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ORIGINAL COMMUNICATIONS.

CANCER OF THE CERVIX; CAUTERY AMPUTATION*

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(With eight illustrations.)

For some years I have maintained that, for all practical purposes, cases of cancer of the cervix that are curable, are curable by cautery amputation. Clinical travel planned in order to observe the leading operators of the world do radical hysterectomy has embraced not only the work of Wertheim and his assistants, but of men like Amann and Franz, Sigwart and Latzko, to say nothing of John G. Clark, and some of the ablest American operators—all men who do better surgery and more extensive removal than was seen at the Wertheim clinic. These observations and my own few cases have turned me back to Byrne's general principle, to which one may add certain betterments of method. The igni-hysterectomies of Mackinrodt were with clumsier instruments than we use and he abandoned his attempts. Gellhorn was his assistant at that period. Gellhorn, though qualified to be a star witness owing to judgment and experience such as few men possess, cannot see any hope in reviving the cautery method. But to me retrial does seem worth while. The low mortality and morbidity, and the willingness of patients to submit to and practitioners to advise a measure with low mortality and morbidity—these are strong arguments. The large number of men who can be trusted with the hot platinum knife is a big item in the argument when you compare this with the relatively few who can have the highest degree of expertness, experience, or skill requisite to carry out one of the most difficult and inaccessible

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operations in surgery. Radical removal of the uterus means to lay bare some inches of the ureter and to dissect to the obturator foramen in getting most of the paravaginal and paracervical fat and to own an equipment that will illuminate adequately this deep cavern. The so-called Wertheim's seen by me in England and the Wertheim's usually seen in America before the American Gynecological Club's German trip of 1912, were almost without exception ordinary total hysterectomies, bringing scant paracervical or para-

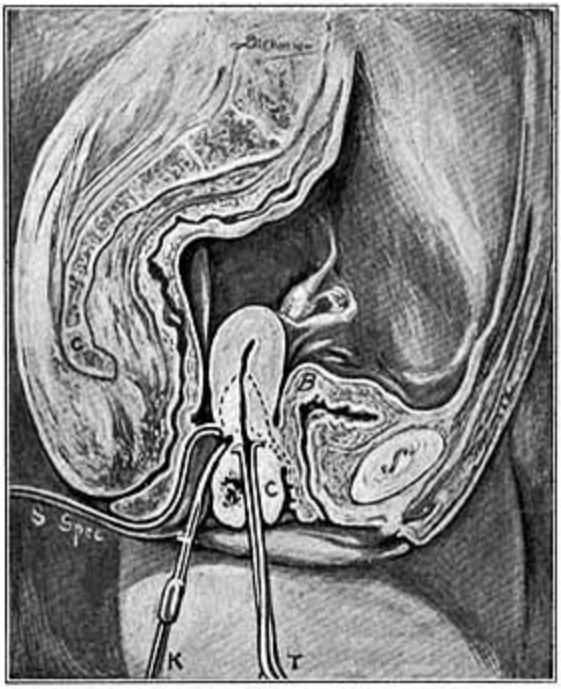

FIG. 1.

vaginal structure and not cleaning off the lateral pelvic walls clear down to the pelvic floor. A radical operation takes nearer two hours than one and a half hours. In the best hands the mortality is necessarily very high and a not inconsiderable number of ureters are injured. Wertheim told us that cancer of the cervix in fat women should not be attacked by the upper route but by the lower. Those cancer cases which come early and give the better results with the Wertheim operation, an enlarged Byrne operation will usually suffice to cure. When the glands are involved, we all know how seldom cure is recorded.

The gynecologist who is in the habit of doing a reasonable proportion of his hysterectomies by the vaginal route is able to institute comparisons upon a basis of experience. Exclusive of hospital patients, my private records show seventy-eight vaginal removals of the uterus. Comparing the partial hysterectomy of Byrne with the Schauta vaginal hysterectomy, as seen in four cases at his clinic and in three done since seeing those cases, I can say that the cautery knife can make neither so wide nor so intelligent a dissection as the steel knife and scissors of Schauta and his assistants. The heated platinum blackens and shrivels and obscures structure. This is a handicap. It takes great skill to dissect out the ureter in a genuine Austrian "Erweiterte Operation." The lovely pictures in the book are more dressed and trimmed up by the artist than my series of careful sketches taken over the Viennese shoulders, which show the frequent difficulty in identifying and clearing the ureter.

