors.—Often, during the course of sparking of a very large tumor, small pieces of tissue adhere to the end of the fulguration catheter, so that it becomes necessary to withdraw the catheter and remove them before sparking can be continued. For purposes of histologic study, these small pieces, as well as the fragments obtained after emptying the bladder, were saved and sections made of them. In most of the cases the sections showed a loss of structure, and

stained poorly, so that their histologic study was not very satisfactory.

Local Reaction.—As a result of the application of the high-frequency current, there occurs a certain amount of local reaction in the wall of the bladder, depending in part at least on the intensity and duration of the treatment. This local reaction has been described by several authors, attention having been called to the fact that it may resemble and be mistaken for carcinoma. That such mistakes are possible and have occurred is known. In a case recently reported just this error was made. The patient had been treated with a high-frequency current. At a subsequent cystoscopic examination, after the fulguration, this reaction was looked on as carcinoma, and the patient immediately was operated on and resection of the bladder was carried out. Sections failed to reveal anything resembling carcinoma.

CLASSIFICATION

For convenience the cases treated have been placed in four groups: papillomas, papillary carcinoma, carcinoma and polyps.

1. *Papillomas.*—In all, ten cases of papillomas have been treated. Regarding the incidence of sex there were eight males and two females. The oldest patient was 79, and the youngest 29. In two of the cases, the tumors were multiple. In one of the cases (a woman) there were found three tumors. The other case of multiple tumors occurred in a man, and there were six tumors present. The number of treatments given was as follows: In four cases, one sparking; in two cases, two sparkings; in two cases, three sparkings; in one case, four sparkings; in one case, five sparkings.

Two of the cases treated were of so-called recurrences, one after a suprapubic removal of the tumor, which was situated near the left ureteral orifice and which had been removed surgically in the days prior to fulguration. The other was a secondary growth after the first was removed by fulguration. In nine of the cases the treatment was carried out through the cystoscope, and in one through the suprapubic opening. Of these ten cases, eight are permanently cured, having been cystoscoped at various intervals since their discharge. One case is still under treatment and one has passed from observation.

2. *Papillary Carcinoma.*—There was one case of papillary carcinoma. Briefly the history is as follows: The patient had painless hematuria for three years. A diagnosis of papilloma was made, and the tumor was removed by surgical operation. It was situated near the left ureteral orifice. Three months after this operation, the patient again had profuse hematuria. I saw him six weeks after the onset of this hematuria. Cystoscopically a tumor was seen near the left ureteral orifice. With a cystoscopic rongeur a large piece was removed, and the diagnosis of papillary carcinoma was made. The sections from his previous operation were then looked up and it was found that a diagnosis of papillary carcinoma had been made at the time of his previous surgical operation. The patient refused any further surgical treatment, as the only possible operation considered was wide excision and transplantation of the ureter. The use of the high-frequency current was suggested to which the patient readily gave his consent. He received in all four sparkings. He has not had any further attacks of hematuria, and at the last cystoscopic exam-

ination, made Feb. 16, 1915, he was free from recurrence.

3. *Carcinoma.*—There were six cases of carcinoma, four in males and two in females. The age varied from 52 to 70 years. Three of the patients were treated through the cystoscope without any result. The treatment was very painful and it had no effect on the growths. It has recently been recommended that these carcinomas be removed, preferably by the cautery, after suprapubic cystotomy, and that then the base be sparked through the suprapubic opening. Three cases were subjected to suprapubic resection and bipolar sparking. One patient, at the time of her discharge from the hospital, showed a perfectly normal bladder on cystoscopic examination. Within six months she had a local recurrence. Another patient died six months later with an extensive carcinomatosis of the bladder. The third has passed from observation.

4. *Polyps.*—There was one case of polyp. The patient was a man. The polyp was large and hung from the internal urethral orifice, so that the patient had pain at the end of urination, and occasionally hematuria. One application of the high-frequency spark caused a complete disappearance of the polyp.

THE EFFECT OF VARIOUS PROCEDURES ON THE PASSAGE OF LIQUIDS FROM THE STOMACH*

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A large amount of experimental and clinical work has been done in the study of gastric function since the time of Beaumont, especially by Pawlow, Boas, Ewald, Cannon and others. Most of this work has dealt with the study of gastric secretion and the chemistry of digestion. Such work and thought as has been devoted to the emptying of the stomach has been largely clinical, although there has been some experimental and theoretical considerations of this subject in recent years.

When considering this subject it is surprising to find how many accepted facts concerning the emptying power of the stomach are conclusions, correct or otherwise, which have existed for so long that they are taken for granted as true, without experimental foundation.

It has been presumed by many that hyperchlorhydria is responsible for an increased action of the gastric musculature, particularly near the pyloric ring, thereby producing an emptying of the stomach more rapid than normal. On the contrary, Cannon¹ and others have shown, in a series of experiments in which this condition was artificially produced, that there was some delay in the emptying of the stomach.

A vague impression has always prevailed that posture or exercise have some influence on the emptying of the stomach. For instance, we instruct people not to lie down after a meal or to lie down at a given time only, before and after eating. Some experimental

* From the Department of Medicine, St. Louis University.
1. Cannon, W. B.: The Acid Control of the Pylorus, *Am. Jour. Physiol.*, 1907, v, 283.