

# Radiation Therapy of Carcinoma of the Nasal Vestibule

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**Abstract**—Between January 1968 and January 1978, 46 patients were treated radiotherapeutically for carcinoma of the nasal vestibule in the Rotterdamsch Radio-Therapeutisch Instituut. In 32 patients who received electron-beam therapy the treatment results appear to be dependent on tumour dose, tumour size, tumour localisation and degree of differentiation. Both the use of tissue equivalent filling in the nasal cavity and an interval during radiation treatment have no influence on the treatment results.

## INTRODUCTION

THE RESULT of radiation therapy in carcinoma of the nasal vestibule has been analysed in 46 patients treated by this method in the Rotterdamsch Radio-Therapeutisch Instituut. Special attention is paid to 32 patients who were treated with electron-beam therapy.

## MATERIALS AND METHODS

From January 1968 to January 1978, 47 patients with histologically proven carcinoma in the nasal vestibule were seen in the Rotterdamsch Radio-Therapeutisch Instituut. The age of the patients varied from 50 to 88 yr. They were all male patients, except one.

Four patients had histological or cytological proven metastatic lymph nodes. One patient had a lung metastasis. In addition the following diagnoses were confirmed: In one patient a carcinoma of the lung, in another one carcinoma of the larynx and of the lip. In three patients carcinoma of the lip, seminoma of the testis and chronic lymphatic leukemia were diagnosed respectively. Treatment of the patients is shown in Table 1.

None of the patients was lost to follow-up, except one, who refused further treatment immediately after start of the first radiation treatment, and was not analysed.

The radiotherapist chose electron-beam therapy for 35 of the patients. Thirty-two of them were treated similarly. Of these patients, sufficient information is available about the primary lesions, tumour size, localisation and degree of differentiation, which will be further discussed. The electron irradiation was given daily in fractions of 250–300 rad tumour dose (TD) (in 3 cases 400 rad TD daily), 5 days a week to a total tumour dose of 4300–6000 rad (1466–1997 ret). The electron energy was in the range 5–18 MeV. The tumour dose was calculated at a depth corresponding with the maximum extent of the tumour. The radiation field was perpendicular to the aperture of the nostril. In 22 patients the nasal cavity was filled with tissue-equivalent material during irradiation. In 9 patients irradiation was stopped half-way for a few weeks, either because a higher dose was required for a larger tumour or because of advanced age.

In these 32 patients the tumour diameter varied from 0.5 to 4 cm. The lesion was localised to the interior nostril and/or the septum and/or the floor of the nose, in some cases with infiltration of the upper lip. Because of the anatomy of the nasal vestibule, a fairly large tumour usually involves more than one single structure. The tumour localisations are demonstrated in Table 2.

The histologically proven diagnoses are demonstrated in Table 3. These patients had no metastatic lymph nodes or distant metastases. Up to now no internationally accepted T.N.M. classification exists concerning the carcinoma of the nasal vestibule.

*Table 1. Carcinoma of the nasal vestibule. Treatment of primary tumour*

No.	Modality	Dose
35	Fast electrons, Betatron	TD 4300–6000 rad/3–8 weeks Energy 5–18 MeV
5	Irradiation 250 kV	TD 4500–6700 rad/2–8 weeks
2	Radium implantation	6000 and 7000 rad iso-effect in 168 hr at 0.5 cm from the needle surface
1	Telecobalt	5200 rad TD/6 weeks
2	Radiotherapy after irradical surgery elsewhere	5400 rad TD/3.5 weeks
1	Surgery after preoperative irradiation	4000 rad TD/4 weeks

*Table 2. Tumour extension in the nasal vestibule*

No. of patients	Nasal septum	Upper lip	Floor of the nose	Nostril
15	×			
4	×		×	
1	×	×		
2	×	×	×	
1			×	
1		×	×	
2	×			×
1			×	×
5				×

*Table 3. Histology of 32 primary carcinomas of the nasal vestibule treated with electron beam therapy*

Histological type	No.
Well differentiated squamous cell carcinoma	18
Moderately differentiated squamous cell carcinoma	8
Poorly differentiated squamous cell carcinoma	3
Basosquamous carcinoma	2
Undifferentiated carcinoma	1

*Table 4. Carcinoma of the nasal vestibule. Treatment modalities and results*

No.	Modality	Results (local recurrences)
35	Fast electrons	11
5	Irradiation 250 kV	2
2	Radium implantation	1
1	Telecobalt	1
2	Radiotherapy after irradical surgery	0
1	Surgery after preoperative irradiation elsewhere	0

## RESULTS

Fifteen of the 46 patients developed a local recurrence. All of them were diagnosed within 16 months after start of radiation treatment (Table 4). To reproduce the recurrence-free period, the actuarial estimation method of Kaplan and Meier [1] was used. The 32 patients mentioned before, who were treated with electron-beam therapy are discussed now. The results are correlated with tumour dose, size of tumour, localization of the lesion in the nasal vestibule, degree of differentiation, use or no use of the tissue-equivalent material to fill the nasal cavity during irradiation and whether or not there was an interval during radiation treatment.

