

## THE SO-CALLED STOCKHOLM METHOD AND THE RESULTS OF TREATMENT OF UTERINE CANCER AT THE RADIUMHEMMET<sup>1</sup>

by

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Cancer of the uterus is one of the conditions where permanent results were first observed with radiological treatment. A large part of the credit for the building up of modern radiotherapy is due to the work of gynaecologists.

As early as 1909 DOMINICI introduced his »méthode du rayonnement ultrapénétrant» and in 1910 CHÉRON and DUVAL published the first results of their »méthode des doses massives» in the treatment of cancer of the uterus.

This method was based on the intracavitary application of relatively large amounts of heavily filtered radium salt. During the course of the years other methods have turned out to be more satisfactory in several fields and even in uterine cancer other procedures have been attempted such as the use of radium emanation instead of the salt, the insertion of radium needles instead of surface application and röntgen treatment as a substitute for radium. None of these or of other similar methods have received general recognition. On the contrary in the radiological treatment of cancer of the uterus, there is a rather general tendency to return to the methods which were recommended almost 25 years ago.

For about 20 years at the Radiumhemmet we have followed a uniform method of treatment based on these principles — the so-called Stockholm method worked out by FORSELL in 1914 — and likewise under uniform control, our method has to date been practiced in 3,000 cases of uterine cancer.

My paper will deal with the method of treatment of uterine cancer used at the Radiumhemmet and the results obtained.

<sup>1</sup> Read before the Wiener geburtshilflich-gynäkologische Gesellschaft Nov. 27, 1934.

### The Radiumhemmet Technique of Treatment of Cancer of the Cervix

The so-called Stockholm method is a fractionated contact treatment or »brachy-radium treatment» concentrated into a few applications given during the course of a month. We use relatively large amounts of radium, a filter equivalent to 3 mm Pb and if possible apply radium simultaneously in the uterus and vagina.

The following is a *typical treatment series*.

In the uterus: 40 mg. el.  $\times$  20 hrs = 800 mg. el. hrs.

In the vagina: 75 mg. el.  $\times$  20 hrs = 1,500 mg. el. hrs.

One week interval — 2nd treatment.

Three weeks interval — 3rd treatment.

In these three relatively equal treatments the total dose is:

In the uterus about 2,400 mg. el. hrs.

In the vagina about 4,500 mg. el. hrs.

Total treatment time about 60 hrs.

The quantity of radium, the treatment time and dose are given above in average figures which are modified in one or the other direction according to varying conditions in the individual case.

The containers which we use for the radium salt are the so-called DOMINICI tubes with walls of gold or platinum equivalent to

1 mm Pb filter. Figure 1 shows examples of such tubes of different lengths and capacities. The tubes are placed in applicators, the walls of which are equivalent to 2 mm Pb. For intrauterine application (Fig. 2) we have narrow capsules corresponding to HEGAR's dilators 7 and 8 and of variable length

so that depending on the length of the uterus we are able to cover the entire cavity from fundus to external os with radium. For vaginal application we use either cylindrical applicators of different lengths and width (Fig. 3) or flat applicators of different sizes (Fig. 4). The variations in the form and size of the applicators are conditioned by the variations in the technique of treatment.

Figure 5 gives a diagrammatic illustration of *the use of the applicators* in tumours of different shapes. The flat applicators (Fig. 5, A) are used

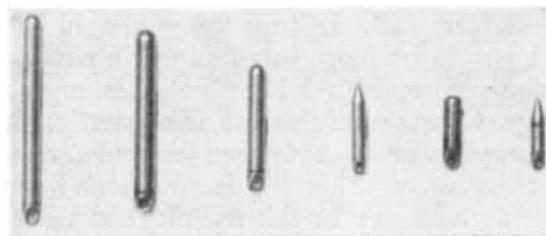


Fig. 1.

for disc-shaped tumours or on surfaces which become relatively even when the applicator is pressed against them.

The cylindrical applicators (Fig. 5, B) are usually applied two or three at a time in a crater or against an irregular tumour surface. Figure 5, C illustrates a treatment where both cylindrical and flat applicators are used. Figures D and E depict the treatment of large cauliflower tumours.

The selection of the applicators has two objects in view. One is to cover as far as possible the entire vaginal surface of the tumour, the other to distend the vagina laterally so that the radium comes as close as possible to the lateral pelvic walls. For this purpose the cylindrical applicators are often held apart by a block of glass (Fig. 6).

This technique which varies according to the extent and shape of the tumour requires a relatively large number of different applicators and of tubes which fit them. The variations in the technique of application necessitate frequent deviations from the average scheme of treatment already illustrated. Large tumours demand a large number of tubes which means that we often cannot avoid exceeding the average quantities of radium mentioned above. With very small tumours the condition is reversed. In such cases the treatment time must be shortened or lengthened in order to attain the desired dosage in mg. el. hrs. On account of our relatively large selection of radium tubes, the variations are as a rule small but they may become rather significant in exceptional cases.

On treatment days the gynaecological department at the Radium-hemmet has at its disposal more than 17 tubes for intrauterine application, which is sufficient for 7 cases, and 6 or 7 series of tubes for vaginal application. Expressed in radium element we have at our disposal three times a week about 700 mg. el.

