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REPORT  
of  
COMMITTEE ON THESIS

The undersigned, acting as a Committee of the Graduate School, have read the accompanying thesis submitted by James Wells Ross, for the degree of Master of Science in Surgery. They approve it as a thesis meeting the requirements of the Graduate School of the University of Minnesota, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Surgery.

*James C. Masson*

*Geo. Eusterman*

*H. E. Robertson*

*J. C. Fitzmurray* 707.

THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

Report

of

Committee on Examination

This is to certify that we the undersigned, as a committee of the Graduate School, have given James Wells Ross final oral examination for the degree of

Master of Science in Surgery

We recommend that the degree of Master of Science in Surgery

be conferred upon the candidate.

James C. Masson  
Chairman

W. Carpenter Macarty  
Geo. Eusterman

J. C. Litzenberg  
Gilbert J. Thomas

Date \_\_\_\_\_

THESIS

CARCINOMA OF THE CERVIX UTERI  
A CLINICAL STUDY WITH A SUMMARY OF THE RESULTS OBTAINED  
BY VARIOUS METHODS OF TREATMENT

James Wells Ross, M. B.

Submitted to the faculty of the Graduate School of the  
University of Minnesota in partial fulfillment of the require-  
ments for the degree of Master of Science in Surgery.

March, 1922.

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In order to estimate the relative values of various forms of treatment in cancer of the cervix, a study was made of 475 cases seen in the Mayo Clinic between January 1, 1913 and December 31, 1918. The latter date was chosen to provide a period of at least three years since the patients were first seen at the Clinic.

The subject is one of great importance for cancer of the cervix still takes its toll in spite of all our efforts. It is the most frequent form of cancer in the female, comprising 29.5 per cent of all types found in women (Welch) and 81 to 86 per cent of all genital cancer in this sex. As carcinoma of the fundus is comparatively infrequent (3 per cent - 10 per cent of uterine cancer) and as it is comparatively readily removed, cancer of the cervix becomes of even greater significance. When we consider that a larger number of women died of uterine cancer during the year 1918 than the number of men of the American Expeditionary Force, killed in the recent war, it behooves us to make every effort to deal more efficiently with this disease. One cannot help being impressed, in reviewing this series and the reports of various men the world over, with the importance of bringing before the public the value of early diagnosis. With this type of cancer especially, in early treatment alone lies the only hope of cure. Often coming at the menopause when disturbances in menstrual function are apt to be disregarded alike by patient and physician, and when the symptoms are difficult to interpret, it will be only when all women at this period of life insist on thorough periodical examinations, that we may hope for success in treatment. The active educational campaign now being conducted by the American Society for the Control of Cancer has already begun to accomplish something. As emphasized in the circular, published by this organization, our efforts must not cause undue alarm. The greatest factor in preventing a patient seeking advice is fear of knowing the truth. If, therefore, we

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can offer the early case a high probability of cure with a low primary mortality and can teach this doctrine throughout the land, our success is assured. On the other hand the profession must realize that it assumes all responsibility for pursuing an expectant or indifferent course when accurate diagnosis is within the reach of all.

It then becomes necessary to develop methods of treatment best suited to individual cases. In this connection a knowledge of the uninterrupted course of the disease and the conditions present in various stages, is of the utmost importance. Cancer of the cervix is essentially a local disease. Leitch in a review of 915 autopsies on patients dying of this condition found hydronephrosis in 75 per cent. He estimated the duration from onset of symptoms to death, at twenty-one months. Regional lymph nodes were involved in only 38.36 per cent although this figure is probably too low if judged by collected statistics of Döderlein. These patients die of cachexia and uremia rather than extensive metastatic cancer.

The radical abdominal operation, Wertheim hysterectomy, undoubtedly carries a prohibitive mortality in the hands of most operators. Is it not then in the interest of the patient that we seek an index of the rate of extension of the disease and subject only those patients to extended hysterectomy who have highly malignant tumors and for whom prognosis of ultimate cure is poor? Cure is then indeed a triumph.

From the past, the cautery and the knife have come down to us as recognized agents in treatment although a multitude of "cures" have been suggested. More recently radium has been introduced, and high voltage X-Ray therapy. Reports of results obtained by many observers using various methods are confusing and this is due chiefly to the fact that the estimated stage of the disease is subject to the personal equation of the observer. The effects of radium may be subject also to variation with the dosage, and method of

application.

In 1912 J. F. Percy brought forward a method of prolonged cauterization by slow heat and cited cases which had remained free from recurrence for periods ranging from three years to eight months. In 1918 he reported sixty-five cases, treated by this method, ten of whom were living from two to nine years after operation (15 per cent). A series of forty-three cases is reported by Cole. These were all inoperable and he estimates the average prolongation of life at ten months. Seven had lived for periods up to three years and in all amelioration was obtained. Balfour in 1916 reported favorably regarding this method employed in inoperable cases. He found marked improvement but my later observations on these same patients show that cure was effected in only two cases so far as is known.