The development of a local recurrence ap-

pears to be dependent on the tumour dose. With a tumour dose of 5400 rad or more, 18% developed a local recurrence, whereas 63% developed a local recurrence with a tumour dose less than 5400 rad ( $P \sim 0.03$ , Fig. 1). Development of a local recurrence appears to be independent on tumour dose when calculated in reTs.

The size of the tumour is important too. Of patients with a primary tumour with a diameter of  $\leq 1.5$  cm, 28% developed a local recurrence, whereas in case of a primary tumour with a diameter of  $> 1.5$  cm, 50% developed a local recurrence (n.s., Fig. 2). In other words, it appears that the recurrences mainly developed in case of tumours larger than 1.5 cm and treated with a tumour dose of less than 5400 rad.

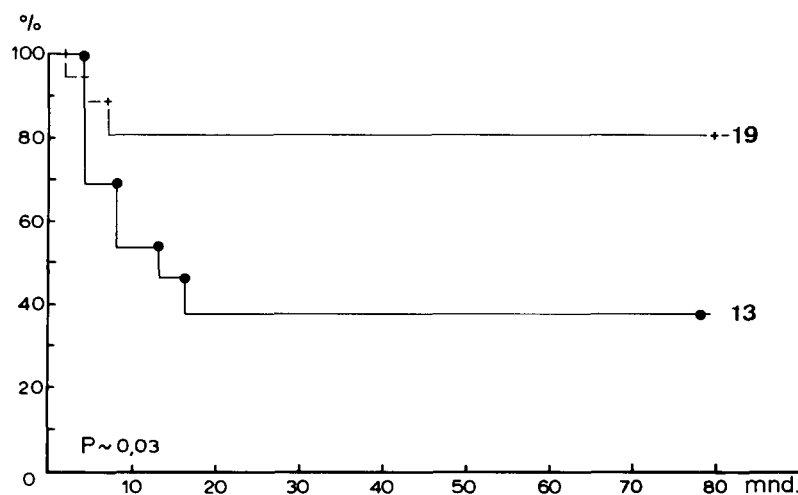


Fig. 1. Recurrence-free period at different points of time. (+) tumour dose 5400 rad or more (n=19), (●) tumour dose less than 5400 rad (n=13).

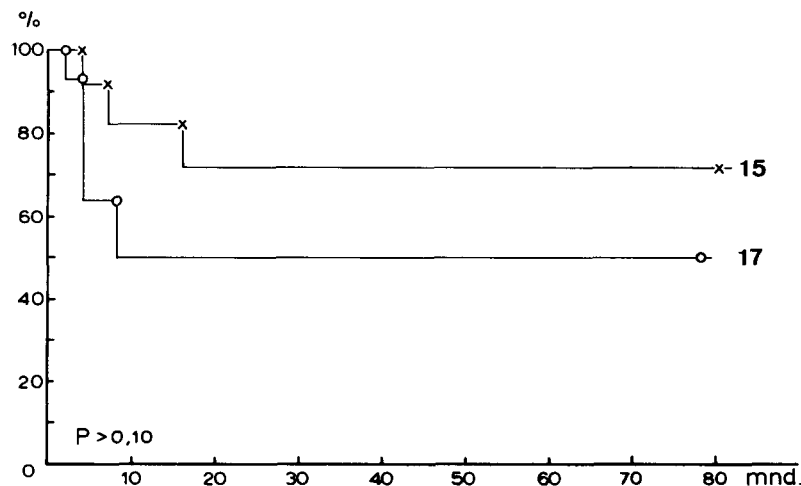


Fig. 2. Recurrence-free period at different points of time: (x) tumours  $\leq 1.5$  cm (n=15), (○) tumours  $> 1.5$  cm (n=17).

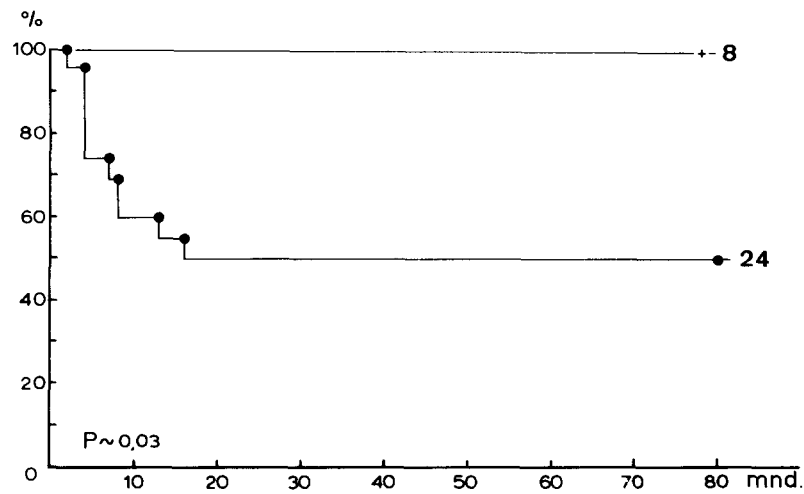


Fig. 3. Recurrence-free period at different points of time. (+) Septum free from tumour (n=8), (●) septum not free from tumour (n=24).