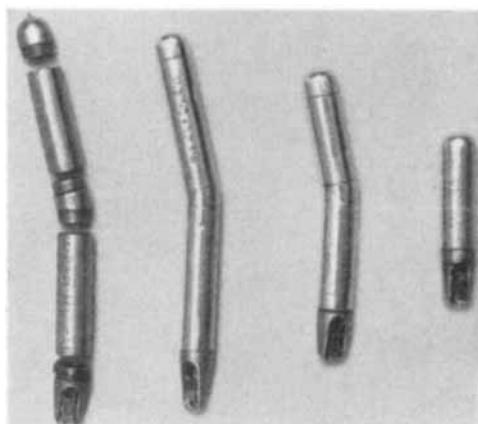


Fig. 2.

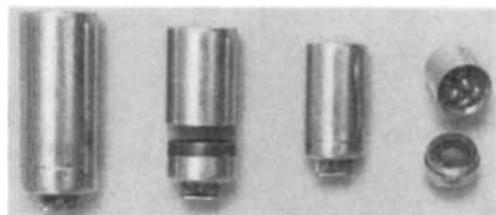


Fig. 3.

The total dose mentioned above for the whole series of treatment also varies, yet within rather narrow limits. These variations are chiefly dependent on the available space. We know by experience that as a rule

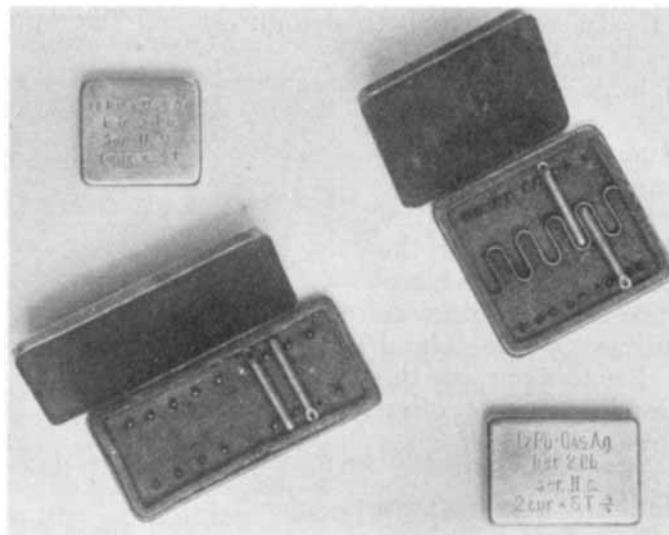


Fig. 4 a.

we cannot exceed a total vaginal dose of 4,500 mg. el. hrs in 3 treatments without risk of rectal injury. It may be mentioned in passing that the bladder is very much less sensitive than the rectum. The most important

point in avoiding rectal injury is to keep the greatest possible distance between the radium and the rectum. We arrange this by tamponage which keeps the radium in position, at the same time holding it away from the rectum. The total dose must be diminished if there is but little space available as in the case of old patients with an atrophic vagina or on account of the size and position of the tumour. If there is plenty of space the dose may be somewhat increased.

If the radium in one or several treatments has been distributed over a large area on account of the size of the tumour, the dose can be increased, while

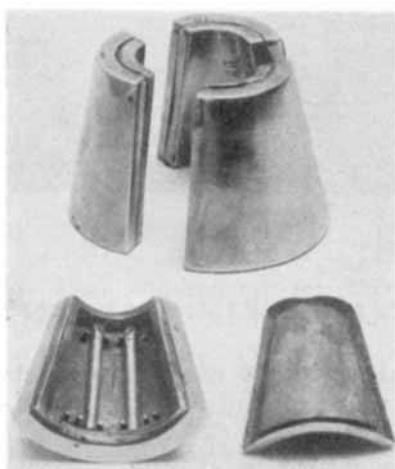


Fig. 4 b.

if one has been forced to concentrate the radium on a small area the dose must be decreased.

The brachy-radium treatment is not varied, however, according to the histological character of the tumour; squamous cell and adenocarcinomas of the cervix are given the same dose.

