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K. Fakhrian · N. Gamisch · T. Schuster · R. Thamm · M. Molls · H. Geinitz
Radiation Oncology, Klinikum rechts der Isar, Technische Universität München, Munich

Salvage radiotherapy in patients with recurrent esophageal carcinoma

Locoregional recurrence remains the major type of failure in 50–75% of the patients treated with surgery and/or radiochemotherapy for esophageal cancer, which finally leads to their death [1, 2, 3]. Once recurrence occurs, the 5-year survival rate drops to 0–11% [4, 5].

The outcome of patients with recurrent esophageal carcinoma (REC) treated with systemic therapy only is significantly worse than of patients treated with radiotherapy (RT), radiochemotherapy (RCT), or RCT plus surgical resection [6]. Therefore, systemic therapy alone is usually reserved for patients with distant metastases.

Surgical resection, radiochemotherapy, or multimodal treatments (radiochemotherapy + surgery) in the management of REC report similar results with regard to survival and local control [6, 7]. Radio(chemo)therapy has been reported to have beneficial effects on symptomatic control and might facilitate long-term survival in some patients with REC [5, 8]. It must, therefore, be considered as an important tool for palliative or curative treatment in REC.

Although the effectiveness of concurrent radiochemotherapy for the primary treatment of esophageal carcinoma has been adequately demonstrated [2, 9, 10, 11, 12], only a few studies have addressed the feasibility and effectiveness of concurrent radiochemotherapy for REC [14, 15, 16]. Thus, the purpose of this study was to evaluate the treatment outcome after radio(chemo)therapy in the management of REC.

Materials and methods

Patient population

The medical records of all patients treated with radio(chemo)therapy for REC at our department between 1988 and 2010 were retrospectively reviewed. Inclusion criteria were histologically proven REC, no distant metastases, and external beam radiation treatment with or without chemotherapy. Patients who received salvage surgical resection or those who were treated with brachytherapy alone were excluded. Patients fulfilling the following criteria were included in the study: local recurrences within the primary tumor bed or at the site of the anastomosis (n = 34, 63%), locoregional recurrences after primary treatment, defined as lymph node metastases (n = 16, 30%) including supraclavicular and abdominal lymph node metastases or patients with local recurrence + locoregional recurrence (n = 4, 7%). A total of 54 patients fulfilled the inclusion criteria. Patient characteristics are summarized in **Tab. 1**.

The initial treatment was as follows: surgical resection in 33 patients (61%), neoadjuvant radiochemotherapy (median 40 Gy, range 30–45 Gy) plus surgery in 13 (24%) patients or definitive radiochemotherapy (median 54 Gy, range 40–59 Gy) in 8 patients (15%).

The median interval of recurrence from initial treatment was 19 months (range 4–79 months); 26 patients had no symptoms and the recurrence was detected during the follow-up examination. In the other 28 patients, the first sign of recurrence was dysphagia (n = 18), hoarseness (n = 7), cervical lymph node swelling (n = 6), and chest pain (n = 6).

The diagnostic work-up for the detection of recurrence included a physical examination and a radiographic evaluation, including computed tomography (CT) and endoscopy based on regular follow-up for all patients. A PET-CT was performed in 15 patients (28%).

Treatment

All patients were treated with high-energy photons using 6–15 MV linear accelerators with multiple portals, 1.8–2.2 Gy per fraction, 5 days/week. Radiation therapy was planned using conventional two-dimentional (15%) or conformal three-dimensional planning (85%). Patients were treated in supine position using a three- or four-field technique.

In patients with no prior radiotherapy, the planning target volume (PTV) comprised the region of recurrence (gross tumor volume, GTV) including the lymphatic drainage, with a margin of 1–1.5 cm laterally and 1–5 cm superiorly and inferiorly. If previously irradiated in the initial treatment, the lymphatic drainage was not electively treated. The PTV received a dose of 30–45 Gy. An additional dose of 5.4–20 Gy was given to GTV in 24 patients (44%). In 30 patients (56%), no boost radiation was performed due to poor performance status, rapid progression under the treatment, or an overlap with previous radiation fields.

