

RADIUM THERAPY IN FIBROID AND  
OTHER BENIGN CONDITIONS  
OF THE UTERUS\*†

BY WILLIAM KOHLMANN, M.D., F.A.C.S.,  
*and*  
ERNEST C. SAMUEL, M.D.,  
New Orleans, La.

In any discussion of the subject of radium and the treatment with radium, it is absolutely necessary to take into consideration the fact that this method of treatment is practically in its infancy. Remarkable progress has, however, been made in a very short time, and in the last few years radiotherapy has come to be more and more recognized by the medical profession as an important factor in the treatment of those conditions whose relief has heretofore been wholly dependent upon surgical measures. Experience has shown that some of these conditions are far more easily controlled and cured by the ray than by the knife, and this method is to be preferred, not only on account of its desirability in the treatment of the specific disease, but also because the patient is able to react more readily when the mental strain of the surgical procedure is eliminated. In cases of bleeding, this is especially true because the patient is already greatly weakened by loss of blood.

Profuse menstruation, otherwise known as menorrhagia, and excessive, irregular bleeding from the uterus, called metrorrhagia, occur either in cases where no pathological changes of the mucous membrane or a small myoma are to be found, or at least, their presence suspected. These abnormal conditions are of greatest importance, not only to the gynecologist, but to the general practitioner as well. Long-lasting, and at times profuse bleedings from this source have weakened many a patient to such a degree that death seemed almost inevitable.

In the past, the treatment of these abnormal conditions has been far from satisfactory. Every known variety of internal treatment, such as tonics and glandu-

\*From the Radium Institute of New Orleans.

†Read in the Section on Surgery, Southern Medical Association, Fourteenth Annual Meeting, Louisville, Ky., Nov. 15-18, 1920.

lar medication, i. e., ovarian and thyroid extracts, have been tried extensively. The use of horse serum was without success. Local treatment of the mucous membrane of the uterus with numberless drugs, cauterization and curettage have not given satisfactory results, and in spite of these measures, finally, in desperate cases, removal of an apparently healthy uterus had to be resorted to, in order to insure the safety of the patient.

In contrast to such an extensive and mutilating surgical cure, how simple and successful is the radiotherapy by Roentgen and radium rays!

In the beginning of 1914 we started the treatment of the conditions just described, by the apparatus suggested by Gauss, of Kroenigs' clinic in Freiburg. The results were very satisfactory, but the details of the treatment, as all of you well know, were rather trying and time-consuming to both patient and operator.

The advent of radium, which has been at our disposal in sufficient quantities since June, 1915, supplanted the roentgen ray, as its application is not only mere simple, but also more effectual.

Three groups of cases have been subjected to treatment. In all these cases, however, careful examination had to be made in order to exclude those in which appeared the slightest degree of pelvic inflammation, and thus avoid any possible exacerbation of existing inflammatory symptoms. The three types mentioned above are:

(1) Cases of menorrhagia or metrorrhagia, in which local examination revealed no pathological condition.

(2) Cases presenting the symptoms of metritis, especially those at menopause.

(3) Cases in which the fundus of the uterus was thickened to such an extent as to justify the suspicion of the presence of small intramural fibroids, or where the fibroid had developed to such a size that the myomatous disease was clinically predominant.

The extent of the influence of the radium treatment on bleeding depends upon two factors:

(1) The age of the patient.

(2) The amount of element and time of application.

The extent of the disease of the uterus (clinical and microscopical) is scarcely to be considered, as extensive disturbances of this organ are just as easily influenced by radium as minor ones.

Women near the menopause require smaller doses. As a rule, the application of 50 mg. of radium for twelve hours is sufficient to stop bleeding and, in many cases, induce the menopause.

In younger women the larger doses are necessary, especially if anemia of higher degree demands the early cessation of menses. It is difficult to decide the strength of the rays necessary to diminish the bleeding in younger women without incurring the possibility of an early menopause. It should be our aim to prevent an abrupt cessation of menses, as younger women are generally as greatly disturbed by radium as by ovariectomy. Small doses by moderately prolonged intra-uterine application may have such an effect. Twelve hundred milligram hours seems to be the largest dose advisable in younger women, if menstruation is expected to continue, and the smallest dose in older patients near the menopause, if it is desired that the menses should cease entirely. The intra-uterine application of radium is to be preferred to the vaginal, for it is more effectual, and furthermore, frequent applications in the vagina and cervix could produce shrinking of the lumen, which is to be considered, especially in middle-aged patients, as the possibility of pregnancy is still present. This was the experience in one case of our series.

