Surgical Treatment or Irradiation of Cervical Carcinoma

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The question, surgery or irradiation, has been debated ever since the introduction of radiation therapy into the treatment of cervical cancer. In my country only a few gynecologists, among them my predecessors Döderlein and Eymer, have insisted on treatment exclusively by radiation therapy. In their choice of the method of treatment most gynecologists at times preferred irradiation and at other times surgery. This inconsistency was and is today due more to an emotional bias established by training than to the lack of factual and convincing five-year cure rates based on therapeutic trial.

Until about 1960 or 1961, the statistical results of irradiation therapy appeared not only superior, but also beset with far less technical difficulties and clinical complications. The primary mortality was very low, there were hardly any pulmonary embolisms, and there was no danger of causing postoperative fistulas. Hospitalization is required only for a few days for radium insertion. Deep x-ray therapy can be administered to outpatients. The extensive surgical procedures initially required additional amenities and an increased personnel, and it has been only in the last few years that these conditions have been met. On this account we are now willing to do more surgery in stages I and II than was possible in the years before 1960.

It is impossible, however, to draw a simple comparison between surgical treatment on the one hand and radiation therapy on the other. During the last decades surgical methods have changed considerably, e.g., their extension according to Meigs, Okabayashi, Antoine, Magara and others, which differ among one another. Also the methods of radiation therapy cannot be considered standardized. It is not enough to determine the r-dose at the portio and at points A and B in order to characterize a method. Other important factors are the spacing and fractioning of the radiation therapy and the reliability with which all possibly diseased glands along the iliac vessels are included in the radiation field. Lymphographies and lymphadenectomies during the last four to five years have shown that metastatic glands may exist even in the region of the para-aortic vessels (according to Gerteis, 1966, in about 6% to 10%). Irradiation of a limited area, as practiced by Heinrich Martius in Göttingen, will not reach these glands. Accordingly, their results were worse by 10% to 20% than those obtained by irradiating a wider percutaneous field.

I have shown in previous work (1961) that my five-year results at Tübingen (1950 to 1954), where my treatment consisted of a combination of Wertheim-Meigs in about 50% of all stage I cases and radium deep x-ray therapy with additional intra-vaginal irradiation in the other 50% were worse by 10% than those of the Munich

TABLE 1
Five-Year Relative Recovery Rate from Cervical Carcinoma. (University of Munich)

Series	No. of Cases	Relative Recovery Rate (%)				Average Recovery Rate (%)
		Stage I	Stage II	Stage III	Stage IV	
1950–1954 (radiation only) Stage I–IV	2,970	79.5	66.4	41.3	3.1	54.5
1955–1960 (Stage I: Surgery, with or without irradiation. Stages II–IV: irradiation only)	2,807	86.1	69.7	44.5	4.9	58.4

TABLE 2
Five-Year Relative Recovery Rate from Cervical Carcinoma. Comparison of Our Results with Results of Authors Preferring Surgical Treatment (Wertheim and Lymphadenectomy, Meigs).

Author	Types of Treatment	Relative Recovery Rate (%)			
		No. of Cases	Stage I	Stage II	Stage III
W. Bickenbach (Munich) (1955–1960)	Surgery and irradiation	2,685	86.1	69.7	44.5
E. Navratil (Graz) (1952–1960)	Schuchardt-Schauta, Amreich	474	86.7	61.0	
	Wertheim-Meigs	233	72.0	59.0	40.0
H. Wimhöfer (Freiburg) (1958–1963)	Wertheim and limited lymphadenectomy	103	83.5 (Stage Ib only)		
M. Ingiulla (Florence) (1951–1960)	Mainly vaginal	407	78.8	56.6	21.2
J. V. Meigs (Durham)	Wertheim and lymphadenectomy	496	83.0	55.0	10.0

Clinic, where radium x-ray therapy was applied exclusively. After my appointment to the Munich faculty I gradually and carefully introduced surgical treatment between 1955 and 1962, and I operated only on pre-clinical cancers, stage Ia and stage I with cancerous ulcers not greater than ½ to 1 inch. I restricted my technique to the simple classical Wertheim operation without the obligatory lymphadenectomy, since it was then accepted that lymphatic involvement in these early carcinomas was rare. Other authors, like Anselmino (1961) and Ober (1964), besides those doing the Schauta operation, agree that the value of performing an extensive lymphadenectomy in these early cases is questionable. I, therefore, removed glands only if they were found to be enlarged on palpation at operations carried out in the years 1955 to 1960. If by histology metastatic involvement was evident, these cases were subjected to postoperative radiation therapy.