Radium has many followers. In 1915 Kelly and Burnham, reviewed 213 cases (14 operable and 199 inoperable). They reported cure in fifty-three of the inoperable ones. The former believed that three out of every four cases of apparently hopeless cancer could be cured by Radium and operation. On the other hand Graves, during June of last year, stated very definitely his opinion that radium does not permanently cure. He believes that some inoperable cases may be rendered operable and such patients may live many months only to die of recurrence. But in the treatment of recurrences he believes that Radium offers more than any other method. He had one patient treated with radium who lived three years and one now living six years after recurrence. In cases favorable for surgery he does not feel justified in substituting radium. Bailey also obtained good results but the time is too short in which to judge the outcome.

In a recent paper Clark was extremely enthusiastic with regard to the effect of radium. Of 214 cases of inoperable carcinoma of the cervix, twenty-five had passed the three year period (11.6 per cent) and forty-one others were living, all over a year since treatment. Only nine however had lived five

years. In the same journal Duncan and Schmitz have published encouraging results. These operators are using larger doses than was the custom at this clinic during the period covered by the present review. Clark also inserted radium needles into the base of the broad and utero-sacral ligaments, a procedure which has not been carried out here. Our immediate results have been encouraging but not sustained in the curative sense. However it is to be hoped that, when sufficient time has elapsed in which to judge the results of treatment during the past three years, a definite increase in the number cured will result.

In the present series radium was used in inoperable cases in most instances. These patients received vaginal and intracervical applications of about 700 mg. hours (50 mg. for 14 hours) repeated three or four times in the course of ten days, with usually one or two rectal treatments of 100 mg. hours. They returned at intervals of two to three months and received similar doses. Now, however, bare radium tubes (wall 0.5 mm. silver) are inserted within the cervix and uterine canal after the redundant growth has been reduced by radiation if necessary. The dose 700 to 3000 mg. hours (sulphate) in favorable cases is given at a single sitting and a total of 9000 to 12000 mg. hours is given within a period of three weeks. X-Ray is used in addition but we have not yet tried the high voltage machine. My results then, must not be considered as the final conclusions of this Clinic relative to Radium and non-operative treatment.

From reports of various authors it would seem that the Wertheim hysterectomy in operable cases offered the best prospect of permanent cure. Graves in 101 cases had six operative deaths and 27.6 per cent of five year cures, with an ultimate cure of 16.8 per cent. Still more recently Bonney in 100 cases reports a five year cure in 50 per cent of the eighty who recovered from operation or 40 per cent of the total. Including inoperable cases he has then 26.1 per cent of five-year cures. His percentage of operability is 63.5

and agrees with that of Graves (64 per cent) while his immediate mortality has been reduced to 6 per cent in his last fifty cases. Of a similar nature is the report of Shaw but it is yet too soon to judge his results. He obtained ten four-year cures in fifty-nine cases and 55.3 per cent of the patients who survived the operation are living and well, all over a year after. He advocates the use of radium to render operable, cases which otherwise would be left to palliative measures.

The operation employed here in cases of this series was in some instances a modified Wertheim although less drastic in the extent of the dissection than that operation as originally advocated. In other instances a much more conservative procedure was carried out. These facts are apparent in the low operative mortality. A cuff of vagina well beyond the growth was removed and as much of the parametrial tissue as was deemed advisable. The ureters were freed.

The interval between cautery and hysterectomy giving most favorable results was one month, and most patients operated on after a greater lapse of time did not obtain permanent relief. It is generally conceded that hysterectomy following radium treatment should be performed after from two to four weeks. This interval allows cellular destruction to take place and antecedes fibrosis. Only one case herein reported, which lived eight months, was radiated prior to operation (one month prior) although this procedure is now being carried out in practically all operable cases. Vaginal hysterectomy was done by the clamp and cautery method.

In this review are considered 475 consecutive cases. There were in addition eight cases of carcinoma in the stump of the cervix following hysterectomy and seven untreated cases comprising explorations, excisions of specimens and simple curettage which are not considered. None of these fifteen patients are living.



Of the 475 patients considered, sixty are living (12.6 per cent). All of these have therefore lived for over three years. It is known that 322 are dead. There were four operative deaths, one after simple cautery, two after Percy cautery and one a hysterectomy after Percy cautery. The length of life up to Jan. 1, 1922 is known in the case of 347 patients living and dead. These are the ones with which we are most concerned (Table A Column 3).