I have seen Werder do his operation in Pittsburg, but inasmuch as the cervical parametrium presents the danger zone of extension in cervix cancer, it seems to me that, as long as a vaginal attack has been undertaken, the whole work had better be completed through the vagina. The only excuse for any of this clumsy, slow cautery technic is the sealing of the lymphatics. The lymphatic channels which carry dangerous cells are those of the lower portion of the broad ligaments, and these are sealed by Werder in his vaginal cautery work. The cautery clamp on the ovarian and round ligament vessels of the upper third of the broad ligament is, therefore, an unnecessary precaution against cancer located in the cervix, and a considerable difficulty and complication. His clamp follows the method of Downes. Downes' clamp is a modification of the Skene clamp, adding to the power and ecraseur action of the original instrument. Therefore, the operation advocated by Werder is a combination of two Brooklyn hysterectomies—that with electro-hemostatic clamps—namely Skene's, on top of a Byrne cervix amputation.

I have seen Percy (and others) cook the core of the womb with an assistant's hand inside the abdomen grasping the uterus and have not failed to note somewhat brutal tools, shock, a huge, shut-in slough, and a considerable death-rate. We know now how this radiation in the pelvis, heating until all the red cells in the body have time to pass, may disintegrate them, and that autopsy has shown gastric ulcers corresponding with the findings after extensive superficial skin burns.

Technic is purposely presented to you this evening rather than

results. Not that careful reports lack weight in argument, but that each operator of sorts must judge for himself. Every man of wide experience and trained judgment who controls ample material must

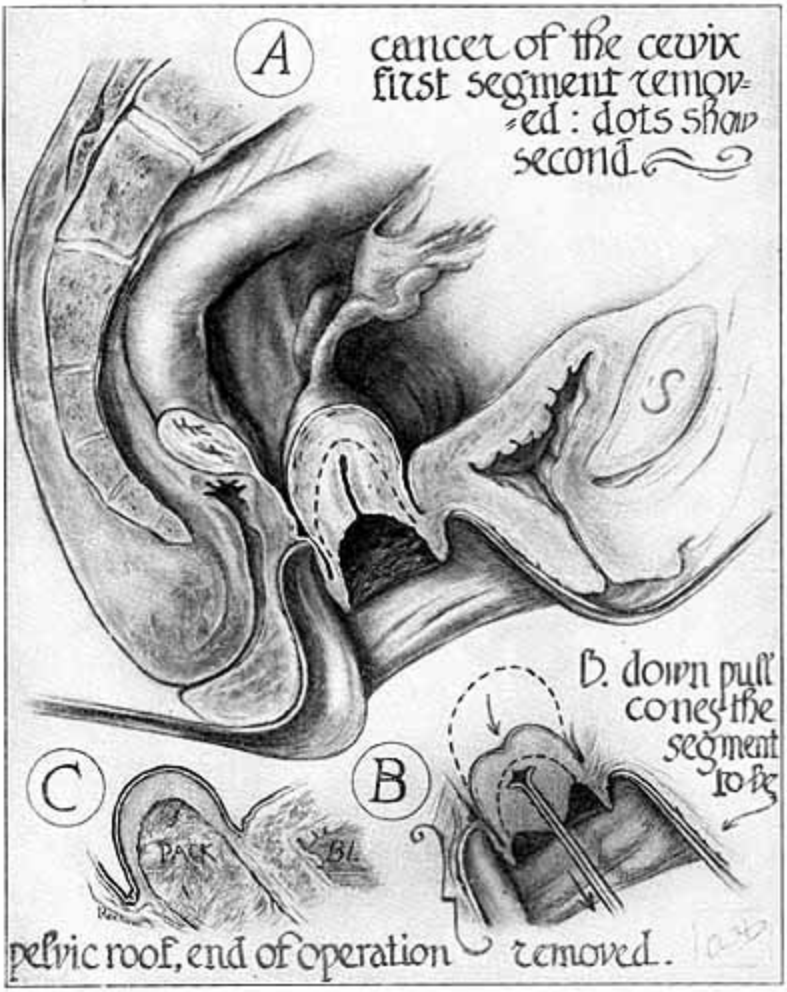

FIG. 2.

