Bulletin of the

University of Minnesota Hospitals
and
Minnesota Medical Foundation

Irradiation Treatment of Uterine Prolapse

Volume XIX | Friday, April 23, 1948 | Number 23

BULLETIN OF THE
UNIVERSITY OF MINNESOTA HOSPITALS
and
MINNESOTA MEDICAL FOUNDATION

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UNIVERSITY OF MINNESOTA MEDICAL SCHOOL
CALENDAR OF EVENTS

Visitors Welcome

April 26 - May 1, 1948

No. 200

Monday, April 26

9:00 - 9:50 Roentgenology-Medicine Conference; L. G. Rigler, C. J. Watson and Staff; Todd Amphitheater, U. H.

9:00 - 10:50 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; Interns' Quarters, U. H.

9:15 - Fracture Rounds; A. A. Zierold and Staff; Ward A, Minneapolis General Hospital.

10:00 - 12:00 Neurology Ward Rounds; A. B. Baker and Staff; Station 50, U. H.

11:00 - 11:50 Physical Medicine Conference; Vocational Rehabilitation; John Taube; E-101, U. H.

11:00 - 11:50 Roentgenology-Medicine Conference; Staff; Veterans' Hospital.

11:00 - 12:00 Cancer Clinic; K. Stenstrom and D. State; Eustis Amphitheater, U. H.

12:15 - 1:20 Obstetrics and Gynecology Journal Club; M-435, U. H.

12:50 - 1:20 Pathology Seminar; Report of March Meeting of the Pathologists; J. S. McCartney, Robert Hebbel and K. Ikeda; 104 I. A.

12:00 - 1:00 Physiology Seminar; Physiological Effects of Bed Rest; Henry L. Taylor; 129 M. H.

12:30 - 1:50 Surgery Grand Rounds; A. A. Zierold, Clarence Dennis and Staff; Minneapolis General Hospital.

1:30 - 2:30 Pediatric-Neurological Rounds; R. Jensen, A. B. Baker and Staff; U. H.

2:00 - 3:00 Surgery Problem Case Conference; C. Dennis and Staff; Small Class Room, General Hospital.

4:00 - 5:00 Pediatric Seminar; Some Newer Aspects of Calcium Metabolism; Mildred Ziegler; 6th Floor Seminar Room, U. H.

4:00 - 5:00 School of Public Health Seminar; Epidemiology in Rural Practice; William N. Pickles, Medical Officer of Health, Aysgarth, Yorkshire, England; 113 MeS.

5:00 - 6:00 Urology-Roentgenology Conference; D. Creevy and H. M. Stauffer and Staffs; M-515, U. H.

Tuesday, April 27

8:30 - 10:20 Surgery Seminar; Lyle Hay; Small Conference Room, Bldg. I, Veterans' Hospital.

9:00 - 9:50 Roentgenology Pediatrics Conference; L. G. Rigler, I. McQuarrie and Staff; Eustis Amphitheater, U. H.

10:30 - 11:50 Surgical Pathological Conference; Lyle Hay and Robert Hebbel; Veterans' Hospital.

12:30 - 1:20 Pathology Conference; Autopsies; Pathology Staff; 102 I. A.

2:00 - 2:50 Dermatology and Syphilology Conference; H. E. Michelson and Staff; Bldg. III, Veterans' Hospital.

3:15 - 4:20 Gynecology Chart Conference; J. L. McKelvey and Staff; Station 54, U. H.

3:30 - 4:20 Clinical Pathological Conference; Staff; Veterans' Hospital.

4:00 - 5:30 Surgery-Physiology Conference; O. H. Wangensteen and M. B. Visscher; Eustis Amphitheater, U. H.

4:00 - 5:00 Pediatric Rounds on Wards; I. McQuarrie and Staff; U. H.

5:00 - 5:50 Roentgenology Diagnosis Conference; Oscar Lipschultz and Staff of General Hospital; M-515, U. H.

Wednesday, April 28

8:00 - 8:50 Surgery Journal Club; O. H. Wangensteen and Staff; M-515, U. H.