Thirty-six patients (67%) received chemotherapy concurrently with RT, 5-fluro-

Tab. 1 **Characteristics of all patients**

Characteristics	All patients
Gender	
Female, n (%)	13 (24)
Male, n (%)	41 (76)
Age, mean (range) years	61 (34–83)
ECOG-PS at salvage treatment, n (%)	
0–I	37 (69)
II–III	16 (29)
Unknown	1 (2)
Histology, n (%)	
AC	17(31)
SQC	37(69)
Pattern of recurrence, n (%)	
Local	34 (63)
Nodal	16 (30)
Local + nodal	4 (7)
Initial clinical stage[a], n (%)	
I	10 (19)
II	11 (20)
III	33 (61)
Initial treatment, n (%)	
R(C)T + SR	13 (24)
SR	33 (61)
Definitive RCT	8 (15)
R status after SR, n (%)	
R0	35 (74)
R1	10 (21)
Rx	2 (4)
Median time to recurrence from initial treatment (months), n (range)	19 (4–79)
Radiation dose (Gy), median (range)[b]	45 (8–68)
Concomitant chemotherapy, n (%)[b]	36 (67)

ECOG-PS ECOG-performance status before REC treatment, **AC** adenocarcinoma, **SQ** squamous cell carcinoma, **R(C)T** radio(chemo)therapy, **SR** surgical resection, **PS** performance status [a]According to TNM classification 6th edition [b]For salvage treatment

Tab. 2 **Results of the univariate analysis**

					Univariate	
Factor	**Group**	**Number**	**Two-year OS (%)**	**Three-year OS (%)**	**MST (months)**	**p**
Age	≤ 60 years	27	28	20	12	0.64
	> 60 years	27	30	17	15	
Initial stage	I–II	21	36	15	16	0.75
	III	33	24	21	12	
Recurrence pattern	Local	34	29	16	10	0.33
	Locoregional	20	27	27	18	
Histology	SQ	37	25	14	12	0.57
	AD	17	35	28	18	
Previous RT	Yes	21	24	19	13	0.89
	No	33	32	18	12	
Time to recurrence	≥ 8 months	48	30	21	13	0.12
	< 8 months	6	17	0	7	
RT technique	Conventional	8	25	13	2	0.02*
	Conformal	46	29	19	15	
RT dosis	< 45 Gy	20	10	5	7	0.001*
	≥ 45 Gy	34	40	27	18	
Sim CTx	Yes	34	34	21	16	0.066
	No	20	20	15	7	

OS overall survival, **MST** median survival time, **SQ** squamous cell carcinoma, **AD** adenocarcinoma, **CTx** chemotherapy, **RT** radiotherapy *Value considered significant.

uracil (5-FU) in 23 patients, cisplatin in 2 patients and cisplatin + 5-FU in 11 patients.

Acute toxicity of radiochemotherapy was evaluated using the common terminology criteria for adverse events version 3.0 (CTCAE v3.0), and late toxicity was scored according to the LENT SOMA scale for late effects on normal tissue [29]. Follow-up evaluations were performed every 2–4 months for the first year and every 6 months thereafter by CT and/or endoscopy.

Statistical methods

Overall survival (OS) was defined as death from any cause, recurrence-free survival (RFS) was defined as the time to a new locoregional failure or death of any cause. All time estimates began with the 1st day after start of radiotherapy. OS and RFS probabilities were estimated using the Kaplan–Meier product-limit method.

Age at the diagnosis of REC (≤ 60 years vs. > 60), stage of the initial diagnosis (I – II vs. III) (according to TNM classification 6th edition), histology (squamous cell carcinoma vs. adenocarcinoma), time interval between the initial treatment and recurrence (≥ 8 months vs. < 8 months), radiation technique (conventional 2D vs. 3D conformal), radiation doses (< 45 Gy Gy vs. ≥ 45 Gy) simultaneous chemotherapy (yes vs. no) and recurrence pattern (anastomotic vs. locoregional) were entered into univariate analysis (**Tab. 2**).

Results

Median follow-up time for surviving patients from the start of R(C)T was 38 months (range 10–105 months). At the end of follow-up, 6 patients were alive. Relief of symptoms was achieved in 19 of 28 symptomatic patients (68%). The median overall survival was 12 months (95% CI 9–15 months) and the median recurrence-free interval was 8 months (95% CI 4–12 months). The overall survival rates at 1, 2, and 3 years were 55 ± 7%, 29 ± 6%, and 19 ± 5%, respectively (**Fig. 1**). The recurrence-free survival rates at 1, 2, and 3 years were 44 ± 7%, 22 ± 6%, and 15 ± 5%, respectively.