reach his own conclusions in any operative procedure. Demonstrate your technic to me; show me the kind of case to which you believe your operation better adapted than any other; let me see you go through the steps, and, if it seems reasonable, I will give it a conscientious test. This is particularly the case in such instances

as cancer of the cervix where few operable tumors come to any one individual, and where many surgeons must try out a claim. It is especially true when, disappointed with a newer radical method, we are asked to turn back to an older plan that presents new features.

By an *enlarged Byrne operation* I mean: *a*. Take the core out of the uterus, removing all of the canal of the body of the uterus as well as the cervix, so that the circular scar of the burn, in its inevitable contraction to a stricture, does not yield the characteristically severe dysmenorrhea that results when only the cervix and part of the canal of the uterus is removed. Byrne often employed this technic, saving only the fundus of the uterus. The advantage of leaving the fundus is that one secures a roof for the pelvis (Fig. 2, *c*). It practically peritonealizes this operation. It prevents bowel adhesions. We who have often done a Byrne cautery operation for the lower part of the broad ligament and then treated the remainder of the uterus like an ordinary vaginal hysterectomy, need of course, to sew the broad ligaments together as a final step. But this additional removal is unnecessary, because in cancer of the cervix the recurrence is not in the upper part of the broad ligament but in the lower part, and it is not good surgery because cutting and sewing should not be done in the neighborhood of cancer tissue.

b. Take all the paravaginal and paracervical tissues that can be safely removed. Our vaginal hysterectomies that have taken in a large part of the broad ligament by the method of Schauta (preceded by the sweeping pelvic incision of Schuchard) taught us how to secure the needed free access. This knowledge and experience of the distance we can safely go have been important enlargements of the Byrne method, which, as far as I know, he never used. Big or water-cooled specula seem to me clumsy and unnecessary. Even Byrne's wet gauze guards placed under the retractors narrow the passage. Two retractors, acting just where one is working, usually suffice.

c. To use the gloved finger in the rectum and the thermometer or little finger in the bladder is to have a guide to deeper and further work than we were able to do in Byrne's time. This development and enlargement of Byrne's method Percy has contributed. It has been shown that the long heating of Percy may cause disintegration of all the red corpuscles. Percy's iron cooks a considerable area steadily. To the red knife edge this grave objection does not apply. Byrne's knife touches only one point at a time.

d. In certain cases one opens the abdomen and has the assistant hold the uterus in the gloved hand so that he can report when the