The cases are arranged in five groups. In so doing a personal error is admitted as the grouping is based on the history of the clinical and operative findings when the latter was available. Group I contains the early cases in most of which microscopic examination was necessary to establish a diagnosis. In Group II are cases which may be considered operable, with no extension to the vaginal wall, a moveable uterus and little or no thickening of the broad ligaments. Group II A comprises cases which might be considered operable were it not for extension to the walls of the vagina. Group III contains inoperable cases as determined by fixation and infiltration of the broad ligaments. Group IV is made up of advanced cases, with bladder or rectal involvement.

There were thirty-three modes of treatment depending on variations in technique as for example, in the use of the Percy Cautery, whether or not the abdomen was opened and whether hysterectomy was performed immediately or at a later date. These various methods are grouped under four main headings, Surgery, Radium, Percy Cautery and Simple Cautery with sub-headings indicating combinations of two or more (Table I - Table IV).

Several factors were common to the series. The average age was practically the same for all groups (forty-eight years) that for Group III being forty-seven and for Group II, forty-nine years. The youngest patient was twenty-three and the oldest seventy-two. All but eleven were married and had borne on an average, four children. The age of the youngest child was on the

Table A

## ABBREVIATED GROUPING OF CASES

Grouping	Total number cases	Cases in which length of life is known	Dead	Living over 3 yrs.	Lived over 5 yrs.	Lived over 4 yrs.	Died under 1 yr.	Average length of life
Group I Early	65	51	26	27	11	25	4	3 yr. 7 mo.
Group II Operable	142	104	91	24	17	26	26	2 yr. 8 mo.
Group IIA Inoperable on account of extension to vagina	87	62	64	5	5	5	28	1 yr. 8 mo.
Group III Inoperable	145	105	112	4	1	2	58	1 yr. 1 mo.
Group IV Advanced	36	25	29	0	0	0	21	7 mo.
Total of all groups	475	347	322	60	34	58	137	

Table 1.

## RESULTS OF VARIOUS FORMS OF TREATMENT IN GROUP I.

Treatment	Total number cases	Dead	Cases in which length of life is known	Living over 3 yrs.	Lived over 5 yrs.	Lived over 4 yrs.	Died under 1 yr.	Average length of life yrs. mos.	
I. Surgery	20	9	16	7	6	9	0	4	1
(a) Plus simple cautery	5	1	5)	4)	2	3	1	4	0
(b) Plus radium	11	5	10)	6)	0	5	0	4	0
(c) Plus simple cautery and radium	4	2	4)	2)	0	2	0	3	9
(d) Plus Percy cautery	10	4	6)	2)	1	2	2	2	3.5
(e) Plus Percy cautery and radium	3	2	3)	1)	1	2	0	3	5
II. Radium only	5	1	3	2	0	0	0	2	7
III. Percy cautery	3	2	2	1	1	1	0	4	0
(a) Plus radium									
IV. Simple cautery	1	0	0	0	0	0	0	-	-
(a) Plus radium	3	0	2	2	0	1	0	3	11
Total	65	26	51	27	11	25	3	3	7

Table 2.

## RESULTS OF VARIOUS FORMS OF TREATMENT IN GROUP II.

Treatment	Total number cases	Dead	Cases in which length of life is known	Living over 3 yrs.	Lived over 5 yrs.	Lived over 4 yrs.	Died under 1 yr.	Average length of life yrs. mos.	
I. Surgery	26	15	*24	*9	11	*12	*2	4	4
(a) Plus simple cautery	9	7	9)	2)	1	1	1	2	6
(b) Plus radium	6	4	6)	2)	0	1	0	2	3.5
(c) Plus simple cautery and radium	8	1	*4) 42	*3) 12	0	*1	*1	2	8
(d) Plus Percy cautery	27	21	20)	4)	4	7	3	3	1
(e) Plus Percy cautery and radium	8	3	*3)	*1)	0	*1	*1	2	4
II. Radium only	21	16	17	2	0	1	8	1	6
III. Percy cautery	23	15	14	1	1	1	6	1	8
(a) Plus radium	2	2	1	0	0	0	0	2	7
IV. Simple cautery	3	2	2	0	0	0	1	0	8
(a) Plus radium	9	5	4	0	0	0	3	0	9
Total	142	91	104	24	17	25	26	2	8