The results from 1950 to 1954 were gained, with the exception of eight cases, by radiation therapy *only* (table 1). The results from 1955 to 1960 include an incidence of 15% stage I carcinoma of which only 10% were subjected to surgery. Still the results for all stages are *better* than those of 1950 to 1954. In 1960, a particularly good result was obtained. We achieved a cure rate of 92.6% in stage I, i.e., in 54 cases, although only one of these patients was operated on. This improvement of the results is, in my opinion, due to more pronounced fractioning of both the radium insertions and the deep x-ray therapy than in the years 1950 to 1954.

The most recent five-year results agree with those of well-known surgeons, who operate on stage I and occasionally also stage II, either with obligatory radical or with limited lymphadenectomy.

I am presenting the 1952-to-1960 results of Navratil (personal

TABLE 3
Five-Year Results of Treatment of Cervical Carcinoma

Author	Procedure	Stage I		State II		Stage III	
		Survivors/ Total No. Patients	Survival Rate (%)	Survivors/ Total No. Patients	Survival Rate (%)	Survivors/ Total No. Patients	Survival Rate (%)
Magara 1955–5/1961	Radical surgery	75/80	93.7	49/60	81.6	36/68	52.9
Bickenbach 1955–1960	Irradiation in stages II & III; Surgery with & without irradiation in stage I.	298/346	86.1	835/1191	69.7	511/1148	44.5

communication) according to the procedure employed, vaginal or abdominal (table 2). Dr. Navratil kindly put these results at my disposal. The vaginal procedure shows the better results. This may be due to the more favorable stage of these patients. Ingiulla (1966), a well-known European surgeon, has mostly done a lymphadenectomy. Wimhöfer (1967) does a limited lymphadenectomy in addition to the Wertheim, but removes glands lateral to the iliac vessels only if they are palpably enlarged. In my opinion the equally good results after irradiation and after surgery with extensive, limited, or even without lymphadenectomy can be interpreted to indicate that, at least in stage Ia and in the earlier forms of stage I, the result does not depend upon an extensive lymphadenectomy and that a simple Wertheim operation with limited lymphadenectomy appears adequate. Furthermore, these results indicate that surgical treatment must not be attempted under all circumstances, e.g., if the procedure constitutes a serious risk to the patient's life.

In my country now there are more gynecological surgeons, like Ober (1964) in Erlangen, who, after studying the results of radiation therapy, agree that both methods may achieve the same results. The only advantage of surgical treatment is the maintenance of ovarian function, since in these early cases the ovaries need not be removed, as they are unlikely to manifest metastases. We are confronted, therefore, by a situation where the indication for surgical treatment is not determined by the carcinoma as such any longer, but by the side effect of the treatment employed, namely, the implied loss of ovarian function. This, however, plays no part in patients over the age of 50 years.

The question of the effect on the lymphatic glands of either one or the other method of treatment cannot be answered by my cases. It is difficult, however, to imagine that the results of my clinic in stages II and III could have been achieved solely by radiation therapy, without assuming a radiation effect on the lymphatic glandular metastases.

A comparison of the effectiveness of either method is best possible in stage II. In my statistics a 69.7% five-year survival rate was achieved. In this stage subjective uncertainty regarding the histological diagnosis in the pre-clinical stages does not occur. As far as I know surgical statistics with better results than my own in stage II were published only in the last few years. Particularly Magara (1965) of Tokyo published figures which are far superior to our own results (table 3).