8:30 - 12:00 Neurology Rehabilitation and Case Conference; A. B. Baker and Joe R. Brown; Veterans' Hospital.

11:00 - 11:50 Pathology-Medicine-Surgery Conference; Addison's Disease; O. H. Wangensteen, C. J. Watson and Staff; Todd Amphitheater, U. H.

4:00 - 5:00 Infectious Disease Rounds; Todd Amphitheater, General Hospital, Veterans' Hospital.

Thursday, April 29

8:15 - 9:00 Roentgenology-Surgical-Pathology Conference; Walter Walker and H. M. Stauffer; M-515, U. H.

8:30 - 10:20 Surgery Grand Rounds; Lyle Hay and Staff; Veterans' Hospital.

9:00 - 9:50 Medicine Case Presentation; C. J. Watson and Staff; Todd Amphitheater, U. H.

10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.

10:30 - 11:50 Surgery-Radiology Conference; Daniel Fink and Lyle Hay; Veterans' Hospital.

11:00 - 12:00 Cancer Clinic; K. Stenstrom and D. State; Eustis Amphitheater, U. H.

11:30 - 12:30 Clinical Pathology Conference; Steven Barron, C. Dennis, George Fahr, A. V. Stoesser and Staffs; Large Class Room, General Hospital.

12:00 - 12:50 Physiological Chemistry Seminar; Studies in Steroid Metabolism; Donald Hill; 214 M. H.

1:00 - 1:50 Fracture Conference; A. A. Zierold and Staff; Minneapolis General Hospital.

4:00 - 4:50 Bacteriology Seminar; Respiration Studies on Stored Grain; C. A. Bryant; 111 MeS.

4:30 - 5:20 Ophthalmology Ward Rounds; Erling W. Hansen and Staff; E-534, U. H.

5:00 - 5:50 Roentgenology Seminar; Case Presentations from the Miller Hospital; H. O. Peterson and J. B. Coleman; M-515, U. H.

Friday, April 30

8:30 - 10:00 Neurology Grand Rounds; A. B. Baker and Staff; Station 50, U. H.

9:00 - 9:50 Medicine Grand Rounds; C. J. Watson and Staff; Todd Amphitheater, U. H.

10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.

10:30 - 11:20 Medicine Grand Rounds; Staff; Veterans' Hospital.

10:30 - 11:50 Otolaryngology Case Studies; L. R. Boies and Staff; Out-Patient Department, U. H.

11:00 - 12:00 Surgery-Pediatric Conference; C. Dennis, A. V. Stoesser and Staffs; Minneapolis General Hospital.

11:30 - 12:50 University of Minnesota Hospitals General Staff Meeting; Social Service - Current Problems in Patient Care; Helen Kretchmer and Donald W. Hastings; New Powell Hall Amphitheater.

12:00 - 1:00 Surgery Literature Conference; Clarence Dennis and Staff; Minneapolis General Hospital, Small Class Room.

1:00 - 1:50 Dermatology and Syphilology; Presentation of Selected Cases of the Week; H. E. Michelson and Staff; W-312, U. H.

1:00 - 2:50 Neurosurgery-Roentgenology Conference; W. T. Peyton, Harold O. Peterson and Staff; Todd Amphitheater, U. H.

Saturday, May 1

7:45 - 8:50 Orthopedics Conference; Wallace H. Cole and Staff; Station 21, U. H.

8:00 - 9:00 Pediatric Psychiatric Rounds; Reynold Jensen; 6th Floor West Wing, U. H.

8:00 - 9:30 Psychiatry and Neurology Grand Rounds; Staff; Veterans' Hospital.

9:00 - 10:30 Pediatric Grand Rounds; I. McQuarrie and Staff; Eustis Amphitheater, U. H.

9:00 - 9:50 Surgery-Roentgenology Conference; O. H. Wangensteen, L. G. Rigler, and Staff; Todd Amphitheater, U. H.

9:00 - 9:50 Medicine Case Presentation; C. J. Watson and Staff; M-515, U. H.

10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; M-515, U. H.

10:00 - 12:50 Obstetrics and Gynecology Grand Rounds; J. L. McKelvey and Staff; Station 44, U. H.