Table 2-A

## RESULTS OF VARIOUS FORMS OF TREATMENT IN GROUP II-A

Treatment	Total number cases	Dead	Cases in which length of life is known	Living over 3 yrs.	Lived over 5 yrs.	Lived over 4 yrs.	Died under 1 yr.	Average length of life yrs. mos.	
I. Surgery	6	2	4	2	3	3	0	4	4
(a) Plus simple cautery	4	4	3)	0)	1	1	0	2	11
(b) Plus radium	1	0	1)	1)	0	0	0	3	11
(c) Plus simple cautery and radium	1	0	1)	1)	0	0	0	3	0
(d) Plus Percy cautery	5	1	2)	1)	1	1	0	3	9
(e) Plus Percy cautery and radium	4	3	3)	0)	0	0	1	2	2.5
			) 10	) 3					
II. Radium only	39	30	26	0	0	0	15	1	0
III. Percy cautery	12	11	10	0	0	0	4	1	8
(a) Plus radium	2	1	1	0	0	0	0	3	6
IV. Simple cautery	6	5	5	0	0	0	3	1	2
(a) Plus radium	7	7	6	0	0	0	5	0	10
Total	87	64	62	5	5	5	28	1	8

Table 3

## RESULTS OF VARIOUS FORMS OF TREATMENT IN GROUP III.

Treatment	Total number cases	Dead	Cases in which length of life is known	Living over 3 yrs.	Lived over 5 yrs.	Lived over 4 yrs.	Died under 1 yr.	Average length of life yrs. mos.	
I. Surgery	3	3	3	0	0	0	1	1	7
(a) Plus simple cautery	5	3	3)	0)	1	1	0	3	0
(b) Plus radium	7	5	6)	1)	0	0	2	1	6
(c) Plus simple cautery and radium	1	1	1) 16	0)	0	0	0	2	6
(d) Plus Percy cautery	5	5	5)	0)	0	0	2	1	7
(e) Plus Percy cautery and radium	1	1	1)	0)	0	0	0	2	6
II. Radium only	57	42	40	2	0	1	22	1	1.5
III. Percy cautery	32	25	22	0	0	0	17	0	8.5
(a) Plus radium	11	9	7	0	0	0	3	1	2
IV. Simple cautery	9	8	7	0	0	0	5	0	8
(a) Plus radium	14	10	10	1	0	1	7	1	3
Total	145	112	105	4	1	3	59	1	1

Table 4

## RESULTS OF VARIOUS FORMS OF TREATMENT IN GROUP IV.

Treatment	Total number cases	Dead	Cases in which length of life is known	Living over 3 yrs.	Lived over 5 yrs.	Lived over 4 yrs.	Died under 1 yr.	Average length of life yrs. mos.	
I. Surgery	1	1	1	0	0	0	1	0	11
(a) Plus Percy cautery and radium	1	1	1	0	0	0	1	0	10
II. Radium only	11	8	5	0	0	0	3	0	9.8
III. Percy cautery	11	9	9	0	0	0	8	0	6
(a) Plus radium	2	-	0	-	-	-	-	-	-
IV. Simple cautery	7	7	6	0	0	0	5	0	7
(a) Plus radium	3	3	3	0	0	0	3	0	5
Total	36	29	25	0	0	0	21	0	7

average sixteen years. Two of those unmarried are still living. In twelve instances the onset of symptoms occurred during pregnancy and two of these patients are living. Microscopic examination was recorded in 277 cases. Of these 249 were squamous-celled carcinoma and twenty-eight adenocarcinoma. The preponderance of the former, 89.9 per cent, is slightly higher than that given by Ogata (87.7 per cent).

If we consider as operable the cases in Groups I and II our percentage of operability will be 44, which is somewhat lower than those of Bonney, Graves, Cullen (50 per cent) and others. If we include cases in Group II A the percentage is raised to 62. Some cases in this latter group proved operable (Table II A).

The average duration of symptoms before the patient sought advice shows a gradual increase in the successive groups. In Group I it was 4.6 months; in Group II, 6.7 months, in Group IIA 6.8 months, in Group III 7.6 months and in Group IV, 11.2 months. This illustrates how a short delay may carry a patient beyond the possibility of operative aid. In fifty-two cases there was a delay due to failure on the part of the physician to recognize the condition. This demonstrates two things. First, the fact that the disease was sufficiently advanced in most cases to be recognized and second, that a diagnosis was not made and should have been, in certain cases. These patients lost on an average six months of valuable time which might have been saved for them had a biopsy been made. Herein lies the responsibility of the profession.

In reviewing the results, the normal death rate for women of this age must be borne in mind (42.9 for the nine years). The foregoing tables will be of assistance in enabling the reader to understand the results obtained. In any group the number treated whose span of life is known, the number surviving four and five years, and the number who died early (within the first year) serve to show the efficacy of the various treatments. If, therefore, under any



given treatment we can show a large number of patients who lived four and five years and a small number of early deaths, I think it will be conceded that this treatment is of distinct value as compared with one showing the reverse.