For stage II and stage III with a relatively small number of cases he cites 81.6% and 52.9%, respectively. These results were obtained by a very radical surgical procedure. Käser (1966) of Frankfurt reported at Florence this summer that he had achieved 78% in stage II by doing extensive surgery. In view of these results the question arises whether surgical treatment should again become the treatment of choice. I myself began extensive surgery again only in 1963, so I am unable, as yet, to show the results.

I want to point out that my results were reached with intravaginal and intra-uterine radium insertions, combined with classical percutaneous deep x-ray therapy (220 kv). The isodose curves are shown in figures 1 and 2.

Figure 1 shows the isodose curves in the case of a radium insertion (20 hours radium 40 mg per plate + 40 mg per tube). The curves have been projected in the plane of the anteverted uterus. At the top the type of radium carrier I use is depicted. This dose is applied three times at approximately fortnightly intervals. Figure 2 shows the average total isodose curves for both radium and deep x-ray therapy. The standard dose is varied in the individual case according to the stage

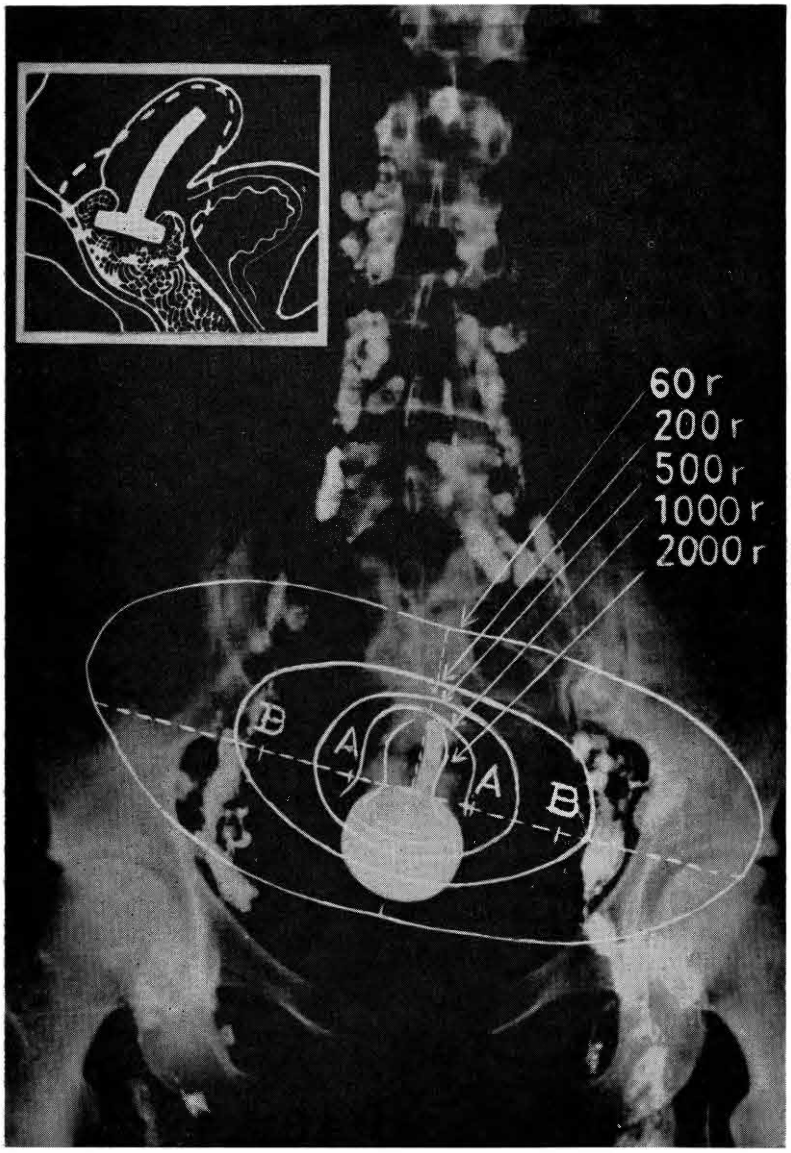


Fig. 1—Isodose curves in a case of radium insertion (20 hours radium, 40 mg per plate + 40 mg per tube).

of the carcinoma; it is increased in very advanced and reduced in early stages. The total dose at the pelvic wall for both radium and deep irradiation usually does not exceed 3,200 r. If the regression of the tumor at the portio or at the pelvic wall is found inadequate at a follow-up examination eight to 12 weeks after the end of treatment, a second series of an additional 2,000 to 2,500 r is applied at the pelvic wall.