Five patients lived more than 5 years (range 65–189 months), three of them had squamous cell carcinoma and other two adenocarcinoma. As the initial treatment, one patient received definitve radiochemotherapy with 54 Gy and two cycles concurrent chemotherapy. The recurrence in this case was outside the primary radiation field and was diagnosed 26 months later. He was treated with 50 Gy and two cycles cisplatin concur-

Abstract · Zusammenfassung

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Salvage radiotherapy in patients with recurrent esophageal carcinoma

Abstract

Purpose. The feasibility and effectiveness of radiotherapy in the management of recurrent esophageal carcinoma (REC) is reported.
Patients and methods. A consecutive cohort of 54 patients with rcT1-4, rcN0-1, or cM0 recurrent esophageal carcinoma (69% squamous cell carcinoma, 31% adenocarcinoma) was treated between 1988 and 2010. The initial treatment for these patients was definitive radiochemotherapy, surgery alone, or neoadjuvant radiochemotherapy + surgical resection in 8 (15%), 33 (61%), and 13 (24%) patients, respectively. The median time to recurrence from initial treatment was 19 months (range 4–79 months). The site of the recurrence was anastomotic or local, nodal, or both in 63%, 30%, and 7% of patients, respectively. Salvage radio(chemo)therapy was carried out with a median dose of 45 Gy (range 30–68 Gy).
Results. Median follow-up time for surviving patients from the start of R(C)T was 38 months (range 10–105 months). Relief of symptoms was achieved in 19 of 28 symptomatic patients (68%). The median survival time was 12 months (95% confidence interval (CI) 7–17 months) and the median recurrence-free interval was 8 months (95% CI 4–12 months). The survival rates at 1, 2, and 3 years were 55 ± 7%, 29 ± 6%, and 19 ± 5%, respectively. The recurrence-free survival rates at 1, 2, and 3 years were 44 ± 7%, 22 ± 6%, and 15 ± 5%, respectively. A radiation dose ≥ 45 Gy and conformal RT were associated with a better prognosis.
Conclusion. RT is feasible and effective in the management of recurrent esophageal carcinoma, especially for relief of symptoms. Toxicity is in an acceptable range. The outcome of REC is poor; however, long-term survival of patients with recurrent esophageal carcinoma after radiochemotherpy might be possible, even with a previous history of radiotherapy in the initial treatment. If re-irradiation of esophageal carcinoma is contemplated, three-dimensional conformal techniques and a minimum total dose of 45 Gy are recommended.

Keywords
Radiotherapy · Esophagus · Squamous cell carcinoma · Adenocarcinoma · Neoplasm recurrence, local

Salvage-Strahlentherapie bei Patienten mit rezidivierendem Ösophaguskarzinom

Zusammenfassung

Ziel. Es wird über die Durchführbarkeit und Effektivität der Salvage-Strahlentherapie in der Rezidivsituation bei Patienten mit Ösophaguskarzinom berichtet.
Patienten und Methode. Von 1988–2010 wurden an unserer Klinik 54 Patienten mit einem rezidivierendem rcT1-4-, rcN0-1- oder cM0-Ösophaguskarzinom (69% Plattenepithelkarzinome, 31% Adenokarzinome) mit einer Salvage-Strahlen-(Chemo)-Therapie bis zu einer medianen Dosis von 45 Gy behandelt. Als primäre Therapie hatten 8 (15%) eine definitive Radiochemotherapie, 32 (59%) eine alleinige Operation und 14 (26%) eine neoadjuvante Strahlenchemotherapie mit nachfolgender Operation erhalten. Die mediane Zeit von der primären Therapie bis zum Rezidiv betrug 19 Monate (4–79 Monate). Bei 63% der Patienten war das Rezidiv lokal oder an der Anastomose aufgetreten, bei 30% in den regionären Lymphknoten und bei 7% in beiden Bereichen.
Ergebnisse. Die mediane Follow-up-Dauer für überlebende Patienten ab Beginn der Strahlentherapie betrug 38 Monate (10–105 Monate). Das mediane Gesamtüberleben nach Salvage-Strahlen-(Chemo)-Therapie lag bei 12 Monaten (95%-KI 9–15 Monate), das mediane rezidivfreie Intervall bei 8 Monaten (95%-KI 4–12). Die Gesamtüberlebensraten nach einem Jahr, 2 und 3 Jahren betrugen 55 ± 7%, 29% ± 6% und 19 ± 5%. 44 ± 7%, 22 ± 6% und 15 ± 5% der Patienten waren nach einem Jahr, 2 bzw. 3 Jahren rezidivfrei. Die Symptomatik (Dysphagie) verbesserte sich bei 68% der Patienten. Eine höhere Bestrahlungsdosis als 45 Gy und eine konformale Strahlentherapie waren mit einer besseren Prognose assoziiert.
Schlussfolgerungen. Die Strahlentherapie bei Patienten mit einem rezidivierenden Ösophaguskarzinoms ist machbar und effektiv. Insbesondere im Hinblick auf eine Symptomlinderung. Die Prognose ist dennoch schlecht, wobei ein Langzeitüberleben in einem kleinen Anteil der Patienten zu beobachten ist. Falls eine Re-Bestrahlung für die Behandlung eines Ösophaguskarzinomrezidivs in Betracht gezogen wird, sollte eine 3-D-konformale Technik zur Planung sowie eine minimale Dosis von 45 Gy angestrebt werden.