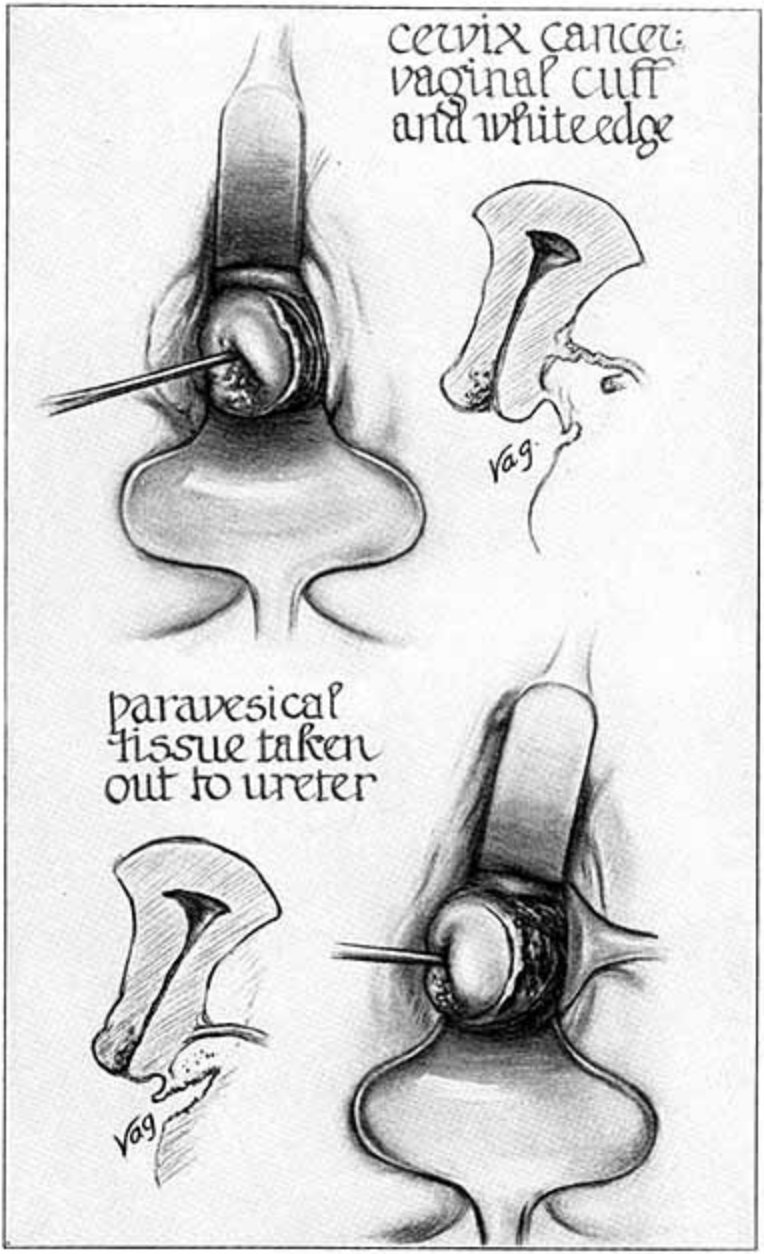

FIG. 3.