Mrs. H. O'N., age 37 years, menstruation at 15, regular but scant periods of 3 to 4 days duration. Married 8 years. Children 3, no miscarriages, labors easy, patient stating that labor never lasted longer than 3 or 4 hours. March, 1918, uterine bleeding began, which was scant but persistent. Early abortion was suspected and the patient curetted March 11, 1918. The scrapings did not confirm this suspicion, and were negative for malignancy. A section of tissue from the slightly eroded cervix was negative. No relief from the bleeding was obtained, and the patient was referred to the radium department of Touro Infirmary for treatment. The records of the department report three administrations of radium (vaginal). There was no bleeding for 5 months, until Feb. 1, 1919, when the patient reported a profuse menstrual period, followed by a scant flow in March with no further bleeding. Pregnancy was normal. Labor set in Dec. 12, 1919. Delivery was delayed, the bag had ruptured

early; the cord was prolapsed. Progress was very slow. Vaginal examination revealed hard, unyielding ring in location of internal os. As pains increased and labor did not progress, forceps were attempted, but extraction was impossible on account of the above-mentioned hard ring. Eventually an abdominal Caesarian delivered a well-formed child of 8 pounds. The patient died on the fifth day, manifesting symptoms of acute dilatation of the stomach.

In regard to efficiency and greater safety, radium could easily take the place of surgical interference in fibromyomata, but large tumors are not very suitable for radium treatment, especially those reaching to the umbilicus. Multiple subserous and very hard fibroids are not easily amenable to radium treatment. The best results are effected by radium in the intramural variety. In these cases the size alone cannot be considered a contra-indication, as these soft, rapidly growing tumors are especially influenced by radium.

The changes in a myomatous uterus are similar to the ones after normal change of life. The uterus gets gradually, but slowly, smaller. Small fibroids, especially if the blood supply is poorly developed, will shrink more quickly than larger vascular ones.

The fact that rapidly growing tumors may be considered fibromyomata, when really they are sarcoma, should not prevent the use of radium, as malignant degeneration is very rare. A rather unusual case came under my observation of a woman who was treated for hemorrhage due to fibroid of the size of a fetal head.

Mrs. J. S., Touro Infirmary, No. 71901. Age 42 years. Diagnosis, fibroid of uterus. For one year the patient had been menstruating frequently and profusely at times. She had had a small fibroid for many years. Examination showed uterus enlarged, the size of two fists, irregularly shaped.

Radium treatment: Feb. 2, 1918, 75 mg. intra-uterine for 8 hours; March 2, 1918, 50 mg. intra-uterine for 8 hours.

Result: Menses ceased and uterus diminished in size.

Two applications relieved the bleeding, brought about the artificial cessation of menses, and the uterus began to shrink, until at the end of the fourth month, the size of the uterus was diminished so that no positive diagnosis of fibroid could be made. After about one year hemorrhage suddenly occurred, and returned in about one month. Uterus had markedly enlarged again, and the possibility of a sarcomatous degeneration induced me to perform abdominal panhysterectomy. The uterus showed dense tis-

sue parts, where apparently the previous fibroid had been found. However, one new nodule, the size of an orange, had formed, and microscopical examination proved it to be a malignant leiomyoma. Patient made a good recovery from the surgical operation, and is in perfect health today.

We have treated 42 cases of these benign conditions of the uterus, of which there were 2 of the first type of cases, namely, those of menorrhagia or metrorrhagia where no pathological condition could be found, and one of which was extremely serious and interesting in regard to the ultimate outcome.

Miss H. A., Touro Infirmary, No. 67338. Age 22 years. Average weight 86 lbs. Menses at 15 years, regular, but profuse for five days. January, 1918, had an attack of grippe, and when periods came menstruated for about six weeks. Lost a good deal of flesh after January. Appetite very poor; bowels fairly regular. Patient very thin and anemic. Cured first week in May to check bleeding. May 16, began bleeding again. When first seen pulse above 130 and weak. She was taken to hospital. Uterus packed. Radium advised to check bleeding. Two treatments given:

1. May 24, 1918, 50 mg. intra-uterine for 7 hrs.
  2. June 3, 1918, 50 mg. intra-uterine for 11 hrs.
- Patient did not menstruate for one year, after which time, returned regularly and in normal quantities.

Of the second type (cases of metritis), there were only five, all of which were relieved by one or two treatments.

The majority of the cases were fibroids, of which variety there were thirty-six. All were treated with radium and, with the exception of two, were relieved from their subjective and objective symptoms. In these two cases panhysterectomy had to be done, one on account of increase of pain, which had been present to some extent before treatment, and the other was a case of large dimensions, the tumor reaching about two inches above the umbilicus.