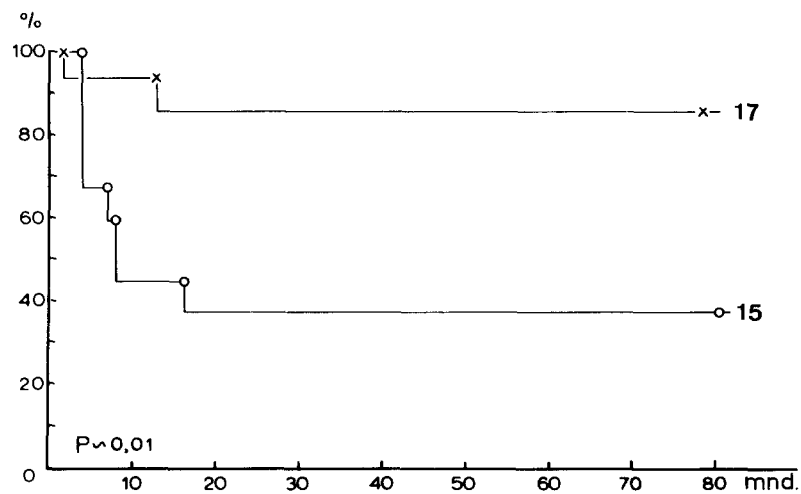


Fig. 4. Recurrence-free period at different points of time. (○) Localization exclusively to septum (n=15), (×) other localizations (n=17).

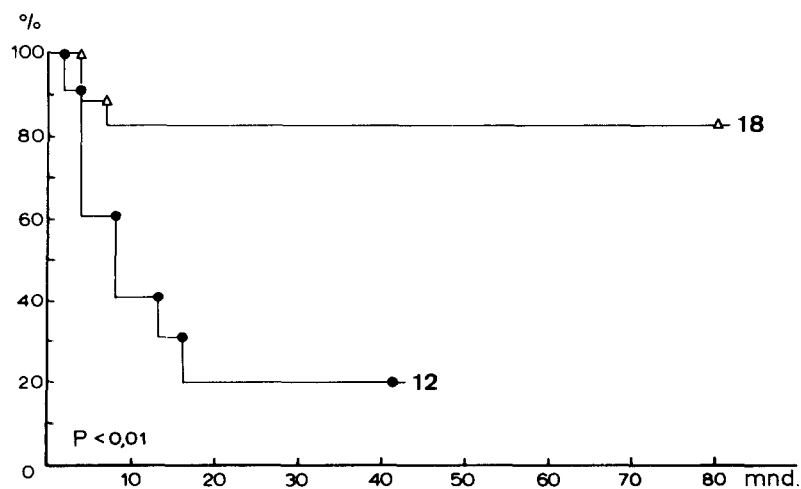


Fig. 5. Recurrence-free period at different points of time. (△) Well differentiated (n=18), (■) moderately, poorly and undifferentiated (n=12).

Nasal septum involvement is considered to be unfavourable, as of the 24 patients with this localisation, 50% developed a local recurrence. No recurrence was seen if the septum was not involved ( $P \sim 0.03$ , Fig. 3).

In 15 patients, the lesion was exclusively localised to the septum, and a local recurrence developed in 9 of them (Fig. 4). Eight of these 15 patients received a tumour dose of 4300–5400 rad and 7 of them developed a local recurrence; the remaining 7 patients received a TD of  $\geq 5400$  rad of whom 2 developed a local recurrence.

Tumours with a higher degree of differentiation appear to have a better prognosis ( $P < 0.01$ , Fig. 5, two patients with basosquamous carcinoma were excluded). It is not possible to correlate the degree of differentiation with tumour dose and localisation as the numbers will become too small to draw conclusions. Both the use of tissue-equivalent filling in the nasal cavity and an interval during radiation treatment have no influence on the results.

There were few problems due to radiation treatment. In some cases, a local radiation reaction was seen. No other complications were observed. The cosmetic effect was good. The 15 patients who developed a local recurrence were treated by local surgery. In 5 of them, regional lymph node involvement was found and 2 developed a pulmonary

metastasis. Treatment of the regional metastases consisted of a combination of radiation and surgery. At the end of the observation period 8 of these 15 patients are alive and well for periods ranging from 18 to 96 months.

The radiotherapy results described here, correspond to those of Wang [2] although he used different radiation techniques in 36 patients who therefore cannot be compared with the group in the present series. Haynes and Tapley [3] describe better results in 22 patients, but the patients and treatment methods are also not quite comparable.

### CONCLUSION

Carcinoma in the nasal vestibule can be treated with good results by electron-beam therapy, provided that certain important factors are taken into consideration: tumour size, tumour localisation, degree of differentiation and tumour dose. A tumour dose of  $18 \times 300$  rad or  $24 \times 250$  rad should be aimed at. In this way a good cosmetic result can be expected. A local recurrence can usually be treated successfully by surgery, which causes, however, unavoidable deformity or mutilation. Therefore, the method of choice is radiotherapy instead of surgery in treatment of tumours in this region.

### REFERENCES

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