11:00 - 12:20 Anatomy Seminar; Report on Meeting of Anatomists; The Brain Blood Barrier, Harold Brody; 226 I. A.

II. IRRADIATION TREATMENT OF UTERINE, CERVICAL AND VAGINAL PROLAPSE

John L. McKelvey

This is to report some simple observations on the use of irradiation for the cure of prolapse of the uterus, vagina, or cervical stump. For reasons to be discussed below, it has a limited usefulness but in the presence of certain indications, it promises to be an effective, safe, and simple procedure. Reports of similar studies have not yet been found in the literature.

The suggestion for trial of this grew out of an experience which it is reasonable to suppose has been encountered by most gynecologists who deal with large numbers of cervical carcinomas. On several occasions, carcinomas of the cervix have been seen in prolapsed uteri, completely outside the introitus. These have been treated by irradiation therapy and in each instance, the end result has been a permanent retraction of the prolapsed organ and the production of pelvic fibrosis characteristic of that seen after similar treatment of carcinomas in the unprolapsed cervix. The findings in these pelves leave no doubt as to the permanence of the support. There is little or no mortality other than that associated with the tumor itself and with the infection which is an inevitable accompaniment of the tumor. There is a negligible morbidity with properly controlled dosage and distribution except for various degrees of closure of the vagina. It was thought, then, that where a functioning vagina is not required, it might be possible to work out indications and contraindications for the application of this observation to the non-malignant prolapse of the uterus, vagina and cervical stump.

This was not undertaken primarily to avoid the risk of surgical repair. Improvements in the safety of the surgical handling of elderly people who make up most of the group in whom irradiation therapy might be useful, has been dramatic in recent years. This is particularly true of non-shocking surgery such as gynecological repairs. In addition, local anesthesia is so completely satisfactory and safe in this type of work that it has allowed the application of surgical repair almost irrespective of the general physical status of the patient. There are, however, at least three circumstances which seemed to suggest the usefulness of irradiation. In patients whose advanced age or degenerative disease reasonably indicated a very short life expectancy, it seemed unwise to undertake uncomfortable and expensive surgical attack. On the other hand, if a simple and safe procedure such as irradiation could relieve them of what are often distressing complaints from the prolapse, it would be useful and indicated. Indeed, many of these elderly people are bedridden as a result of the prolapse and there is a reasonable expectation that if one could keep them out of bed and mobile, actual prolongation of their lives might be expected. Secondly, there is at least one type of prolapse which is difficult to cure. The cervical or vaginal stump which prolapses on occasion after subtotal or total hysterectomy is only treated with certainty by complete closure of the vagina and pelvic floor. It appears as though this is the type of lesion which responds most easily and satisfactorily to irradiation. It is possible that this can be done without complete exclusion of a functioning vagina although this requires further investigation. Finally, it is not necessary to argue that the simpler and less uncomfortable procedure is always the method of choice. Within the limits of its indications, irradiation satisfies these requirements.

It will be evident from the details of the following case histories that it is not yet entirely clear as to what is the most efficient technique accomplishing the desired purpose. Maximum therapy as given for the treatment of carcinoma of the cervix is much too complicated and prolonged. The techniques for this are designed to supply massive dosage to a distance from the local cervical area. In handling the prolapse of the uterus, upper vagina, or cervical stump, the local effect is what is desired. For that reason, irradiation from sources with short focal

distances have been chosen. Vaginal radium and interstitially applied radon have been used.

Three patients have been treated sufficiently long ago to allow evaluation. A fourth is undergoing treatment at present and will not be reported now.

Case Histories

Mrs. ... U. H. Age. 65 years.
Para 2-0-0-2.

1933 Subtotal hysterectomy and right salpingo-oophorectomy elsewhere.

1940 Seen here with a mass in the pelvis. Exteriorization of a diverticulitis mass in the sigmoid.

1941 Closure of the colostomy by end-to-end anastomosis.

1945 June. Admitted with the complaint that the cervical stump has begun to prolapse two years before. Also complained of urinary stress incontinence. Examination showed a large cystocele and rectocele. The cervical stump prolapsed 6 cms. beyond the introitus. A repair was done with apparently satisfactory results. The urinary incontinence was completely relieved.