Mrs. I. B. M., Touro Infirmary, No. 59829. (Increase of pain). Age, 44 years. Diagnosis: fibroid. Patient suffered severe menstrual pain and increased flow. Had to remain in bed first two or three days. Slight vaginal discharge. Intra-uterine application of 50 mg. of radium in celluloid tube did not change character of menses. On the contrary, it produced continued pain. Hysterectomy was done, which was followed by relief of symptoms.

Miss A. B., Touro Infirmary, No. 60691. (Large tumor). Age, 30 years. Diagnosis, fibroid. Patient always enjoyed good health, menses regular until October, 1916. Menses became irregular, about every 15 days, flow profuse, of

## CASES OF FIBROID

| Name          | Hospital Number | Age | No. of Applications | Amount of Element | Method of Application | Time of Exposure |
|---------------|-----------------|-----|---------------------|-------------------|-----------------------|------------------|
| Mrs. P. A.    | 79859           | 50  | 4                   | 1.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 25 mg.            | Vaginally             | 10 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 25 mg.            | Vaginally             | 10 hrs.          |
| Mrs. F. B.    | 70080           | 56  | 2                   | 3.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 25 mg.            | Vaginally             | 10 hrs.          |
|               |                 |     |                     | 4.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 25 mg.            | Vaginally             | 10 hrs.          |
| Mrs. C. B.    | 80866           | 50  | 2                   | 1.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 12 hrs.          |
| Mrs. A. D.    | 80240           | 40  | 1                   | 50 mg.            | Intra-uterine         | 18 hrs.          |
| Miss A. B.    | 60691           | 36  | 5                   | 1.—50 mg.         | Intra-uterine         | 4 hrs.           |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 9 hrs.           |
|               |                 |     |                     | 3.—50 mg.         | Intra-uterine         | 9 hrs.           |
|               |                 |     |                     | 4.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 5.—50 mg.         | Intra-uterine         | 11 hrs.          |
| Mrs. J. H.    | 88399           | 38  | 1                   | 75 mg.            | Intra-uterine         | 12 hrs.          |
|               |                 |     |                     | Mrs. de C.        | 67012                 | 46               |
|               |                 |     |                     | 2.—75 mg.         | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 3.—100 mg.        | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 4.—50 mg.         | Intra-uterine         | 11 hrs.          |
| Mrs. R. E.    | 83250           | 45  | 1                   | 50 mg.            | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | Mrs. A. F.        | 57645                 | 42               |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 12 hrs.          |
| Mrs. W. F.    | 81860           | 28  | 3                   | 1.—50 mg.         | Intra-uterine         | 12 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 12 hrs.          |
|               |                 |     |                     | 3.—50 mg.         | Intra-uterine         | 12 hrs.          |
| Mrs. M. F.    | 83207           | 44  | 1                   | 100 mg.           | Intra-uterine         | 12 hrs.          |
|               |                 |     |                     | Mrs. L. F.        | 83144                 | 46               |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 12 hrs.          |
| Mrs. I. F.    | 63990           | 49  | 2                   | 1.—50 mg.         | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 10 hrs.          |
| Mrs. M. G.    | 83231           | 46  | 1                   | 50 mg.            | Vaginally             | 24 hrs.          |
|               |                 |     |                     | Mrs. P. G.        | 88854                 | 42               |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 12 hrs.          |
| Mrs. M. H.    | 62481           | 40  | 3                   | 25 mg.            | Vaginally             | 12 hrs.          |
|               |                 |     |                     | 1.—50 mg.         | Intra-uterine         | 23 hrs.          |
|               |                 |     |                     | 2.—75 mg.         | Intra-uterine         | 10 hrs.          |
| Miss L. H.    | 71907           | 34  | 3                   | 3.—75 mg.         | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 1.—75 mg.         | Intra-uterine         | 8 hrs.           |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 24 hrs.          |
| Mrs. C. H.    | 72321           | 44  | 2                   | 3.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 1.—75 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 2.—75 mg.         | Intra-uterine         | 11 hrs.          |
| Mrs. G. K.    | 60399           | 42  | 3                   | 1.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 21 hrs.          |
|               |                 |     |                     | 3.—50 mg.         | Intra-uterine         | 12 hrs.          |
| Mrs. M. K.    | 68563           | 42  | 2                   | 1.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 2.—75 mg.         | Intra-uterine         | 23 hrs.          |
| Mrs. S. L.    | 85273           | 51  | 1                   | 50 mg.            | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | Mrs. B. L.        | 70021                 | 38               |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 8 hrs.           |
| Mrs. R. L.    | 66761           | 46  | 2                   | 1.—50 mg.         | Intra-uterine         | 8 hrs.           |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 10 hrs.          |
| Mrs. C. M.    | 68392           | 47  | 3                   | 25 mg.            | Vaginally             | 10 hrs.          |
|               |                 |     |                     | 1.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 2.—75 mg.         | Intra-uterine         | 11 hrs.          |
| Mrs. J. M.    | 72902           | 42  | 2                   | 3.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 1.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 10 hrs.          |
| Mrs. I. B. M. | 59829           | 44  | 1                   | 50 mg.            | Intra-uterine         | 10 hrs.          |
| Mrs. M. M.    | 62313           | 39  | 3                   | 1.—50 mg.         | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 3.—50 mg.         | Intra-uterine         | 11 hrs.          |
| Mrs. A. R.    | 81818           | 29  | 3                   | 1.—50 mg.         | Intra-uterine         | 12 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 12 hrs.          |
|               |                 |     |                     | 3.—50 mg.         | Intra-uterine         | 12 hrs.          |
| Mrs. M. S.    | 56963           | 35  | 2                   | 1.—50 mg.         | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 10½ hrs.         |
| Mrs. S. J. S. | 85585           | 44  | 1                   | 50 mg.            | Intra-uterine         | 22 hrs.          |
|               |                 |     |                     | Mrs. T. S.        | 63480                 | 50               |
|               |                 |     |                     | 2.—75 mg.         | Intra-uterine         | 11 hrs.          |
| Mrs. J. S.    | 71901           | 42  | 2                   | 1.—75 mg.         | Intra-uterine         | 8 hrs.           |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 8 hrs.           |
| Mrs. M. S.    | 78811           | 43  | 3                   | 1.—75 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 2.—75 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 3.—75 mg.         | Intra-uterine         | 10 hrs.          |
| Mrs. L. T.    | 61200           | 35  | 2                   | 1.—50 mg.         | Intra-uterine         | 11 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Intra-uterine         | 11 hrs.          |
| Mrs. A. W.    | 81702           | 40  | 2                   | 1.—50 mg.         | Intra-uterine         | 24 hrs.          |
|               |                 |     |                     | (Dr. Hirsch).     | 2.—50 mg.             | Intra-uterine    |
| Mrs. E. W.    | 82912           | 44  | 2                   | 1.—50 mg.         | Intra-uterine         | 24 hrs.          |
|               |                 |     |                     | (Dr. Cohn).       | 2.—50 mg.             | Intra-uterine    |
| Mrs. W. W.    | 80409           | 39  | 4                   | 1.—50 mg.         | Vaginally             | 10 hrs.          |
|               |                 |     |                     | 2.—50 mg.         | Vaginally             | 10 hrs.          |
|               |                 |     |                     | 3.—50 mg.         | Intra-uterine         | 10 hrs.          |
|               |                 |     |                     | 4.—50 mg.         | Intra-uterine         | 10 hrs.          |
| Mrs. F. D. W. | 85402           | 44  | 1                   | 50 mg.            | Intra-uterine         | 28 hrs.          |