Schlüsselwörter
Strahlentherapie · Ösophagus · Plattenepithelkarzinom · Adenokarzinom · Lokale neoplastische Rezidive

rently. A grade 3 stenosis developed after 6 years and was treated twice with bouginage. After the bouginage, he now has only occasional odynophagia, but can eat and drink without any problems. The patient is still alive 10 years after the treatment for REC.

The second patient was treated initially with neoadjuvant radiochemotherapy with 30 Gy in combination with cisplatin followed by surgical resection. Then 50 months after surgery, he developed a locoregional recurrence, which was treated with radiochemotherapy with 54 Gy and two cycles of cisplatin + 5-FU. An acute grade 2 radiogenic dermatitis was observed at the end of the treatment. Until his death 6 years after the treatment for REC of an unknown cause, no late toxicities ≥ grade 3 such as fistula or stenosis were diagnosed.

The third patient received neoadjuvant chemotherapy followed by resection as the initial treatment. She was diagnosed with a locoregional recurrence 11 months after the surgical resection. REC was treated with radiochemotherapy of 45 Gy and concurrent chemotherapy with 5-FU. She died almost 10 years after the treatment for REC. No late toxicities ≥ grade 3 were diagnosed.

The forth patient had undergone a surgical resection only as the initial treatment. Fifteen months after surgical resection, local recurrence was diagnosed, which was treated with radiochemo-

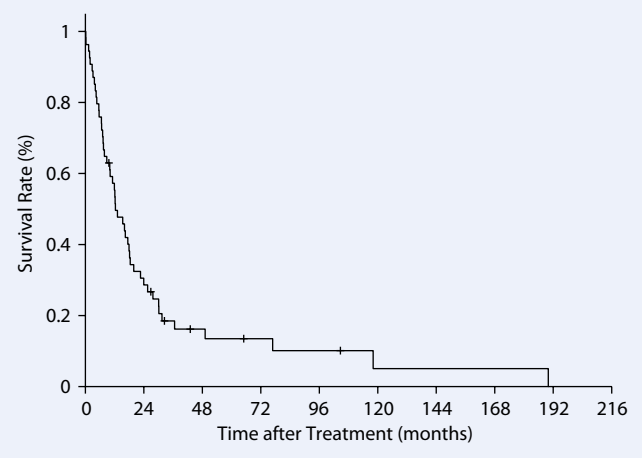

Fig. 1 ▲ Kaplan–Meier overall survival (OS) curve of the whole cohort (54 patients), median OS 12 months

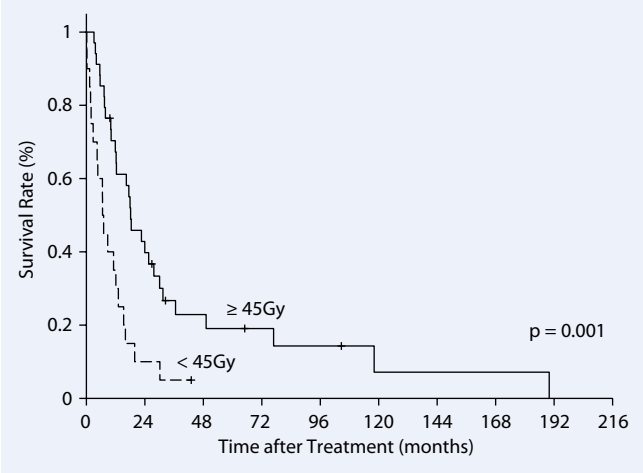

Fig. 2 ▲ Overall survival (OS) for radiation doses < 45 and ≥ 45 Gy: significantly better OS at a dose level ≥ 45 Gy (p = 0.001)

therapy (60 Gy plus concurrent 5-FU). After 15 years, he died of an unknown cause. No late toxicities ≥ grade 3 were diagnosed.