1946 December. Returned again with the cervical stump at the introitus. This was treated by the application to the cardinal ligaments and uterosacral ligaments of 8 radon seeds each containing 1.7 mcs. This was followed by 15 mgm. of radium in a Kaplan colpostat central cork (0.75 cms. f.d.) for 100 hours to the upper vagina. This was tolerated without difficulty.

1947 Patient last seen. The vaginal vault was well supported and the patient has no complaints.

Mrs. U. H. Age 54 years.
Para 5-0-0-5.

1940 January. Admitted complaining of uterine prolapse. Examination showed a marked cystocele and rectocele with a 1° prolapse of the uterus. A colpoperineorrhaphy and cardinal ligament advancement with umbilectomy and repair of diastasis recti were done. It was planned to ventrally fix the uterus to the abdominal wall but the senile organ was so small that it could not he brought into position for this, probably as a result of the repair.

1940. July. The patient returned with cervix protruding 3 cms. beyond the introitus. The remainder of the repair was adequate. She was given a pessary which she wore for two years.

1942 The patient was readmitted with findings as above. 16 radon seeds for a total of 25.3 mcs. were applied to the vaginal mesenteroids, the parametria and uterosacral ligaments. Four days later 25 mgms. of radium were applied in a central cork of the colpostat (0.75 cms. f.d.) for 100 hours to the vaginal vault. This was tolerated without difficulty.

1945 Patient was last seen. The upper vagina was small but support was excellent. There were no complaints.

Mrs. U. H. Age 62 years.
Para 7-0-0-5.

1944 April. The patient was first seen complaining of pain in the left knee and hip. There were marked varicosities in the lower extremities.
July. Saphenous vein ligation, right. Following this, fluid and later pus kept accumulating in the wound and was repeatedly aspirated.
November. Saphenous vein ligation, left. During December, 1944, and April and June, 1945, multiple sclerosing injections were carried out.

1947. June. Patient was admitted complaining of the fact that the

uterus had been protruding from the introitus for at least nine months. There was a history of exertional dyspnoea and ankle edema for many years. She had vague substernal discomfort on exertion. She was markedly obese, being 65 inches tall and weighing 223 pounds. Examination showed marked varicosities, left sided cardiac enlargement, abnormal E.K.G. and hypertension. There was a very large cystocele, a moderate urethrocele, a large rectocele and enterocele. On pushing, the whole uterus could be made to prolapse beyond the introitus. A diagnostic curettage was done because of minor uterine bleeding. This showed only a chronic cervicitis and atrophic endometrium. It was noted that the patient was short of breath while lying on the examining table.

July 6 40 mgms. of radium were applied to the upper vagina in a Kaplan colpostat and central cork for 100 hours. This was tolerated without difficulty.

July 18 Sudden chest pain, temperature elevation and cardiac irregularity. Chest x-ray showed pulmonary infarction in the left base and atelectasis of the right medial lobe. There was some pain in the right calf and bilateral positive Homan's sign. Dicumarol was given and there was fairly rapid improvement.

Aug. 1 Four radon seeds each containing 2.2 mcs. were applied to parametria and uterosacral ligaments.

Aug. 11 A second episode of pain in the right lower chest occurred. There was cough, temperature elevation and rales were found in both lung bases. Dicumarol was started again. Symptoms and findings rapidly subsided and the patient was discharged after two months hospitalization on August 23. At this time the uterus was well supported.

Sept. 5 Seen in cardiac clinic. The conclusion here was arteriosclerotic heart disease with mild chronic cardiac failure and mild agina.

The patient's sister reported that she died suddenly at home two weeks after this visit.

In these three patients, the irradiation seems to have produced entirely satisfactory results. There is little to support the suggestion that in the last patient, the venous thrombosis and embolism were the result of the therapy of the prolapse. A longer observation period of the effect on the prolapse would certainly have made this result more convincing.