five days duration. May 4, 1917, severe hemorrhage for one day, bleeding continued for ten days. Recurrence of hemorrhage May 29, large clots. General weakness. Vaginal and abdominal examination revealed large fibroid extending above navel.

## Treatment:

May 21/17. 50 mg. radium intra-uterine for 4 hrs.  
May 30/17. 50 mg. radium intra-uterine for 9 hrs.  
June 9/17. 50 mg. radium intra-uterine for 9 hrs.

Patient began to improve, but after a few months flow increased again, and two more applications were made.

Feb. 6/18. 50 mg. radium intra-uterine for 10 hrs.  
Feb. 13/18. 50 mg. radium intra-uterine for 11 hrs.

Patient did not show any improvement. On the contrary, continued to have a great deal of bleeding, complicated by continuous discharge. Hysterectomy was decided upon, and uterus was removed. The tumor was about the size of a boy's head: one large fibroid, with multiple small subserous fibroids.

All the other fibroid cases were relieved by one to three applications of 50 mg. radium of mostly twelve hours duration. I have here a detailed history of these cases, giving number and time of applications:

Summarizing the results of these observations, we see that an average of only a little more than two treatments was necessary to produce the desired results. The age of the patients was, with one exception, between 30 and 56 years, ten cases ranging from 30 to 40, and the rest from 40 to 56 years. The average number of treatments given to the cases between 30 and 40 was only slightly increased over the treatment of the cases above 40 years of age.