In some instances the diagnosis of carcinoma was not confirmed microscopically but all were clinically malignant. This applies more especially to the case of patients treated by Radium in the earlier years. As in some who died, the nature of the growth is not known, and it was impossible from replies received to establish whether death was due to cancer or other causes, it is reasonable to suppose that in some now living and on whom we have no microscopic findings, cancer was present. In the case of those living we have positive diagnoses in all except seven cases. An analysis is shown in Table V. I have examined the tissue removed in forty of these and am indebted to Dr. Broders for confirmation of my findings. These specimens were studied from the histologic standpoint to determine if their structure contributed in any way to the survival of the patients concerned. The epitheliomas were graded I, II, III and IV on the basis of Broder's classification. Those showing no differentiation were placed in Grade IV. Where any differentiation was present the tumor was placed in one of the lower grades. Where differentiated and undifferentiated tissue was present in equal amounts Grade II was established. It was noted that 83.2 per cent fell in Grades III and IV and none in Grade I. There were six in Grade II (16.6 per cent) twenty in Grade III (55.5 per cent) and ten in Grade IV (27.7 per cent). Of the four adenocarcinomas one was of particular note in that it showed a marked degree of metaplasia. Photomicrographs of typical sections are shown. From these findings it is apparent that even in the case of patients who survive, the tumor is usually of a very malignant type and hence complete destruction of the growth must be accomplished early in order to obtain good results.

Table V.  
PATIENTS NOW LIVING.

Treatment	Time	Cases	Clinical		Pathological findings
			Group		
Total abdominal hysterectomy	over 8 yr.	3	II	All	E All *
"	6 "	1	IIA		E
"	5 "	3	II	2	E
"	4 "	1	II	1	E
"	4 "	1	I		A Ca.
"	3 "	1	I		E
Vaginal hysterectomy	"	8 "	II	1	E
"	"	8 "	IIA	1	E
"	7 "	1	II		A Ca.
"	6 "	2	I	2	E both
"	5 "	2	I	2	E both
"	4 "	1	I		E
"	3 "	1	II		E
Simple cautery and later hysterectomy	"	8 "	II		E
"	7 "	1	I		E
"	5 "	1	I		E
"	4 "	1	I		E
"	3 "	1	II		E
Simple cautery and immediate hysterectomy	"	3 "	I		E
Total abdominal hysterectomy and radium	"	4 "	I	1	E
"	"	4 "	II	1	E
"	3 "	4	I	1	E
"	"	4 "	IIA	1	E
"	"	4 "	III	1	E
"	"	4 "	II	1	E
Vaginal hysterectomy and radium	"	4 "	I	4	E 2 A 2
Simple cautery and total abdominal hysterectomy and radium	"	3 "	II	2	E both
"	"	3 "	IIA	1	E
Simple cautery and vaginal hysterectomy and radium	"	4 "	I	2	E both
"	"	4 "	II	1	E
Percy cautery and later hysterectomy	"	7 "	II	2	E both
"	6 "	2	II	1	E
"	6 "	2	IIA	1	A Ca.
"	4 "	1	I		E
Percy cautery and immediate hysterectomy	"	5 "	I		E
Percy cautery and vaginal hysterectomy	"	3 "	II	1	E #
Percy cautery and later hysterectomy and radium	"	4 "	II		no specimen
Percy cautery and immediate hysterectomy and radium	"	5 "	I		E
Radium only	"	4 "	II		no specimen
"	3 "	5	I	1	" "
"	"	5 "	I	1	E
"	"	5 "	II	1	no specimen
"	"	5 "	IIA	1	A Ca.
"	"	5 "	IIA	1	no specimen
Percy cautery only	"	6 "	II		E
"	7 "	1	I		no specimen #
Simple cautery and radium	"	4 "	I	1	E
"	4 "	2	IIA	1	no specimen
"	3 "	1	I		E

- \* One had cautery and radium for recurrence
- # Radium for recurrence.

The length of life under various treatments brings out several interesting facts (Table VI). The percentages, however, are based on numbers much too small to render them of value other than comparative. It will be seen that the efficacy of vaginal hysterectomy in certain cases is indisputable. Of the nine living patients treated by this method most belonged in the earlier groups (Table V). One, however, had extension to the vaginal wall (Group IIA). Another point well illustrated, if we accept the supposition that similar numbers of tumors of like potentialities are present in the various minor groups, is the fact that delayed hysterectomy gave better results than immediate hysterectomy in conjunction with both simple and Percy cautery. Furthermore, abdominal hysterectomy and vaginal hysterectomy, when supported by radium gave almost identical results which were apparently slightly better than either agent alone produced. Radium as a means of obtaining permanent cure was disappointing. Of 133 cases so treated only six are known to be living. In justice to radium, however, must be considered three living patients treated by cautery and radium. These results must not be given too much weight nor used to condemn the method, for the majority of the patients obtained inestimable relief which could not have been given by any other means, and the dose used at that time was found to have been too small. Hemorrhage was controlled and discharge diminished or at least rendered less disturbing, although pain when once it became established was not influenced to any great extent.

