

THE USE OF ENDOCERVICAL AND ENDOMETRIAL SMEARS IN THE DIAGNOSIS OF CANCER AND OF OTHER CONDITIONS OF THE UTERUS

G. N. PAPANICOLAOU, M.D., AND A. A. MARCHETTI, M.D.,
NEW YORK, N. Y.

*(From the Department of Anatomy, Cornell University Medical College and the
Department of Obstetrics and Gynecology of the New York Hospital)*

A STUDY of the diagnostic value of vaginal smears in carcinomas of the cervix and of the fundus of the uterus has been conducted for over three years in this institution. The results of this investigation, of which a preliminary account¹ has already been presented, will be fully described in a monograph.²

The diagnosis of cancer of the uterus by vaginal smears is based on the fact that, like all the epithelial tissues of the body, the superficial cell layers of the tumor are subject to continual exfoliation. The exfoliated cells mix with the secretions of the uterus and cervix, find their way into the vagina and may be recognized in a smear of vaginal fluid.

The rate of exfoliation is variable.² Certain types of uterine cancer, like adenoma malignum, do not shed as well as others. The number of exfoliated cells depends upon the type and the developmental stage of the tumor as well as upon the existence and extent of a blood discharge. It is therefore evident that in a smear prepared from fluid obtained directly from the endocervix or from the uterine cavity, the chances of finding exfoliated cancer cells would be much greater than in corresponding smears prepared from the vaginal fluid. Of course, the vaginal smear has the advantage of being easily prepared with fluid which can be obtained without inconvenience or danger to the patient. The procurement of fluid from the uterine cavity is a more delicate procedure and one accompanied by somewhat greater technical difficulties.

The credit for demonstrating to us the practicability of the endocervical or endometrial smear belongs to Dr. George Bourgeois, of the Margaret Hague Maternity Hospital, and to Dr. William Cary, of the New York Hospital. Bourgeois used a curved metal intrauterine cannula with one terminal and several lateral apertures, as is frequently employed in tubal insufflation tests. Cary's technique, which we are now using, is described in another article in this issue. The cannula developed by Cary can be easily introduced into the endocervical canal and the uterine cavity without causing trauma or appreciable discomfort or pain to the patient. From this standpoint, it should not be compared with any endometrial aspirating curette as used in obtaining endometrial biopsies where the element of trauma is always present. The fluid of the uterine cavity is obtained by mere suction and retains its normal cytology. The technique of fixing and staining the uterine smears is the same as that used for vaginal smears.^{2, 3}

Compared to the vaginal smear, the uterine smear shows a larger number and a greater variety of endometrial and cervical cells. As a consequence, the diagnosis of cancer of the cervix as well as of the

fundus, is greatly facilitated. The irregularities and abnormalities in the structure and size of the cells and of their nuclei are more apparent in the endometrial than in the vaginal smear. Anisocytosis, nuclear gigantism, atypical fragmentation of the nuclei, even mitotic figures are encountered more frequently.

Another advantage of the endocervical or endometrial smear is that it makes possible the procurement of uterine cells, even in the absence of bleeding. In the vaginal smear, endometrial cells are usually present when there is uterine bleeding, which carries the cells into the vagina. Therefore, in the normal cycle, endometrial cells are found in the vaginal smear chiefly during the menstrual flow, whereas with an endometrial smear one can obtain endometrial cells during all stages of the cycle as well as in amenorrhea and menopause.

On the other hand, the vaginal smear presents a distinct advantage because of its simplicity and the facility with which it can be applied as a general routine method. A vaginal smear can be prepared at any time and as frequently as desired, without discomfort to the patient, and the procedure can be entrusted to a nurse or even to the patient herself. From this standpoint, we believe that it will remain as a standard routine method, whereas the endometrial smear will be applied more selectively in cases in which additional information is desired, after considering all possible contraindications, more particularly those of infection or pregnancy.

References

1. Papanicolaou, G. N., and Traut, H. F.: *AM. J. OBST. & GYNEC.* 42: 193, 1941.
2. Papanicolaou, G. N., and Traut, H. F.: "Diagnosis of Uterine Cancer by the Vaginal Smear," Commonwealth Fund, New York, 1943.
3. Papanicolaou, G. N.: *Science* 95: 438, 1942.

A METHOD OF OBTAINING ENDOMETRIAL SMEARS FOR STUDY OF THEIR CELLULAR CONTENT

WILLIAM H. CARY, M.D., NEW YORK, N. Y.

(From the Department of Obstetrics and Gynecology, Cornell University Medical College)

THE purpose of this contribution is to describe a technique for aspirating the endometrial and/or endocervical secretions for a study of their exfoliated epithelial content, as discussed in the accompanying paper by Papanicolaou and Marchetti, and to outline the steps by which the investigation was evolved. The apparatus somewhat resembles Randall's aspirating endometrial curette with which it should not be confused, for our procedure may be carried out repeatedly with little or no discomfort to the patient and without traumatism of the tissues.

In 1929,¹ the writer presented an analysis of 266 postcoital studies performed by a standardized technique with respect to patients' preparation, hour of study and aspiration of specimens. In that paper was illustrated a cannula* devised for this technique and it was so fashioned that one end made an airtight engagement with the tip of a standard

*Since this article was written, I learn that a cannula of similar type has been employed previously in examinations of the larynx.