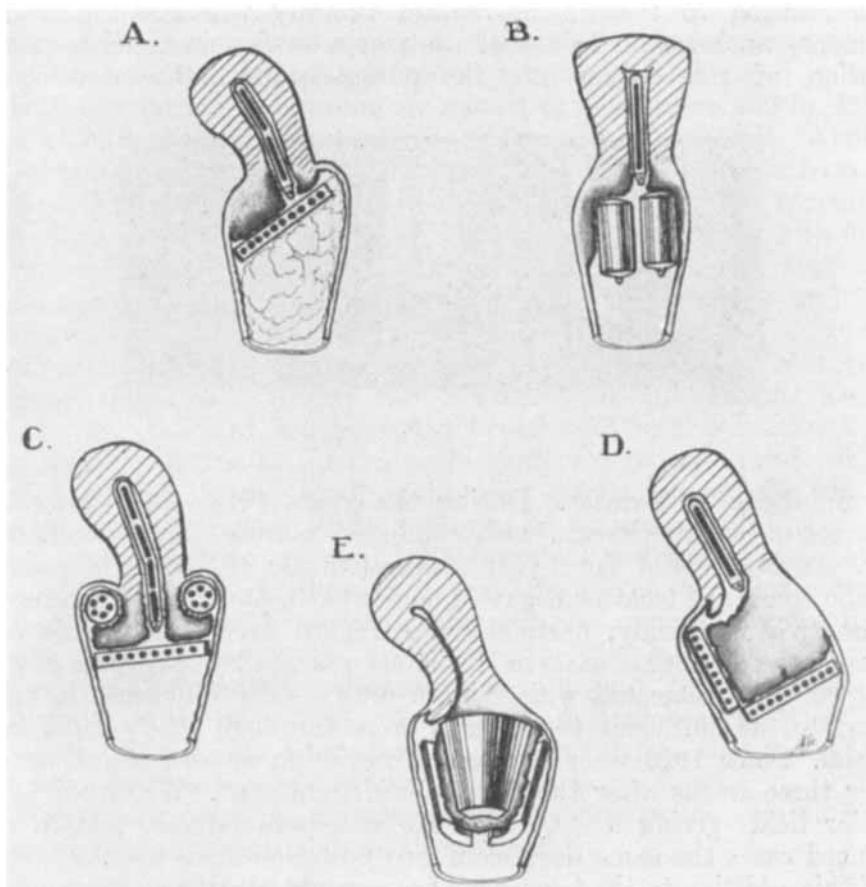


Fig. 5.

The difficulty of keeping available beds and radium for the rapidly increasing number of patients has forced us so far to concentrate the treatment still further. For many years we have given in most cases only two treatments with a 3 weeks interval. Such a concentrated treatment demands a decreased dose; we give on an average altogether 2,200 mg. el. hrs in the uterus and 4,000 in the vagina.

As I mentioned in a paper in 1930<sup>1</sup> the more concentrated treatment does not seem to have impaired our 5-year results. When the conditions allow I prefer, however, to give three treatments. Shorter treatments diminish the danger of infection. The decrease in the size of the tumour surface even one week after the first treatment often permits of a more exact application at the second.

In addition to the brachy-radium therapy which is the essential treatment, we have made use of röntgen radiation in order to prevent extension of the cancer into the parametrium or the development

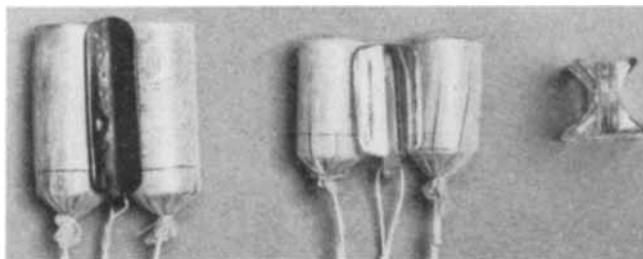


Fig. 6.

of lymph-node metastases. During the years 1918—1922 we carried out a series of experiments with combined radium and röntgen treatment. An analysis of the 5-year results (Annals of Surg. 1931) showed that the combined treatment gave a somewhat better result than brachy-radium treatment only, particularly in regard to the inoperable cases. Although the number of cases in this series was small — 457 cases of which about 60 % were treated with radium only — the difference in results seemed to me sufficient to demand more thorough study on a larger material. Since 1929 we give röntgen radiation in all cases of cervical cancer three weeks after the last radium treatment. We irradiate two anterior fields giving  $3 \times \frac{1}{3}$  SED to each parametrium and in more advanced cases the same dose from two posterior fields also.

If this addition to the treatment has brought about any improvement at all in our 5-year results, it seems to be relatively insignificant as far as one can judge at present. I would not dare stress as a fact, as is generally done in the literature, the advantage of combined radium and röntgen treatment over brachy-radium treatment alone.

During recent years we have more and more combined brachy-radium with teleradium treatment. In March 1929 the Radiumhemmet acquired its first large »bomb« containing 3 grams of radium and in February

<sup>1</sup> Acta Obstetr. et Gynec. Scand. 1930, IX, 1—4.

1934, a larger one for 5 grams. It is still too early to estimate whether this addition to the therapy will improve our 5-year results.

Certainly, however, we have seen primary healing in various cases treated with combined brachy-radium and teleradium where according to long experience we should not have attained such a result with brachy-radium and röntgen treatment with our usual doses. The most striking results were noticed in cases of superficially growing, papillomatous squamous cell cancer extending far down in the vagina and out on the vulva, in cases with metastases around the vaginal inlet and in some cases with discontinuous lymph-node metastases. In these and in similar cases I should not want to be without access to the bomb. Another great advantage of teleradium treatment is the fact that it affects the general condition of the patient a good deal less than röntgen treatment.

The distance from the radium in the bomb to the skin is 5 to 6 cm. As a rule we irradiate one field a day giving 5 to 6 gm. hrs. Our usual total dosage is 25 to 30 gm. hrs on the skin of the abdomen and back and 20 gm. hrs on the vulva.

Two or three brachy-radium treatments and a series of röntgen or teleradium radiation conclude the treatment in most cases. During the first year renewed brachy-radium treatment in those cases which do not seem to heal is associated with great risk and is almost without exception useless. Only small stubbornly persistent nodules on the portio are sometimes treated by insertion of radium needles.

Different procedures are used for recurrences and metastases in cases once clinically cured. If the recurrence appears on the portio we do hysterectomy in operable cases and insertion of radium needles in inoperable. Vaginal metastases are treated by the insertion of needles sometimes combined with electrocoagulation and those around the vaginal inlet with teleradium. Superficial recurrences covering large areas of the vagina are treated by electrocoagulation and teleradium; sometimes cautious brachy-radium treatment is used.

Recurrences in the parametria apparently do not respond to either röntgen or teleradium in spite of all attempts.