The Percy cautery proved itself curative in only two early cases, although palliation was effected in the remainder as cited by Balfour in an earlier review of some of these.

Table 6  
LENGTH OF LIFE UNDER VARIOUS TREATMENT IN ALL GROUPS

Method	Cases treated	Cases known	Living	5 yr. cures now living	Per cent 5 yr. cures known	5 yr. cures now living	Per cent 3 yr. cures known	Dead who lived over 5 yrs.
Total abdominal hysterectomy	25	24	9	7	30.4	9	39.0	4
Vaginal hysterectomy	29	23	9	7	30.4	9	39.0	4
Amputation cervix	2	1	0	0		0		1
Simple cautery and later hysterectomy	15	12	5	3	25.0	5	41.0	1
Simple cautery and immediate hysterectomy	8	8	1	0		1	12.0	2
Total abdominal hysterectomy and radium	15	14	6	0	*	6	43.0	0
Vaginal hysterectomy and radium	10	9	4	0		4	44.0	1
Simple cautery and total abdominal hysterectomy and radium	9	6	3	0		3	50.0	1
Simple cautery and vaginal hysterectomy and radium	5	4	3	0		3	75.0	1
Fercy cautery and later hysterectomy	31	25	5	4	16.0	5	20.0	5
Fercy cautery and immediate hysterectomy	13	6	1	1	16.0	1	16.0	0
Fercy cautery and vaginal hysterectomy	3	2	1	0		1	50.0#	0
Fercy cautery and later hysterectomy and radium	7	6	1	0		1	16.0	2
Fercy cautery and immediate hysterectomy and radium	10	5	1	0		1	20.0	0
Radium only	133	91	6	0		6	6.7	4
Fercy cautery only	81	57	2	2	3.5	2	3.5	3
Fercy cautery and radium	17	9	0	-		0		1
Simple cautery	26	20	0	-		0		0
Simple cautery and radium	36	25	3	-		0	12.5	0
Total	475	347	60	24	7.0	57	16.6	30

# Percentages in this table are based on "Cases known". They thus favor small groups and those wherein a large number are excluded on account of insufficient data.

\* Radium was first used here in 1915

Your attention is now called to Table I (Early cases). It will be noted that twenty cases in Group I were treated by surgery alone. Information relative to length of life or whether living or dead, is lacking in four instances. Nine are known to be dead, seven known to be living, and no patient died within the first year. We have, then, information concerning sixteen patients. Six lived five years and nine lived four years, the former being included in the latter. If we compare these figures with those in the corresponding columns under other methods of treatment and consider the degree of involvement indicated by the group, we may arrive at a fairly accurate estimate of the relative values of the methods used in different stages of the disease. (Tables II, IIA, III, IV)

The point may be raised that these cases are not accurately grouped, else why do we find any cases in Groups I and II treated by other means than surgery. On account of factors such as obesity, cardiac decompensation, and the personal considerations of the patient, some early cases were treated by radium. On the other hand, the probable accuracy is borne out by the gradually increased mortality, the shorter period of life, and the longer duration of symptoms in the higher groups.

The individual groups may now be considered. The average length of life of a few patients treated by a particular method means very little, but if the number also be taken into consideration this average may give some idea of what was accomplished.

Of the eleven cases in Group I who lived over five years, ten were surgically treated. Two of the three treated by Radium on whom we have complete data are living and have lived three years. The third lived one and one-half years.

Both of those treated by simple cautery and radium are living, one three years and the other four years after treatment. (In making a special sub-heading for those receiving cautery and radium, I am reducing the number

treated by radium reported by Stacy in 1920). It is thus apparent that in these very early cases the various types of treatment gave similar results and it remains for time to prove the durability in those wherein radium was employed.

In Group II the Percy cautery and radium yielded approximately the same early mortality. The former obtained one five-year cure and the latter one four-year cure. The combination of radium, cautery, and surgery in this group proved equally efficient to, if not slightly better than surgery. The incidence of early deaths is higher but four of the seven are living while only nine of twenty-four wherein surgery singly was used survive. (See asterisks Table II)

Group IIA is of special interest. Of the five surviving patients all received surgical or combined treatment. The use of radium as an adjunct gave the best results while alone it was disappointing as a curative agent.

In Group III only cases receiving radium or radium as part treatment survive. Of those on whom the Percy cautery was used, seventeen of twenty-two died within the first year while of those on whom radium alone was used, only twenty-two of forty died in this period. In Group IV radium again showed a slight superiority in prolonging life. Its palliative effect is universally recognized.