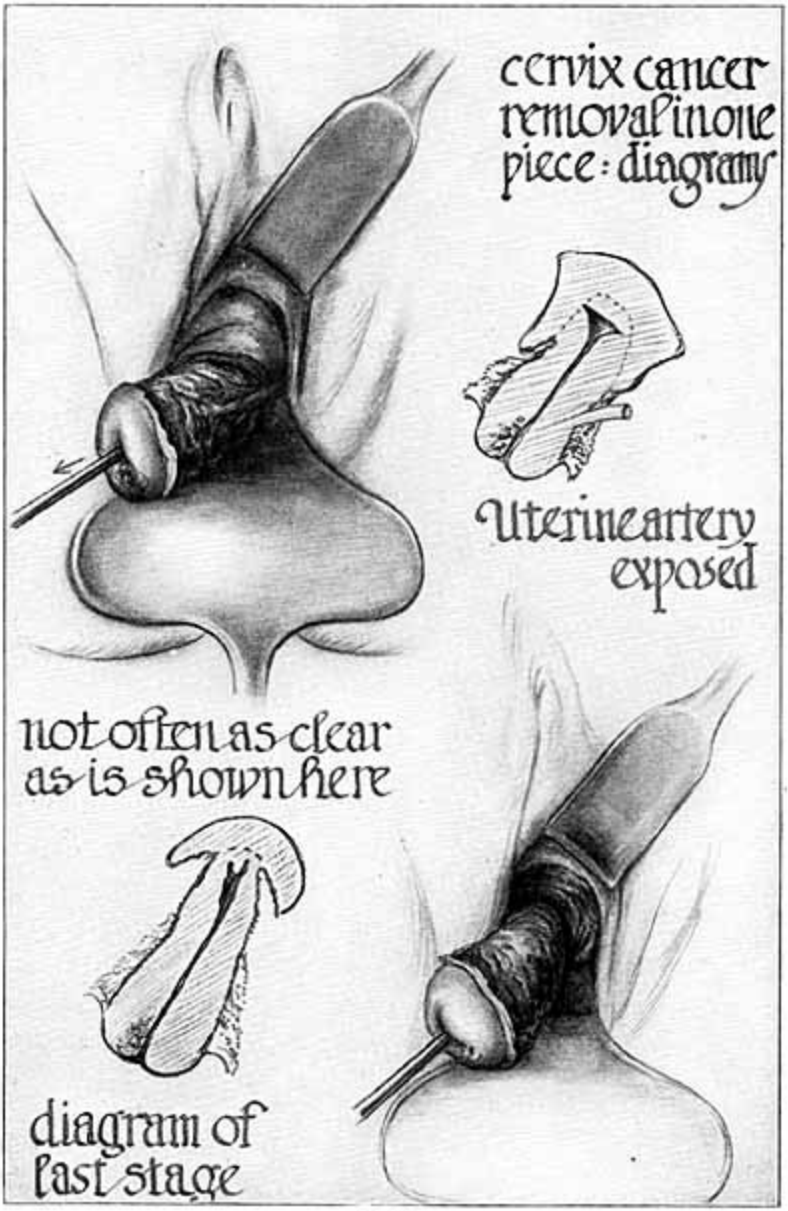

FIG. 4.

knife is in danger of going through the peritoneum. This guidance by the method of Percy is an important contribution. It enables us to work more briskly, but of course it adds very materially to the mortality, because of the peritoneal shock involved from a hand in the peritoneal cavity during the hour and a half necessitated in doing certain cases.

These then are the enlargements of the Byrne operation which, while not novel, might be said to give a fuller scope and a promise of better results. Dr. Byrne has removed the entire uterus with no more than the ligation of the ovarian arteries. I had to show that it could be done (not because I desire to advocate it) and re-

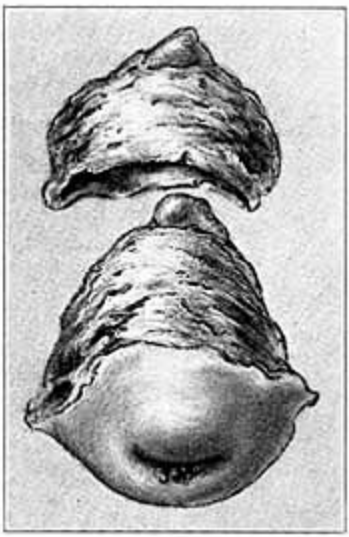

FIG. 5.—Two-piece removal with whole endometrium early involvement.

moved the whole uterus with the use of one single ligature. It shows how these large vessels can be shrunk securely. The upper vessels are not as fairly treated by cautery as the lower because the uterine artery is accessible and retreats so little that it can be hardened to the consistency of horn and trusted not to bleed.

We have tried doing a Byrne amputation of the cervix, and, some weeks later, an abdominal hysterectomy, but I must condemn it. One is obliged to wait till granulation is complete. By this time there is a strongly contracted scar-ring which prevents uplifting the fundus and the top of the broad ligament and masks the ureter relations in such an attack from above.

The apparatus* comprises two electrical devices. One is known as a rotary converter. This is used to transform the direct current into an alternating current. An alternating current may be transformed far more easily than a direct current. Therefore, the alternating current is used. This alternating current from the rotary is in turn put through a closed circuit transformer. This closed circuit transformer steps down the voltage from that obtained from the rotary (about 75 volts) to about 20 volts. This 20 volt alternating current is obtained from the secondary of the transformer, and may be regulated from 0 to 20 volts. At the same time, in converting this higher voltage alternating current into a lower

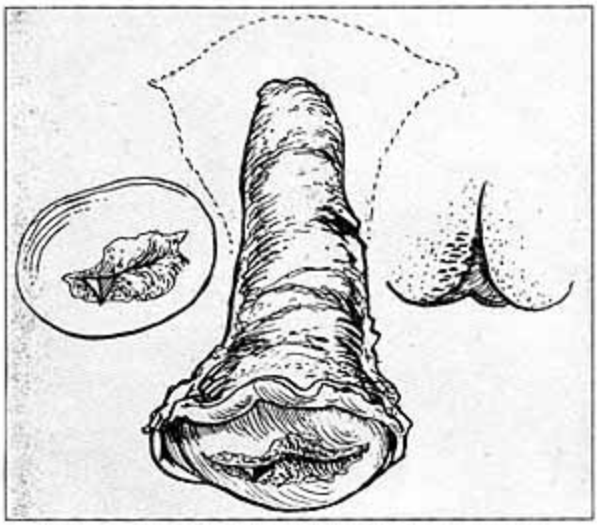

FIG. 6.—One-piece removal taking all endometrium.

voltage alternating current, we are also transforming the quantity of electricity from a lower amperage to a correspondingly higher amperage output, so that one is able to obtain a lower voltage and higher amperage. This, then, is used for heating the cautery knives.