Indications

It is not suggested that irradiation is a substitute for surgical repair of uterine prolapse. In a very large proportion of patients with this finding, there are other anatomic defects which require repair and which are probably not adequately cared for by irradiation. Further experience will be required before the finer details of this problem can be reasonably considered.

One group of circumstances does seem to form a clear indication for this approach. In the presence of recurrent prolapse of the uterus after adequate anatomic repair and prolapse of the vaginal vault after such surgical procedures as vaginal hysterectomy or subtotal hysterectomy, when there is not too much cystocele, enterocele or rectocele and when a functioning vagina is n not required, irradiation is a simple, safe and apparently efficient method of treatment. These post-operative lesions have been troublesome to the gynecologist and irradiation appears to be a welcome solution.

The second indication is in those patients who are extremely poor surgical risks or whose life expectancy for other reasons than the prolapse is likely to be too short to justify surgical repair. There is always as well the occasional patient who for reasons of her own, will refuse surgical interference. Here the

choice will lie between irradiation and permanent pessary support. The occasional patient will not tolerate a vaginal pessary and in others there is insufficient perineal floor to support a pessary. These can be treated by irradiation.

Contraindications

For the moment, irradiation cannot be recommended in those patients who require a functioning vagina. There is every reason to believe that, under most circumstances, a functioning vagina can be preserved as it is with a large number of irradiated cervical carcinomas. However, more experience will be required before such assurance can be given.

Large cystoceles and rectoceles have not been affected short of extensive lower vaginal irradiation which is probably undesirable here. Whether or not large enteroceles will respond cannot yet be stated. A patient is now being treated by irradiation who presents all three lesions in extensive form. Until further experience is available, this type of lesion should be considered an indication for surgical approach.

Serious urinary incontinence should be treated surgically. Tissues which has been exposed to irradiation heals poorly because of the attendant fibrosis and lace of blood supply. One hesitates to set up conditions which would interfere with the possibilities of surgical repair in the presence of a complaint which interferes so seriously with the patient's welfare as does incontinence of urine.

Technique

The irradiation techniques which are used in the treatment of cervical carcinoma are designed to produce a maximum of irradiation energy over the widest possible extent of the lymphatic drainage area from that organ. Involvement of gut and bladder are inevitable. Neither of these is desirable in the treatment of prolapse and, indeed, should be avoided as much as possible. The use of the inverse square law to advantage will allow a maximum of localization of the effect and a minimum of effect at distance. X-ray by ordinary technique is not useful. Irradiation from short focal distance by radium and radon is, then, the method of choice. What is desired is the stimulation of connective tissue production and its eventual contraction about the upper part of the vagina. This can be accomplished with intravaginal radium. Some focal distancing is desirable in order to protect the vaginal mucosa itself from excessive dosage. A beta ray screen is used for the same purpose. The effect of this can be reinforced in carefully chosen areas by the application of interstitial irradiation to the points where normal supporting ligaments should be. These should avoid bladder, ureters and rectum. There is little choice as regards the order in which these are applied. Radon seeds have been used although there is no reason why removable interstitial radium might not be equally useful. Its application is a little more complicated than that of the seeds.

A pack should be applied for twenty-four hours after the application of the seeds. This allows the formation of fibrin plugs which will permanently fix the seeds in position. The radium has been applied over 100 hours. This time factor is used here for all surface irradiation for the simple purpose of getting rid of one variable in the relationship between physical dosage and biological effect.

For the vaginal radium, the Kaplan colpostat has been used. This takes a container with a beta ray screen and produces a focal distance of approximately 0.75 cms. It has two arms on a light spring and a separate container identical with that on each arm which may be placed between the two and is referred to as a central cork. As many of these three are used as the vaginal vault size will allow. The larger the number of these portals which can be used, the larger the physical dose in milligram hours will be and vice versa.

Present experience will allow only a tentative statement as to specific dosage. It is suggested that when the vaginal vault will allow only a single portal, 25 or 30 milligrams of radium should be applied over 100 hours. This should be immediately preceded or immediately followed by about 20 millicuries of radon in gold seeds of about 2 millicuries each which are applied to utero-sacral and cardinal ligament area and to the extension of the cardinal ligaments along the upper lateral vagina. These last mentioned structures have been referred to as the vaginal mesenteroids.