There were twenty-one rectovaginal, thirty-five vesicovaginal, and one vesicosigmoidal fistula, a total of fifty-seven in 418 cases or 13.6 per cent. The largest number followed Percy cautery but this may be due in part to the fact that the abdomen was not always opened to control the uterus and estimate the degree of heat. The incidence is shown in Table VII. It is 12 per cent in the entire series (475) and as two fistulae were present in eleven cases the percentage of patients with fistula would be 9.7.

Table VII

## Fistulas.

Treatment	Cases	Recto- Vaginal	Vesico- Vaginal	Vesico- Sigmoid	Total	Percentage
Surgery	56	1	2		3	5
Simple cautery and surgery	23		4		4	18
Surgery and radium	25	2	2		4	16
Surgery and Percy cautery	47	3	2		5	11
Surgery, Percy cautery and radium	17		2	1	3	18
Radium	133	6	9		17	13
Percy cautery	81	7	13		20	24 (high)
Simple cautery and radium	36		1		1	3
	418	21	35	1	57	13.6

Eleven patients had two fistulas which makes the incidence 9.7 per cent in the series (475 cases).

We may then conclude:

I. That in very early cases surgery alone gives good results.

That in combination with radium surgery gives slightly better results than surgery alone.

That the ultimate result in these cases treated by radium alone is not known as only three years has elapsed.

II. That in operable but not early cases surgery alone or

combined with radium gives the best results.

That radium alone or Percy cautery are both less efficient and of equal value. Hence where radium is not available Percy cautery should be used.

III. That in cases operable except for vaginal extension, surgery

gives the best results and radium is disappointing.

IV. That in inoperable cases radium alone or in combination with

cautery or surgery is the only effective agent.

V. That in advanced cases radium is superior to all other

methods but not curative.

VI. That the incidence of fistula is higher with Percy cautery

than with any method.



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## APPENDIX

Replies received too late to be included.

Group	Treatment	Tabulated as	Reply	Time	
				Years	Months
	Vaginal hysterectomy	unknown	living (good health)	8	3
I.	Vaginal hysterectomy	unknown	died		10
	Radium only	unknown	living	3	7
II.	Simple cautery	unknown	died	2	6
	Simple cautery and radium	unknown	died	4	8
	Simple cautery and radium	unknown	died (at operation elsewhere)		5
	Radium only	unknown	died		8
	Vaginal hysterectomy and radium	unknown	living	4	4
	Simple cautery immediate abdominal hysterectomy and radium	unknown	living	4	10
	Percy cautery abdomen opened followed later by total abdominal hysterectomy	unknown	living	6	
III.	Simple cautery and radium	unknown	died	2	6
	Total abdominal hysterectomy preceded and followed by radium	unknown	living (radium)	4	10
	Percy cautery	unknown	living (for recurrence)	6	8
	Simple cautery preceded by radium	unknown	died		3
	Radium only	unknown	died		2
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I	Simple cautery followed later by vaginal hysterectomy	Cautery followed later by abdominal hysterectomy.	Surgeon's report of operation performed elsewhere.		

These replies credit another three year cure to radium and an eight year cure to vaginal hysterectomy in Group I. They further establish the value of hysterectomy when supported by radium or Percy cautery.

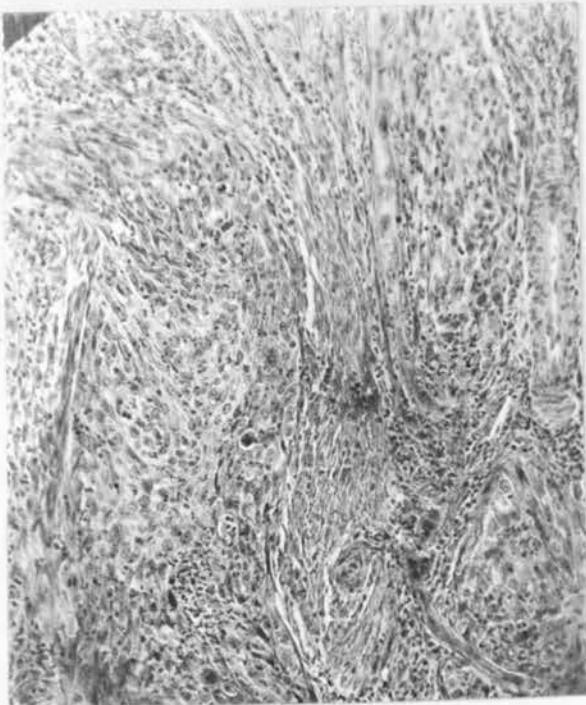


Fig. 1 (/100) No. 129862, Mrs. N. Age 34 Squamous-celled carcinoma of the cervix Grade iv. Active cells with no tendency to differentiation. Patient living and well 5 yrs. 10 mos. after total abdominal hysterectomy.