### **The Radiumhemmet Technique of Treatment of Cancer of the Corpus**

Already in 1916 ADLER expressed the opinion that adenocarcinoma was more radioresistant than squamous-cell carcinoma. ADLER's statement applied to cervical adenocarcinoma but has been extended by others to all adenocarcinomas. As far as corpus adenocarcinoma is concerned I have repeatedly emphasized that the less satisfactory results obtained in many places are not ascribable to the histological type but to an imperfect treatment technique.

At the Radiumhemmet we have for many years used about the same technique in carcinoma of the corpus and the collum but have gradually arrived at a method particularly designed for the corpus. It is still too early to state definitely whether our present method of procedure will turn out to be an improvement because it requires many years to obtain a sufficiently large series of cases observed over a long enough period of time to allow conclusions to be drawn.

Time does not allow me to go further into the theoretical and practical difficulties which meet every attempt to introduce into the uterine cavity a heavy radium preparation and to place it so that the organ is

given a homogeneous radiation. We have adopted a different method of procedure and for several years have packed the uterus with a large number of weaker preparations of suitable size. The earlier method, however, is still used in those cases where the width of the uterine cavity allows the introduction of only a relatively small applicator. In packing we use cylindrical applicators, small ones for the medium sized uteri

and our large vaginal applicators for the largest uteri. These applicators are introduced one at a time through the dilated cervix until the cavity, which may often markedly expand, is entirely filled. Figures 7 and 8 illustrate this method using small and large cylinders.

Figure 9 shows the provisional instrument constructed at my suggestion by our physician Dr SIEVERT for the introduction of the small cylinders after dilatation to HEGAR 8.

The method is not yet worked out in detail. Our physics laboratory is collaborating with the gynaecology department to carry out a series of measurements with the SIEVERT condensor chamber. The object is firstly to study the variations in the distribution of the radiation intensities when the applicators have been differently placed in the uterus in order to determine the most suitable radium preparations and the best method of placing them in the uterus, and secondly to determine the relation between the intensities when using a different number of applicators in different uteri in order to calculate the treatment time.

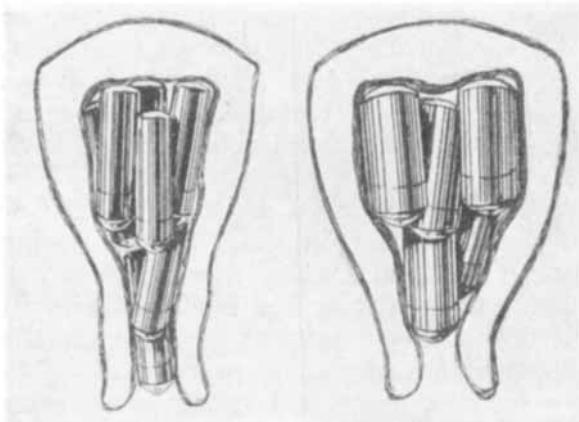


Fig. 7.

Fig. 8.

At present we must grope our way. The dose distributed in two treatments varies between 2,600 and 4,000 mg. el. hrs according to the size of the uterus. The quantity varies between 80 and 200 mg. el.

Because of the danger of later metastasis to the vagina we give at least one vaginal treatment to all fundus cases. After the treatment is concluded the patient is carefully controlled by regular examinations. If symptoms do not disappear or if new symptoms such as bleeding, discharge or an increase in the size of the uterus reappear after a temporary cure we do a total hysterectomy.

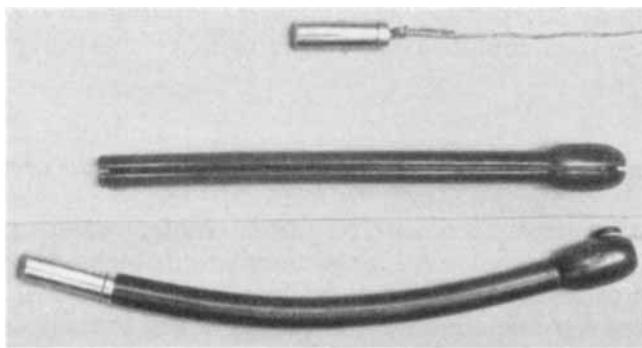


Fig. 9.

This closes my account of the so-called Stockholm method. There was a time when it was believed that it should be possible to simplify radium treatment to such an extent that it could be practiced according to given rules by anyone who had access to the necessary quantity of radium. My brief account will probably have shown that we ourselves have had to relinquish this ideal. In order to obtain satisfactory results it is not sufficient to be familiar with the technique of radium application, in itself usually a simple operation, but it requires a careful planning of the treatment for each individual case, an estimation of the factors of influence, recognition and understanding of the variations in the healing process and insight into the dangers and complications. It demands in other words the knowledge which only experience can provide and which even in radiological treatment distinguishes the craftsman from the artist.

I have only time to mention briefly a number of other questions in connection with the treatment.

Biopsies are performed at the first treatment in all cases.

Excochleation of the tumour is never done.

Anesthesia is usually unnecessary.

The patients are hospitalized as a rule for four days during each brachy-radium treatment. Between treatments the patient is generally up and about and able to do her housework.

Severe radium injuries such as fistula of the bladder and rectum scarcely ever occur nowadays.

Mild proctitis cannot be entirely avoided.

Ulceration of the bladder is occasionally observed. It may appear several years after treatment and as a rule causes only insignificant discomfort.

Perforation of the uterus occurs but requires no special interference.