Between the transformer and the knife run particularly heavy cables, in order to lower resistance and to prevent heating. This applies especially to the wires running through the handle to the knife. This handle is very heavily insulated and does not heat up in a long operation. The absence of a switch in the handle seems to me also to make for lowered resistance and cooler structures, but some operators prefer such a switch.

*The outfit is made by the Wappler Electric Manufacturing Company of New York.

The peculiarity of my knife, in which it differs from others, lies simply in its larger mass of metal. Thereby the lower degree of heat is longer held, and thereby also in connective tissue planes the slightly curved blunt blade can push away structures like the bladder.

The difference from previous apparatus, and practically the whole story of efficiency in this outfit, now about eight years in use, depends on two things; a powerful rotary converter and a powerful knife connected by heavy wire. Little knives and thin knives cool

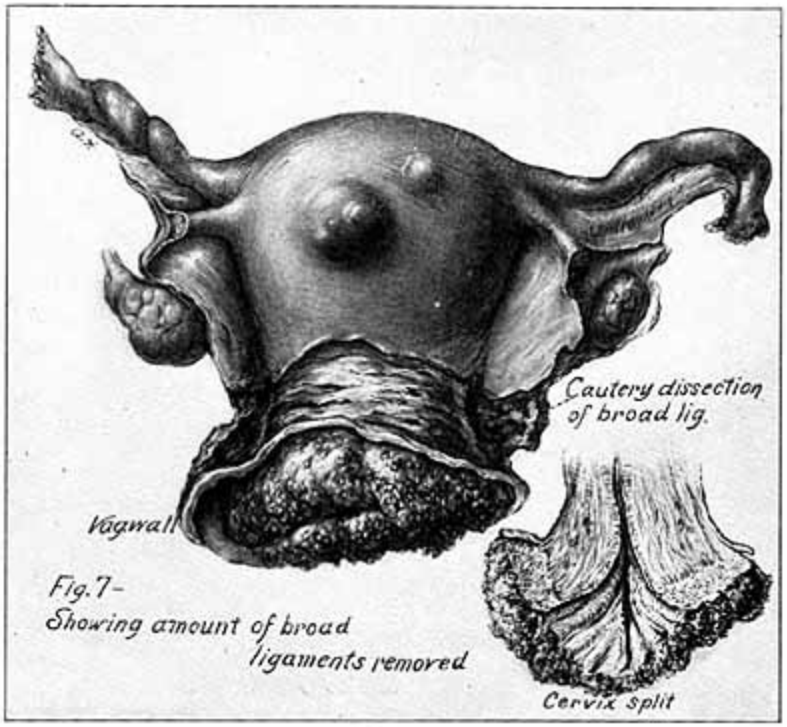

FIG. 7.

quickly, and, in consequence, the operator heats them far too hot, so that the tissues are charred instead of being cooked to horn. A black scab on the end of a vessel is knocked off by the blood current or the retractor. The tough, white, stiff surface, feeling and looking like horn or rubber, is the tissue to leave in the track of the knife. Thus he who has used the method a few times is not afraid to cook the uterine and trust to the cooking to hold the vessel, but the beginner will sleep better with ligatures about these big vessels.

Steps of the Operation.—Rotten tissue may be curetted from the

cervix cavity, the surface seared well with the flat of the knife. Dragging downward on the uterus and making counter-traction so that the line of incision is taut, the knife edge whitens a millimeter each side of the cut. Charring is to be avoided as far as feasible and also extreme white heat of the platinum. The perpetual refrain of this operation must be that of Byrne—"less heat," "less heat," "a deep dry roast," "a deep dry roast." The constant fault is too much heat, and this is unavoidable with light knives and small conducting wires. The attendant keeps his hand upon the switch and the operator calls for more or less current according to the density of the tissues and their vascularity