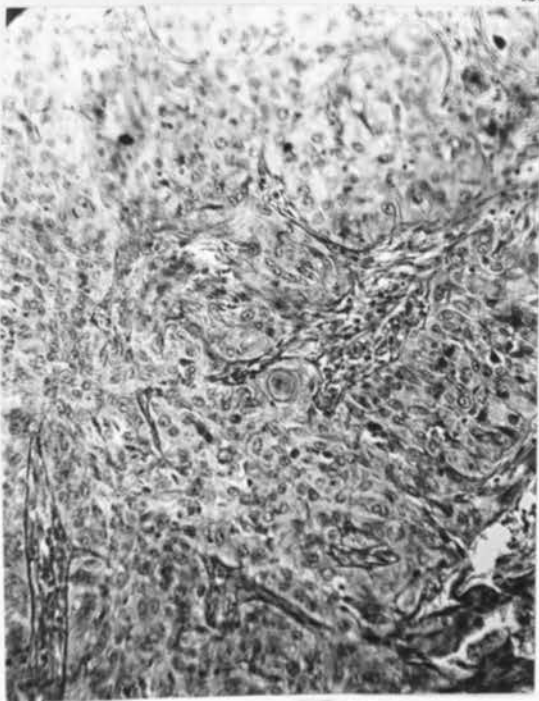


Fig. 2 (/100) No. 166324, Mrs. A. Age 47 Squamous-celled carcinoma of the cervix Grade iii - Active cells with small area of keratinization. Patient living and well 5 yrs. 4 mos. after Percy cautery and immediate abdominal hysterectomy.

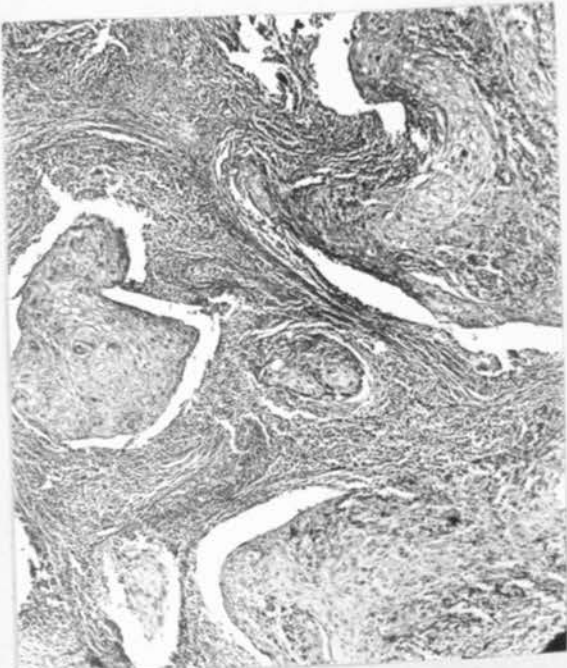


Fig. 3 (/100) No. 147230, Mrs. W. Age 62 Squamous-celled carcinoma of the cervix Grade ii. Differentiated and undifferentiated cells in about equal proportions. Patient living and well 5 yrs. 10 mos. after total abdominal hysterectomy.

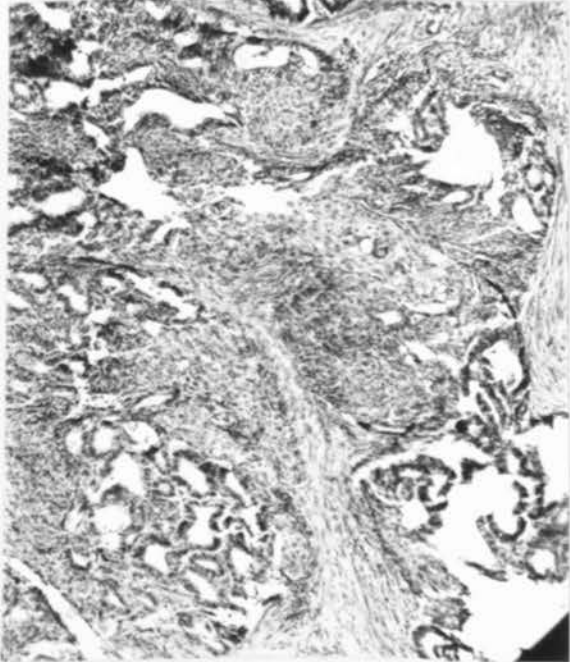


Fig. 4. (/50) No. 245369, Mrs. C. age 57. Adeno-carcinoma of the cervix showing metaplasia. Patient living 3 yrs. 1 mo. after vaginal hysterectomy. Has now a recurrence.