Severe salpingitis, diffuse peritonitis and pulmonary embolism are the really dangerous complications. Our primary mortality lies between 1 and 2 %.

### The Radiumhemmet Results in Treatment of Cancer of the Cervix

The following account of our results is chiefly based upon the rules laid down by the Radiological Subcommission of the Hygiene Section of the League of Nations.<sup>1</sup> Deviations from these rules will be explained later on, except for one which I want to mention at this point. According to the rules of the Subcommission the cure figure must be based upon the number of cases treated and not on the number examined. I consider it of the utmost importance, however, to give the absolute cure rate whenever possible as this figure is the only one which is of value when comparing statistics from different clinics.

My report includes all cases of primarily radiologically treated carcinoma of the cervix from the beginning of 1914, the year when we began to use a uniform method of treatment, to the end of 1928, the last year for which the 5-year results are available.

*The total N° of primarily radiologically treated cases of cervical cancer observed at the Radiumhemmet 1914—1928 inclusive: 1567*

Not treated . . . . .	112	7.1 %
Treated . . . . .	1 455	92.9 >

According to the rules of the Subcommission, the reason must be stated in cases which are not treated. Scrupulous adherence to this rule is important because this brings out the similarities and dissimilarities in the initial material of the different clinics, a necessary prerequisite in order to determine whether or not a comparison of the results is justifiable.

<sup>1</sup> Series of League of Nations Publ., III. Health, 1929, C. H. 788.

Our non-treated cases given in Table 1 are grouped according to the rules of the Subcommission.

Table 1

*Non-treated cases of cancer of the cervix 1914—1928 inclusive: 112*

	Not examined	Examined
a. Considered hopeless . . . . .	3	77
b. Denied treatment (lack of radium or beds) . . . . .	—	—
c. Treatment refused by patient . . . . .	2	2
— unable to travel (sick or dead) . . . . .	8	—
— did not come (cause unknown) . . . . .	8	—
d. Previous radiological treatment elsewhere . . . . .	3	4
e. Referred for operation . . . . .	1	2
— consulted another clinic . . . . .	2	—
	27	85

Table 1 shows  
 that 27 patients have not appeared for examination,  
 that the majority of the cases (80 of 112) have not been treated because  
 they were considered hopeless and  
 that the rest are cases which did appear for examination but which  
 had been treated radiologically elsewhere or were referred for opera-  
 tion.

In calculating the absolute cure rate those 80 cases are included which  
 were considered hopeless and 2 cases which were examined but refused  
 treatment. We have excluded 30 cases, 24 not examined and 6 examined  
 (4 treated radiologically elsewhere and 2 referred for operation).

The absolute cure rate is thus calculated as follows:

Not included in calculation of absolute cure . . . . .	30	= 1.9 %
Included in calculation of absolute cure		
non treated cases . . . . .	82	
all cases treated . . . . .	1 455	
	1 537	= 98.1 %

*The 5-year result in cancer of the cervix at the Radiumhemmet 1914—1928 inclusive*

Total no. cases examined . . . . .	1 537
Symptom-free after 5 years . . . . .	327
<i>Absolute cure rate</i> . . . . .	21.5 %
Total no. cases treated . . . . .	1 455
Symptom-free after 5 years . . . . .	327
<i>Relative cure rate in cases treated</i> . . . . .	22.5 %

According to the rules of the Subcommission, the relative cure figure  
 for radiotherapy results should not include patients who have remained

cured after hysterectomy following unsuccessful radiological treatment. Eight of our patients have undergone such an operation. The relative cure rate with radiological treatment only becomes 21.9 % after this deduction.

Another important request of the Subcommission is that the cases where histological diagnosis is lacking should be listed separately. Among my cured patients there are 8 such cases, all with clinically definite cancer. Seven of those I have reported in detail in *Acta Radiologica* (1927, VIII, 363). They belong to the period previous to 1922 before we had our own pathology laboratory. In the remaining case dating from 1927 and presenting a large crater in the posterior vault, we forgot to take a biopsy.

As the diagnosis in these cases can scarcely be doubted and as the cure figures are barely affected by the small number, I have not reported them separately.

The Subcommission, as is known, demands the grouping of the cases into four different stages according to the anatomical extent of the tumour. Without going into detail, Stage I refers to cancer limited to the cervix, Stage II where the tumour extends into the vaults with or without involvement of the parametrium with the uterus still movable, Stage III where at least one parametrium is massively infiltrated and Stage IV the so-called blocked pelvis. In general the first two stages correspond to the operable cases and the last two to the inoperable. Most of the borderline cases belong to Stage II.

Since 1928 we have followed this grouping. Previously we used to distinguish between operable, borderline and inoperable cases. Although a retrograde classification can never be fully satisfactory I have nevertheless regrouped all our cases previous to 1928 into the four stages.

Table 2

*Distribution of cases of cancer of the cervix 1914-1928 inclusive according to stages*

No. of treated cases	1 439 <sup>1</sup>	No. of cases	%
Stage I	141	= 9.8	
» II	403	= 28.0	
» III	557	= 38.7	
» IV	388	= 28.5	
	1 439	100.0	

The relative 5-year cure in the different stages is shown in Table 3. The figures in parenthesis give the cure after deduction of the cases operated upon after unsuccessful radiological treatment.

<sup>1</sup> 16 cases excluded which were given only röntgenological treatment for consolatory reasons.