The method of preparation of the radium applicators that are being used at our clinic by Dr. Samuels and his associate, Dr. Bowie, has been to use the two mm. of silver. This is further enclosed in the celluloid containers with cotton packed on top, and melted paraffin poured on top of the cotton, thereby sealing the container. Then the celluloid capsule receives a paraffin coating, which probably takes care of most of the beta rays. The method of sterilization is to put the whole applicator down in 40% formalin, allowing this to remain, with part of the white thread that is attached to the tube, for about ten minutes. It is then taken out, and sterile water is poured over the applicator, after which it is put into sterile gauze until inserted. We are indebted to Dr. Robert Abbe for the idea of the celluloid capsule, which we have found very efficient. The element is packed in the very end of the applicator, and not allowed to come in contact with the cervix. When more than 75

mg. are used this is impossible, but this large amount is only used in desperate cases when two or three applications with the ordinary amount have failed. The usual cleanliness that is used in all vaginal work prevails here. We do not use the retention catheter, as the liability of cystitis is always present, no matter how careful we are. After the introduction of the applicator a large vaginal pack is applied well against the cervix to hold the tube in position. The pack must not make the patient uncomfortable enough to prevent voiding. We do not allow the patient to sit up after the radium is in position. At the termination of the application, the patient is instructed to take a douche night and morning of very hot saline. A watery discharge always follows and usually appears in about five days. This continues for about six months after the application, and gradually subsides. For each subsequent application the same rules apply.

#### DISCUSSION

Papers of Dr. Floyd and Drs. Kohlman and Samuel.

*Dr. Louis Frank, Louisville, Ky.*—My own tendency, and I believe it is true of all those who have used radium, is to become very enthusiastic about certain cases in which it is used. This is notably true in carcinoma of the uterus, and in cases of myopathic bleeding and small fibroid tumors. We may say, I think without fear of successful contradiction, that in myopathic bleedings the percentage of cures will approximate 100. However, we do not believe that radium and x-ray should be used except as an adjunct and aid to surgery. Therefore, we believe their use should be confined to the surgeons themselves, particularly, radium and therapeutic x-ray should never be used by a mere technician, but by a careful and skilled radiologist. The use of these agents is fraught with some danger. Our own experience has been largely with radium. The radiological work is done by a skilled radiologist. The first speaker called attention to some of the dangers we have to deal with in treatment of the pelvic organs of women. There must not be any inflammatory diseases in the pelvis. Such cases when radiated are accompanied by great danger of lighting up of the inflammatory disease. Therefore the radiologist must know what he has to deal with before he applies this kind of treatment.

One point I would touch upon so far as the paper of the essayist is concerned is the hopelessness of many of the carcinoma cases that are sent for treatment. We cannot hope to get results with many of them. But in a certain number of them, hopeless as they are, the lives are prolonged by radium therapy. The point of accurate diagnosis, as mentioned by the first speaker, before treatment, we think is very important. This

was touched upon the other day by Dr. Bloodgood in relation to bone tumors.

We are getting very good reports from radium in tumors that have never been submitted to the microscope. We believe that all cases, even the myopathic bleeding curettings, should be submitted to the microscope and we believe this should be done in every case. Naturally, in some of the deep-seated growths treated by x-rays this cannot be followed out. We had this illustrated yesterday, for instance, in a case of carcinoma of the jaw in which large glands in the neck were dissected out and then treated with x-rays. The glands were broken down and suppurating. Had the case been treated by x-rays alone without microscopic diagnosis, we should have looked upon this case as a cure by x-ray, and the glands as malignant. For that reason the diagnosis should always be microscopic.

Another point that I think has not been sufficiently touched upon is the preoperative treatment of malignancy by x-ray and radium. In the first essayist's paper the point was particularly stressed that these cases were treated post-operatively by x-ray and some with radium. This is as it should be and we have made it a rule to treat all cases of malignancy following operation with x-rays, in some cases leaving the wound wide open for treatment. But the preoperative treatment is just as important. The operation must be performed rather soon after this treatment or the fibrosis will be so great as to give trouble.

We have treated about three hundred cases in the past four years with radium and from this group we have made a collection of our cases of cancer of the cervix which we would like to review briefly if we have the time.