We do not insist on a certain dose at points *A* or *B*, since we evaluate the degree of tumor regression of the individual case at a clinical examination after about 60% standard dose of the first series has been applied. Whether further irradiation is necessary, and how much, depends upon our findings at this examination. The characteristic of our method is, therefore, that it is individualized.

I consider it possible that the introduction of supervolt therapy, which we are going to start within a short while, will further improve our radiation results in stages II and III by about 10%, if not even 15%, similar to the results reported by Fletcher and Rutledge (1958) for stage III and Schubert and Uhlmann (1965) for stage II (1958-1960) 85.7% to 77.8% and for stage III 55% to 59.7%.

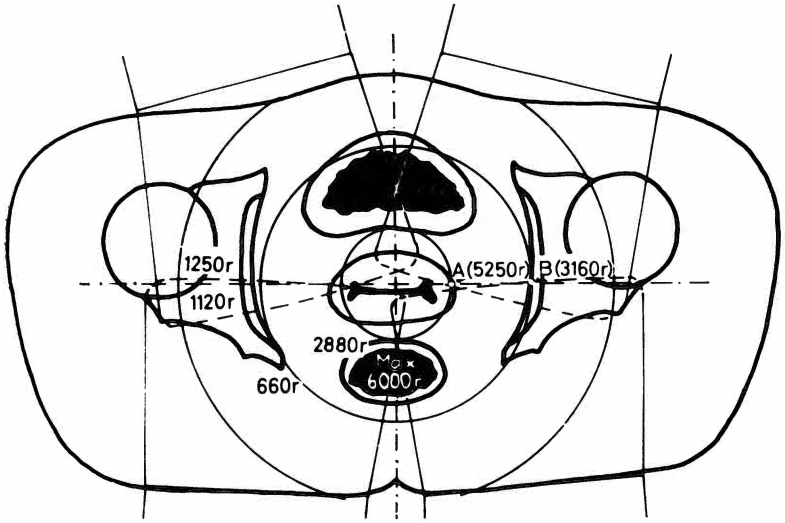
From this one can deduce that again irradiation therapy and surgical treatment lie head-on in their effectiveness, and that it is impossible to say that the one method is, generally speaking, superior to the other. We are fortunate to have two equally effective methods of treatment of the cervical carcinoma at our disposal. We are, therefore, able to individualize our therapy.

It is well to point out that there are histological types of tumors, which are not susceptible to radiation therapy. According to our experience, carcinomas with strongly *dissociated* growth and carcinomas which have a marked tendency towards lymphatic spread (Navratil, personal communication) show very poor response to irradiation. Only 8% of cases of stage I could be cured by irradiation, if such histological findings were detected.

We have had little experience with secondary operations and exenterations, since local recurrences at the portio and in the vaginal stump are relatively rare. Pelvic wall recurrences were more frequent; in these cases, however, surgical treatment was out of the question.

Personally I believe that pelvic wall recurrences are associated with the dosage, since frequently this is too low at the pelvic wall, whereas healing occurs at the portio where the focal dose is higher.

All in all, the various methods, surgical with or without lymphadenectomy and irradiation, including supervolt therapy, permit marked individualization according to the age of the patient, her general condition, her operability, and



	x-ray (220 KV)		Ra 226 (mass-number) 88 (atomic-number)		total
A:	2370 r	+	2880 r	=	5250 r
B:	2500 r	+	660 r	=	3160 r

Fig. 2—Average total isodose curves for radium and deep x-ray therapy.

according to the histological findings. It may be said for all methods that the best results are still obtained in the early stages of the carcinoma. By surgery as well as by irradiation, 90% or more permanent cures may be achieved. This, in view of the nature of cancerous disease, is an important fact.

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