**Table 3**  
*5-year cures in different stages of cancer of the cervix 1914—1928 inclusive*

	No. treated	No. 5-yr cures	Cure %
Stage I . . . . .	141	81	57.5 (54.0)
» II . . . . .	403	188	34.3 (32.5)
» III . . . . .	557	90	16.2
» IV . . . . .	338	18	5.3

### The Radiumhemmet Results in Treatment of Cancer of the Body

It is considerably more difficult to present correct statistics of the results of treatment in corpus than in collum cancer. The chief reasons for this are difficulties in definition of the concept »clinical cure», in obtaining a positive histological diagnosis and in distinguishing between corpus cancer and pure endocervical carcinoma.

The cure figures must naturally vary according to the care with which the primary material is selected and the principles which form the basis of selection. These variations become considerable in the case of corpus cancer where the series is always small. It is therefore highly desirable that these questions be brought up for discussion so that the correct lines of procedure are clear.

The question as to which patients should be counted symptom-free at the end of the 5-year period is difficult to decide. If we make it a rule to count as clinical cures only patients who are both subjectively and objectively symptom-free, then the diagnosis of freedom from symptoms must be based on clinical examination and not on oral or written reports from the patient or relatives. As we all know, it is not at all unusual for a patient with corpus cancer to feel absolutely well for months or years in spite of the presence of a clinically definite cancer.

If we were to estimate the permanent cure at the end of 10 instead of 5 years, the doubtful cases would become considerably less, but the advantage would be questionable because of the increasing number of deaths from intercurrent disease.

In the meantime I myself count as symptom-free those who feel well, are able to work and do not present any palpable change due to cancer. This procedure allows of course of a good deal of subjective interpretation but it supplies us with the chief facts of the patient's condition, at the same time securing the possibility of comparable statistics.

The necessity of a definite histological diagnosis cannot be sufficiently stressed. The diagnosis of cancer in curettings is, however, one of the most difficult problems for a pathologist and is thus more easily demanded than performed.

The following experience may be illustrative:

At the III International Radiological Congress in Paris 1931, where I reported our results in the treatment of adenocarcinoma of the uterus I had with me slides of our 41 cured cases. On this occasion the preparations were examined by LACASSAGNE and GRICOUROFF of the Fondation Curie who considered that two of the cases classified as adenocarcinoma by our pathologist REUTERWALL were doubtful and that three cases which were somewhat doubtful in REUTERWALL's opinion should be interpreted as adenocarcinoma. A few months later ROBERT MEYER conferred the same favour upon us without knowing of the previous discussion. He agreed with REUTERWALL in regard to the diagnosis in all cases which we had registered as adenocarcinoma and was inclined to characterize three of REUTERWALL's doubtful cases also as adenocarcinomas. In one instance where the diagnosis was considered doubtful by all the experts, the patient died of adenocarcinoma of the uterus after 15 years of freedom from symptoms.

In regard to the histological diagnosis we ourselves for many years have adhered to the rule of including in the statistics only such cases where the histological diagnosis has been verified by the chief of our own tumour pathology department. We have submitted our earlier material to a scrupulous revision and have been forced to exclude no less than 14 cases previously regarded as 5-year cures because we could no longer get hold of the slides or else because on examination of the procured slides we could not support the original diagnosis with which the patient was referred to us. Furthermore we place in a separate group the doubtful cases which the pathologist feels forced to diagnose as »probably cancer».

The question of distinguishing corpus cancer from pure endocervical carcinoma, which as far as I know had not been discussed previously, I brought up at the IVth International Radiological Congress in Zurich July 1934. I pointed out that there exists a rather large group of cases where cancer can be histologically demonstrated in both cervix and corpus. In our series more than 50 % of these cases are advanced carcinomas involving the entire uterus. About 25 %, however, were apparently early cases without palpable changes. Clinically, histologically and as far as the course was concerned, most of these cases seemed to correspond to the classical description of corpus cancer and until quite recently we have registered them as such. During later years, however, we have temporarily kept them separately under the heading *cancer corporis et colli uteri*.

It is especially desirable to reach an agreement as to how these cases should be classified. Our possibility of comparing different statistics on corpus cancer will be entirely ruined if one clinic places these with the corpus cancers and another with the cervical cancers.

At the Radiumhemmet it seems as if these cases are increasing year by year probably because we give this point our special attention and because we routinely perform a fractional curettage of the uterus.

It is a fact that it frequently is impossible to place these cases in one or the other conventional group without violating the diagnosis. This brings up the question of whether the division of uterine carcinoma into cancer of the corpus and collum should be retained. It was originally dictated by solicitude in regard to the operation statistics and was perhaps realizable in cases where the extirpated uterus was available to inspection. In radiologically treated cases it is impossible to carry out and for radiotherapeutic statistics it would probably be more valuable to introduce a histological instead of a macroscopic classification.

Since there are so many unsolved problems in regard to corpus cancer statistics you might perhaps think it advisable to postpone the reporting of results. I am of the same opinion and therefore I shall confine myself to a brief survey of our material without special consideration of the cases which, according to our method of procedure, have been operated upon after unsuccessful radiological treatment and without special attention to the histologically doubtful cases.

*The total number of primarily radiologically treated cases of cancer of the corpus, observed at the Radiumhemmet 1914—1928 inclusive: 169.*

Non-treated . . . . .	13	7.7 %
Treated . . . . .	156	92.3 >
	169	100.0 %

Of 13 untreated cases 6 were not examined by us.