During the past four years we have treated 74 cases of cancer of the female genital tract, divided as follows; cervix uteri, 61; vagina, 6, of which 5 were recurrences after operation for cancer of the cervix, which probably should be listed with the above. Of these 61 cases of cancer of the cervix 26 are alive; three of these cases were radiated after operation; 1 was treated (inoperable), and four months later was operated in another clinic. Three of these cases occurred in patients previously operated for fibroids. In five cases the lesion was distinctly local; all of these are alive and perfectly well. Four of them were treated more than a year and a half ago. Of the rest of the group, 27 are dead or dying. A number of these lived for twenty to thirty months without any local evidence of disease, death resulting either from deep extension or pressure on the ureters and uremia. In 8 cases the result is unknown. In the 6 cases of cancer of the vagina, the primary one died. When first seen the rectum was infiltrated and operation was impossible. Of the five recurrent cases four are dead or dying; 1, untraced.

We believe that all cases of cancer of the body of the uterus should be operated upon. This type of cancer metastasizes late and operation a year or more after the onset of symptoms often brings a cure. After operation all of these should be treated by radium in the vagina and should have crossfire through the abdomen with the Coolidge tube. The number of these cases treated by ra-

dium is seven. Four are alive and well, one more than three years and another more than two years. One is dead and two have not been traced.

Our results in treatment of cancer of the rectum have been most unsatisfactory. We have treated thirteen inoperable cases, and we are sorry to say that none of them is well. This may be due to the fact that there was very wide extension when the patients were first seen by us. Notwithstanding our unsatisfactory results we think that these cases should be given the benefit of treatment in the hope that we may prolong the life of the individual and sometimes obtain a cure. In operable cases we think that radium should be used before operation, thus killing off some of the cancer cells and making recurrences less probable.

*Dr. H. E. Ashbury, Baltimore, Md.*—There is in this question of the use of radiation an idea abroad that there is a difference between radium radiation and x-ray radiation. There is a difference, but it is a difference which is physical. The rays of both radium and x-rays fit into the light spectrum where the wave lengths are shortest and overlap each other, the gamma rays of radium being a little shorter and more penetrating than the x-rays which we are able to generate at the present time. These very penetrating rays give off a greater number of beta rays which we find are the active agent of destruction in the treatment of malignant disease. X-ray machines are now being constructed capable of operating at 200,000 volts that will undoubtedly produce energy equivalent to large quantities of radium.

*Dr. Floyd* has discounted the value of his slides a little, for I think they show admirably the pathology which was present. They reveal the necessity for surgeons knowing in advance of operation the extent of metastases. Breast cases should have the chest roentgenographed before the breast is removed, and in prostatic carcinoma an x-ray study should be made of the spine and pelvis for evidence of metastases. The method now advocated for the treatment of malignancy is the combined use of radium, x-rays, surgery and electro-thermic coagulation. By their timely and intelligent application the surgeon has a formidable weapon with which to control the treatment of malignancy. It has taken years to educate the public to go to the surgeon when they have a suspicious lesion simulating cancer. I am afraid if the radiologist attempts to control the treatment of the disease without the aid of the surgeon that we shall undo that part of the education that it has taken so long to establish.

The preoperative and postoperative treatment by x-radiation is supposed to seal lymphatics and prevent the development of metastases. In the case of preoperative treatments, one should wait until the full effect of the radiation has had time to make itself evident before operating, and one should not operate while the reaction is at its height, since the tissues do not heal quite so readily. Postoperative x-ray treatments should be started as soon as practicable, and cases should be kept under systematic observation to detect recurrences early.

That certain types of malignancy respond better than others, is well known. In my experience, some patients with carcinoma of the cervix

and evident metastases in the pelvis after radical operation and intensive x-ray radiation, have made a good recovery, while others having similar lesion, and just as complete surgery and radiation, continue to advance in spite of all the treatment we can give them.