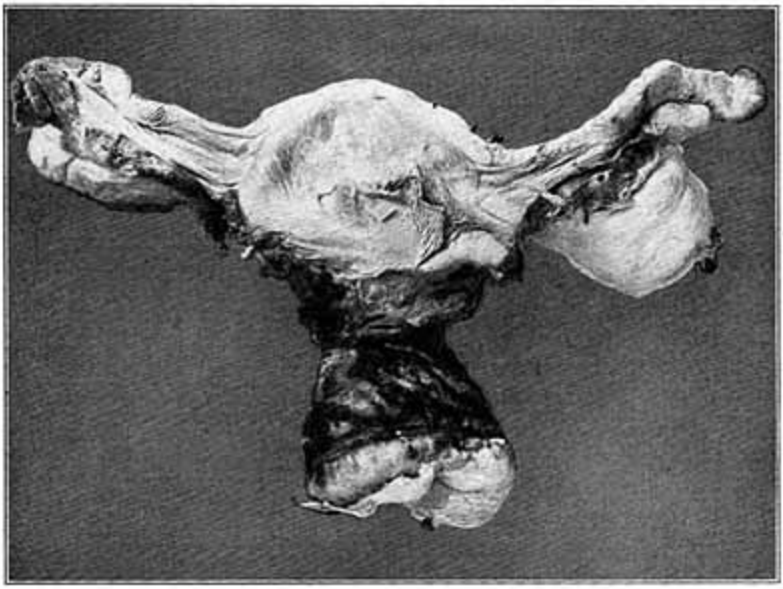

FIG. 8.—Byrne's own removal of uterus by cautery.

As soon as the vagina is freed, progress in the loose cellular tissue in front or behind the cervix goes easily—one dissects and one shoves. The slight curve of the knife and its blunt edge clear away the bladder rapidly. The posterior section is freed to the cul-de-sac. We next have the flat band of the broad ligaments to handle. Keeping away from the uterus and a safe distance from the ureter, the base of the broad ligament and the uterosacral ligament are cooked and severed. As we approach the uterine it may sometimes be dissected out by the knife, not too hot, and then carefully shrivelled, not with the edge, but with the flat of the knife. As is well known,

the desired traction pulls into the field and away from the ureter a short length of uterine artery comparable, in a way, with what is removed by dissection. The cautery knife then frees the broad ligament to its thin upper portion. Great care—and this is most important—must be taken by the assistants not to use the points of lateral tractors against the severed lower parts of the broad ligament, lest they drag the vessels open, if these have not been ligated. Ligation is very rarely needed. I have ligated one uterine artery.

Removal in two stages was often done by Byrne in that he cut away the lower section (Fig. 1), then "domed" the uterus with a second instrument, a coil of platinum over plaster, shaped like a finger tip. This has never worked well with me. The second piece is taken by the eversion and dissection method Byrne also taught. The spreading forceps—or a strong single tenaculum—drags progressively downward as the knife works upward (Fig. 2, *B*). Finally there is left only a fundus (Fig. 2, *C*).

It should be clearly understood that the operation is bloodless—or nearly so—only if the procedure is very slow. Quick severing leaves a mere crust of char. Jerky traction and prodding with retractor-points displace this crust. At the end of the operation one places the bicarbonate-carbolic gauze tampon of Byrne, or, as I prefer, zinc oxide gauze yard lengths, dusting vagina and vulva with bicarbonate of soda. These remain a week or more and are removed only when loose, lest roughness result in secondary hemorrhage. Suppuration and granulation go on for many weeks, but the convalescence is as quick (as far as the general strength and up-getting are concerned) as if one had done an ordinary knife-suture amputation of the cervix.

A drawback to the Byrne operation is the destruction of the specimen in some early cases. It is sometimes cooked through, and spoiled for microscopic confirmation of the diagnosis.

SUMMARY

Cervical cancer that is curable, is curable by partial cautery hysterectomy as often as by grave operations, and is attended with very low mortality and morbidity. These with the absence of shock, a lessened fear and readier consent, encourage new trial of the somewhat expanded Bryne operation. Removal of paravesical and paracervical tissues, together with the entire uterine canal, leaving only the fundus to peritonealize the operation; done with the

electrically heated heavy platinum knife, with finger in rectum, or thermometer in bladder, and sometimes with a hand in the abdomen, permit more extensive work than formerly, and promise better results.

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