It is probably best to keep the vaginal vault supported for a time after this. There are no accurate data which would allow an objective decision as to the most desirable duration of this. There is no reason why this should require hospitalization or bed rest if there be sufficient perineal support to hold a pack in place. In this group of patients, a broad gauze pack has been used. This is moistened with a suspension of 1% neutral acriflavine in a mixture of oil, beeswax, and paraffin. 1% neutral acriflavine in glycerine should be reasonably satisfactory, This produces no secondary irradiation. It prevents bacterial growth so that the packs may remain in position for 2 or 3 days. It is not irritating to the vagina and prevents the irritant effect of untreated gauze.

Conclusions

A technic is described for the treatment in a few selected case of prolapse of the vaginal vault, cervical stump, or uterus by means of radon. Three case in which this was used are detailed.

III. MEDICAL SCHOOL NEWS

Dr. Syverton to Head Bacteriology

The appointment of Dr. Jerome T. Syverton as Professor and Head of the Department of Bacteriology and Immunology has recently been announced. Dr. Syverton comes to the University from Louisiana State University where he has been Professor of Microbiology and Head of the Department since 1947. Dr. Syverton was born in North Dakota and received his Bachelor of Arts degree at the University of that state. His undergraduate medical training was received at Harvard where he received his M.D. in 1931. He was on the faculty of the University of Rochester from 1937 to 1947. However, during a part of this period he was in the U. S. Naval Reserve and was assigned to foreign duty with the second naval reserve unit in the Pacific area from 1944 to 1946. He was also a visiting investigator for the Rockefeller Institute in 1944. Dr. Syverton is the author of numerous scientific publications in his chosen field of investigation. He will take over his duties in the Department of Bacteriology on September 16, 1948.

Dean Aids Medical Resources Planning

Dr. Harold S. Diehl, Dean of the Medical School, has again been called upon to participate in the planning for the most effective use of our nation's medical resources in case of another national emergency. During the recent war Dr. Diehl devoted a great deal of time and effort to to this work as a member of the Directing Board of Procurement and Assignment Service. The effectiveness with which this board worked during the trying years of World War II is well known to the entire medical profession. Dr. Diehl recently attended a meeting of the A.M.A. Council on National Emergency Medical Service in Chicago in which this problem was again considered. He also participated in several conferences in Washington relative to the protested provision in the proposed Selective Service Law which would permit the President to issue a special call for physicians up to the age of 45 years.

Last week Diehl was the principal speaker at a special University of Nebraska Convocation devoted to the new and expanded Student Health Service Program recently inaugurated by that University.

Anatomists Attend Meeting

Members of the Anatomy Department played an active part in the sixty-first annual meeting of the American Association of Anatomists April 21-23. Dr. E. A. Boyden is Vice-President of the organization and Dr. A. T. Rasmussen is Vice-President elect. The following medical school staff members presented papers at the meeting: Roger M. Berg, E. A. Boyden, Berry Campbell, Rachel L. Fralick, Roger C. Murray, Robert A. Good, J. F. Hartmann, L. J. Wells, Arthur Kirschbaum, E. T. Bell, Jack Gordon, Carmen Casas, R. A. Miller, David W. Molander, Franklin R. Smith, R. Dorothy Sundberg, Ruth E. Hodgson and Lane Williams.

Duluth Clinic Lectures

Dr. Arthur Grollman, Professor of Experimental Medicine at Southwestern Medical College in Dallas, Texas will give the annual Duluth Clinic Lecture series on May 11th and 12th. Dr. Grollman has done a large amount of fundamental research in Cardiovascular and Renal Physiology. He is, in addition, a diplomate of the American Board of Internal Medicine and has made many contributions to the study of Hypertension. He will speak Tuesday at 8:00 p.m. on "Recent Advances on the Pathogenesis and Treatment of Hypertension." On Wednesday, May 12 at 4:00 p.m. his subject will be "The Hypothalamus and Its Disorders." An informal seminar at 12:30 Wednesday, May 12th will center around the topic "The Interrelationship of the Endocrine Organs."

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