*Dr. Richard A. Barr, Nashville, Tenn.*—The distinction between the use of surgery followed by x-ray and radium, and the use of radium and x-ray followed by surgery should be definitely made. I am only interested in two types of cancer, cancer of the breast and cancer of the uterus. Unless the preoperative radiation does definitely seal the lymphatics it certainly is of no advantage, and we lose some time in using it. Even if it does this, I cannot see the use of sealing the lymphatics before operation unless you expect to handle the tissues very roughly and squeeze the cancer cells out. I cannot see the use or advantage of preoperative radiation in cancer of the breast. It should of course always be used after operation. In inoperable cancer of the cervix I think everybody now advises the use of radium. In this class of cases I have had only a limited experience, and that recently, with the use of radium. For a number of years I have had all cases of cancer of the uterus that I have operated on given postoperative x-ray treatment and with good results. Cases of cancer of the cervix that were at all advanced I formerly referred to someone who had radium. I began to be suspicious of myself and thought perhaps I was putting the dividing line toward surgery because I had surgery and did not have radium. It is very natural for a man to feel, if he has only one plan of treatment to offer, that everything is suitable to that, so I decided I had better supply myself with radium and so be able to make a less prejudiced selection of cases. The advantage in the use of radium in cervical cancer over some other cancers is that it can be placed directly in the center of the disease. If it has any influence whatever of course it is right where it will have the widest area of influence. The effect of radium as you get away from it diminishes with the square of the distance. It takes four times as much radiation to get the same effect at 2 cm. that you do at 1 cm. Now with regard to operation after the use of radium in cancer of the cervix, if you are going to get any effect from the radium you get it in that tissue that you can remove by hysterectomy. Consequently, in doing hysterectomy you will remove the tissue that has had most effect from the radium and leave that which has had the least effect. For this reason it seems to me that if you are going to use radium in cancer of the cervix you should use the maximum dose, and in addition use the x-ray in front and behind for its effect on the areas not reached by the radium, and having done this you should be satisfied and should not operate. I have not had sufficiently long experience myself to draw conclusions from it, but I am leaning more and more to the use of radium in all cancers of the cervix, even very early cancer. I have been following the technic of Dr. Schmitz of Chicago, in cervical cancer, using 50 mgs. of radium for ten hours a day, for seven or eight days. This, he thinks, will give you the maximum effect of radium that you can obtain without burning the

rectum or bladder. I wish to say, as a practical point, that I have taken my courage in my hands and have used 50 mgs. in the cervix for as much as ten hours a day for fourteen days without any serious burning of the rectum or bladder, but I have done this only in those cases with an enormous cancer of the cervix in which I was confident that the cervix itself would act as a very considerable filter and so protect the rectum and bladder.

*Dr. M. F. Bledsoe, Port Arthur, Texas.*—There is a tendency, as we all know, to follow where results seem easy to get in cases where they have been hard to get formerly. I only wish to speak of one point in Dr. Kohlman and Dr. Samuel's paper, and to note that in his statistics I believe one case was under 30 years of age where they used radium for profuse and prolonged bleeding. The younger the woman the more radium it takes to bring about a premature menopause, which indicates the effect of the radium on the uterine wall. Unless we become too prone to quit-seeking the cause of this bleeding of young women, it is well to pause at this period in a paper of this kind. I wish the Doctor in closing would mention just a bit along the line of what their experience is in that line. It seems to me that with an agent with which it is so easy to control these conditions it might get too easy and we might use it too much.

*Dr. F. Webb Griffith, Asheville, N. C.*—I should like to ask whether the Doctor has used radium at all in cases of persistent leucorrhoea, as Dr. Curtis of Chicago has reported.

*Dr. William D. Haggard, Nashville, Tenn.*—I feel that these agents which are so very efficient should be used with great caution and skill. Carcinoma is essentially a surgical malady and if anybody in the world has had the experience that is most valuable it is the surgeon, and it seems to me the surgeon should by experience and judgment know best when to use radium. The surgeon, with all of these various agents at his command can come nearer choosing the agent that is best indicated than the man who has only surgery, or only x-rays or only radium. In other words, our feeling has been that if we could apply these agents, in the proper manner as an adjunct to surgery we should be doing the greatest good. Radiotherapy is in its infancy and it is a problem to know just what to do, and what not to do. The men who have used radium for some time have felt that if it would do such marvelous things in the inoperable cases of carcinoma of the cervix, it could be used successfully in the early cases. Personally, I have not been able to bring myself to do that. We still do hysterectomy in the early cases and use radiation as an adjunct. When we look back and see the few cases of carcinoma of the cervix that are alive and well after five years our courage oozes out at the ends of our fingers. I saw a woman recently whom I operated seventeen years ago for carcinoma of the cervix. You can count them one by one. By their infrequency we shall know them. Some men have been emboldened to use radium in the early cases rather than surgery and are very enthusiastic about it. Personally, I feel that we should stay close to shore for a while. We have recently had two cases of recurrence of carcinoma of the cervix operated elsewhere, within the year, one in February and

one in July, and radium has been able to dissipate the recurrences, so if radium will do that we feel that we should first operate and then use it as a prophylactic.