The results of treatment are calculated on 163 cases.

*The 5-year result in cancer of the corpus at the Radiumhemmet 1914—1928 inclusive.*

Total no. of cases examined . . . . .	163	
Symptom-free after 5 years . . . . .	76	
<i>Absolute cure rate</i> . . . . .	46.6 %	
No. of cases treated . . . . .	156	
Symptom-free after 5 years . . . . .	76	
<i>Relative cure rate in cases treated</i> . . . . .	48.7 %	

*Distribution of the corpus cases into different groups.*

Clinically operable . . . . .	42	26.9 %
Technically , . . . . .	79	50.7 >
Inoperable . . . . .	35	22.4 >
	156	100.0 %

*5-year result of treatment in the different groups*

	No. treated	No. 5-yr cures	Cure %
Clinically operable . . . . .	42	27	64.3
Technically > . . . . .	79	31	39.2
Inoperable . . . . .	35	9	25.7

*The total number of primarily radiologically treated cases of cancer corp. et colli uteri observed at the Radiumhemmet 1914—1928 inclusive: 56*

Non treated . . . . .	21	37.5 %
Treated . . . . .	35	62.5 >

Of 35 treated cases 9 (25 %) were 5-year cures.

Most of the cases of corpus cancer and of cancer corp. et colli were not treated according to our present technique of packing the uterus.

I have already mentioned in discussing the absolute cure the necessity of a uniform material when comparing different statistics. In spite of all warnings there is constant infringement of this rule. I wish to illustrate the importance of the primary material with some examples from our clinic.

In studing the question whether there has been an improvement in the results in later years, I have subdivided our cervical cancers into three periods.

**Table 4***Cancer of the cervix (primarily radiologically treated) 1914—1928 inclusive**Cure results during different periods*

	No. treated	No. 5-yr cures	Cure %
1914—19 . . . . .	296	65	22.0
1920—25 . . . . .	730	159	21.8
1926—28 . . . . .	413	103	24.9

The final result in these three periods seems to be somewhat better during the last three years.

It must, however, be stressed that the material has improved from the beginning of 1921 when operation for carcinoma of the cervix was abandoned in Sweden.

**Table 5***Improvement of the material*

Total no.	Stages I & II %	Stages III & IV %
1914—19 . . . . .	296	22.3
1920—28 . . . . .	1143	41.8

Table 5 shows a rather significant increase in the number of the less advanced cases. In spite of the better material the 5-year cure figure remains about the same which means in fact a less good result in later years.

This is still more obvious if we compare the different stages.

*Cure results in the different stages before and after 1920*

Curve %	Stage I to IV	Stage I	Stage II	Stage III	Stage IV
1914—1919 . . . . .	21.9	50.0	40.7	21.1	7.2
1920—1928 . . . . .	22.9	58.2	33.2	14.4	4.7

This shows that the results are worse in all except Stage I. One might feel justified in drawing the depressing conclusion that in spite of greater technical skill and greater experience the results have become poorer. The impairment is, however, only apparent and may be explained by:

- 1) The relatively small number of cases in 1914—19 which leaves more room for chance variations.
- 2) A more exact classification during later years.
- 3) Finally, increasing experience in diagnosing the recurrence.

These are all factors which cast their influence in favor of the first 5-year period but their significance can hardly be estimated in figures. The truth probably is that the results during these 15 years have been about the same.

Here is another observation of interest.

Table 6

*Cancer colli uteri (primarily radiologically treated) 5-year cures 1920—1928 inclusive*

No. of cases treated	5-yr cures %	No. of cases in % of		
		Stage I	Stage II	Stage III
1920 . . . . .	96	27.1	12.5	27.1
1921 . . . . .	115	23.5	13.9	27.0
1922 . . . . .	130	20.0	10.0	27.7
1923 . . . . .	105	23.8	18.1	28.6
1924 . . . . .	149	23.5	10.7	35.6
1925 . . . . .	134	14.2	10.4	24.6
1926 . . . . .	143	25.9	11.2	33.6
1927 . . . . .	143	25.9	6.8	38.5
1928 . . . . .	128	23.4	10.9	28.9
				33.6
				31.4
				35.7
				19.6
				31.1
				18.2
				27.5
				22.7

As can be seen from Table 6 there is great constancy in the 5-year results during the last 9 years. In the middle of the series there occurs, however, an exception, i. e. 1925, showing a catastrophic fall in the cure percentage. From the table one might be inclined to conclude that the markedly increased number of hopeless cases (31.4 % of stage IV in 1925) is the obvious explanation.

A closer analysis shows, however, that the results in Stage IV are not impaired while in Stages I and III the cure figure is 50 % lower than the average for the whole period.

*5-year cures 1920—1928 inclusive compared with those of 1925*

	5-yr cures in % of			
	Stage I	Stage II	Stage III	Stage IV
1920—1928 inclusive . . . . .	58.2	33.2	14.4	4.7
1925 . . . . .	26.7	30.3	6.7	7.1

As a matter of fact no single explanation will suffice. The poorer results in 1925 are due to a variety of unfavorable coincidences which defy further analysis.

I have presented these examples which show the difficulty of comparing the results in different years or different groups of cases selected from even a very uniform material in one and the same clinic in order to illustrate how hopelessly complicated it becomes to draw conclusions from a comparison of the results of different clinics.