Radium should be supplemented with x-rays for larger areas. The work of Dr. Floyd has enabled us to investigate our own cases and gives us a little firmer ground to stand on, and when we found that twice as many cases that had had surgery plus radium and x-rays were alive and free from recurrence as those who had surgery alone, it encouraged us to go on with the combined treatment. I hardly know how we should get along without it. The carcinomata of the cervix have been the despair of surgery, the cases that are inoperable, but they yield splendidly to radium and x-rays. We have had a goodly number of cases that are clinically well, not necessarily permanently well. It is not easy for me to delude myself about cancer. Nobody has a more wholesome fear of its treachery. I had a case that was operated upon by my father for cancer of the breast twenty-seven years before, who had a recurrence and after five years had spontaneous pathologic fracture of the femur, that was evidently metastatic, while turning over in bed. It would seem that thorough-going post-operative radiation would have effected a permanent cure in a case so favorable that remained free from recurrence from a simple amputation without axillary dissection, for so long a period. By the utilization of these agents if we can add anything to the time limit and comfort of these patients and at the same time get a complete and permanent cure we will feel that our efforts are not in vain.

*Dr. Floyd (closing).*—I did not wish to make the impression, or have anyone think for a moment that we are claiming to cure malignant conditions, but from the reports we have received in tracing up quite a large number of these cases we know we have temporarily greatly benefited a number of them. Of the final outcome, of course, we do not know. I believe in many of these inoperable and many of the advanced cases the relief that we can give by radiation, particularly in the advanced cases that are suffering great pain, is remarkable. It is not infrequent to have these patients come in under the influence of morphin for the pain they are having, and after one or two treatments have them give up the morphin and go on to the metastatic end without much pain.

Bleeding can be checked and the odor can be checked, and the patient can live much more comfortably whether life is prolonged or not. We do not believe at present that either of these agents can take the place of surgery, but if it is true that we can destroy malignant cells at a distance of one and a half inches from the location of the growth, it seems that we are coming to the point of curing these early cases by radium without any surgery at all.

A number of the points very ably discussed by Dr. Frank were covered in the paper but were omitted on account of the length of the paper.

As to preoperative radiation, we have not done so much of this as has been done by other men. We have been radiating some of our cases before operation, but we do not wish to make any claim or report at present.

Speaking of the prostate cases, I remember that we have had two cases brought in that we have apparently greatly benefited by radiation. In one the mass was so extensive that we could not remove the entire gland, only a portion of it, by operation. Following enormous doses of rays over a period of fifteen to eighteen months the patient remained well and apparently free from trouble for two and a half years. Another case is symptomatically well at the end of more than a year. They both were inoperable cases primarily.

In conclusion, I wish to stress one point that I was not able to bring out in the paper but which was mentioned in the discussion, and that is, the routine raying of every breast case that comes with the lump in the breast or axilla. If you have not been doing this you may be surprised at the number that will show lung metastases. This is particularly true of sarcoma in general. You will be surprised to x-ray the lungs and find a sarcomatous metastasis in what you have thought was an operable case. We have in two or three cases shown liver metastases, the masses being shown throughout the liver which, on the plate, resemble, but are not so definite as the shadow masses in the lungs. Those cases were refused operation and went on and died shortly of what we thought was metastases which had already taken place in the liver.

*Dr. Samuel (closing).*—I am purely and simply a radiologist. I am not a surgeon or gynecologist; I do not see one of those cases until they are referred for radium treatment. The only thing I am asked to pass on is the amount of radium that should be used, the amount of time and how often it should be repeated. I cannot understand why in every medical meeting I attend I hear the statement that we should not use the radium, that it belongs to the surgeon. Dr. Ashbury made the statement that x-rays and radium intertwined with surgery. I see no reason why we should not use radium as we use x-rays. I have been using radium under the direction of the best men in the city, the cases being diagnosed clinically and from the microscopic end as well, and then referred to the radiologist for treatment.

Regarding Dr. Bledsoe's remarks, radium should be used by the specialist and not by the general physician. The average general surgeon knows as much about it as the nurse in a sanitarium, as to how much and how long and how far from the skin it should be used and how treated. When you get radium they get you to go to their laboratory and teach you how to use it in two or three weeks.

We have not treated any case under twenty-eight. A case under twenty-five does not belong to the radiologist, or radium therapist.

We have had some excellent results in using some 25 mgs. sutured into the cervix and usually one such treatment suffices.

I think all are in accord in regard to the treatment of fibroids. In the service of Dr. Matas, whose work I have the pleasure and honor of doing, operative interference in fibroids of the uterus has been cut down 75 per cent. He is perfectly satisfied with what we are doing.

In closing I wish to say that I think Dr. Barr is a very brave man to leave the radium in so long.