The more one studies these questions the more pessimistic one becomes in regard to the possibility of forming an opinion as to the value of the different methods of treatment by means of a comparison of published results.

I am convinced that in this respect the absolute cure figures are the only ones of real value. In addition we must insist both that the results are calculated on large series and that all cases observed are carefully registered and reported. Even when adhering to these rules we must consider certain differences in the primary material, for example between the clientel in city and country clinics.

I cannot support the conception of those who demand as a basis of comparison the relative cure rates in the different stages. Each of the four stages contains cases which present such significant differences in regard to the anatomical extent of the tumour and the division into stages itself leaves room for so much subjectivity that not even the most scrupulous division can satisfy our demand for a uniform primary material.

It is not my purpose to give any survey of the results obtained elsewhere nor to enter into the question of operative versus radiological treatment. Experience acquired during the past years seems to justify the assumption that radiological treatment is a necessary weapon in the therapy of uterine cancer, that this is probably the only method of treatment in more than half of all cases, the method of choice in another 25 % and practically unavoidable in the form of preoperative or post-operative treatment even in the earliest cases.

## SUMMARY

For about twenty years at the Radiumhemmet a *uniform method* of brachy-radium treatment has been followed and under *uniform control* has been practiced in about 3,000 cases of uterine cancer.

The author describes the so-called Stockholm-method for the treatment of cancer of the cervix and the Radiumhemmet present technique for treating cancer of the corpus by packing the cavity with radium.

Five-year cure results in cancer of the cervix 1914 to 1928 inclusive:

absolute cure rate in 1,537 cases observed: 21.3 %

relative cure rate in 1,455 primarily radiologically treated cases: 22.5 %

relative cure rate in Stages I, II, III and IV: 57.5, 34.3, 16.2 and 5.3 % resp.

As to fundus cancer the author points out the impossibility of obtaining uniform statistics until basic rules are worked out, particularly in regard to three questions, i. e. the concept »freedom from symptoms», problems arising out of difficulties in histological diagnosis and the distinction of corpus carcinoma from the pure endocervical cancers.

A brief summary is submitted of the five-year results in the treatment of 169 cases of cancer of the fundus and 56 cases of cancer corporis et colli uteri.

Finally the necessity of having a uniform primary material when comparing statistics on results of treatment is illustrated by experiences from the Radiumhemmet.

## ZUSAMMENFASSUNG

Am Radiumhemmet ist 20 Jahre lang eine einheitliche Brachy-Radium-Behandlungs-Methode angewendet und unter gleichfalls einheitlicher Leitung an 3,000 Fällen von Uteruskarzinom erprobt worden.

Verf. beschreibt die sogen. Stockholmer Methode zur Behandlung von Ca. colli uteri und die gegenwärtige Technik des Radiumhemmets bei Behandlung von Ca. corp. uteri mit Packung des Cavums.

5-Jahres-Heilungs-Resultate bei Behandlung von Ca. colli uteri von 1914—1928:

Absolute Heilung in 1,537 beobachteten Fällen 21.3 %,

Relative Heilung in 1,455 primär radiologisch behandelten Fällen 22.5 %,

Relative Heilung in Stad. I, II, III und IV 57.5 resp. 34.3, 16.2 und 5.3 %.

Bezüglich der Korpus-Karzinom-Statistik betont Verf., dass Ausarbeitung von Regeln für die Erreichung einheitlicher Statistiken wünschenswert sei, besonders in Bezug auf den Begriff Symptomfreiheit, Forderungen betreffs der histologischen Diagnose und Trennung der Korpus-Karzinome von den rein endozervikalen Karzinomen.

Es folgt ein kurzer Bericht über das Behandlungsresultat in 169 Fällen von Korpuskarzinom und 56 Fällen von Ca. corp. et colli uteri.

Schliesslich wird auf Grund der am Material des Radiumhemmets gemachten Erfahrungen die Notwendigkeit eines einheitlichen Ausgangsmaterials beim Vergleich von Statistiken hinsichtlich des gewonnenen Resultates beleuchtet.

## RÉSUMÉ

On a appliqué depuis 20 ans, au Radiumhemmet, une méthode uniforme de traitement par le brachy-radium, qui, sous une même direction, a été appliquée à 3000 cas de cancer de l'utérus.

L'auteur décrit la méthode dite de Stockholm pour le traitement du cancer du col et la méthode actuelle du Radiumhemmet pour le traitement du cancer du corps avec remplissage du cavum.

Résultats de 5 ans dans le traitement du cancer du col de 1914 à 1928: guérison absolue dans 1,537 cas observés, 21.3 %; guérison relative dans 1,455 cas traités par radiothérapie primaire, 22.5 %; guérison relative aux stades I, II, III, et IV, resp. 57.5, 34.3, 16.2 et 5.3 %.

En ce qui concerne le cancer du corps, il ressort de la statistique qu'il serait désirable qu'on élaborât des statistiques uniformes, en ce qui touche plus particulièrement la conception »exempt de symptômes«, les exigences concernant le diagnostic histologique et la distinction entre le cancer du corps et le carcinome purement endo-cervical.

Bref compte-rendu des résultats donnés par le traitement de 169 cas de cancer du col et 56 cas de cancer du corps et du col.

Enfin, l'auteur signale, en s'appuyant sur l'expérience acquise au Radiumhemmet, la nécessité d'un matériel de départ uniforme dans les comparaisons des statistiques de résultats.