The fifth patient had initially undergone sole surgical resection. An anastomotic recurrence was diagnosed 11 months after surgery. Radiochemotherapy with a dose of 45 Gy plus two cycles of 5-FU concurrently was applied. A grade 2 mucositis and a grade 2 radiogenic dermatitis were observed as acute toxicity. She is still alive 5 years after the treatment for REC. No late toxicities ≥ grade 2 were diagnosed. She has an odynophagia grade 1 while eating meat, rice, and pasta and an exertional dyspnea. As she is 81 years old, it is not clear whether the dyspnea is a late sequela of the treatment or due to the advanced age of the patient, or both.

A sixth patient is still alive more than 3 years after the treatment for REC. Initially he had received neoadjuvant radiochemotherapy with 40 Gy followed by resection; 13 months after surgery, a local recurrence was treated with radiochemotherapy with 40 Gy plus two cycles of cisplatin concurrently. Except for a grade 3 acute leucopenia at the end of the treatment, there were no remarkable acute toxicities observed in this patient. No clinical or radiological signs of recurrence were observed in the 43 months after the treatment for REC. He can eat and drink as usual, is fit for work, and except for a grade 1 dyspnea and a grade 1 atrophy and induration of cervical skin, no late toxicities ≥ grade 2 have been observed in this patient.

In 15 patients, a new locoregional recurrence was observed within a median period of 8 months (range 5–106 months). Only one of the recurrences was in-field. Fourteen patients developed metastasis, 6 in the lung, 4 in the liver, 3 in bone and 1 in the CNS.

Five patients died during treatment, due to the rapid progression of the disease.

Univariate analysis

The results of univariate analysis for OS are shown in ◘ **Tab. 2**. In the univariate analysis, treatment with conformal RT technique (conventional vs. conformal RT planning, p = 0.02) and a RT dose of ≥ 45 Gy (< 45 Gy vs. ≥ 45 Gy, p = 0.001) were associated with better OS.

The overall survival rates at 1, 2, and 3 years were 35 ± 11%, 10 ± 7%, and 5 ± 5% for patients who were treated with a dose < 45 and 67 ± 8%, 40 ± 9%, and 27 ± 8% for patients who were treated with a radiation dose ≥ 45 Gy (median survival time 7 months, CI 95% 6–8 vs. 18 months, CI 95% 11–26, p = 0.001) (◘ **Fig. 2**).

The median recurrence free survival was 5 ± 2 months (CI 95% 1.2–8.7) for patients who were treated with a dose < 45 vs. 12 ± 3 months (CI 95% 6.8–17.6) for patients who were treated with a radiation dose ≥ 45 Gy (p = 0.001). Though statistically not significant, the median recurrence-free survival for patients who were treated with conventional RT was 2 ± 1 months (CI 95% 0.0–4.2) vs. 10 ± 3 months (CI 95% 5.1–15.2) for patients treated with conformal RT (p = 0.07).

A PET staging was associated with a statistically nonsignificant improvement in OS and RFS. Patients who received a PET prior to RCT had a median OS and RFS of 18 ± 1 and 11 ± 3 months, respectively, and patients without a PET staging had a median OS and RFS of 10 ± 3 and 8 ± 2 months, respectively (OS p = 0.17, RFS p = 0.4).

Multivariate analysis

We examined possible prognostic factors using Cox's regression analysis. RT technique (conventional vs. conformal RT planning), time interval between surgery and recurrence (≥ 8 months vs. < 8 months), RT dose (< 45 Gy vs. ≥ 45 Gy), and concomitant chemotherapy were entered into the model. Of these factors, RT dose ≥ 45 Gy was selected as a significant prognostic factor for OS (p = 0.002) and RFS (p = 0.008).

Treatment-related toxicity

No treatment-related deaths were observed. The therapy had to be discontinued in one patient due to grade IV pneumonia. A tracheo-esophageal fistula developed in another patient. The most common acute toxicity was dysphagia (grade 2 = 8 patients, grade 3 = 10 patients, grade 4 = 3 patients) followed by

Tab. 3 **Results for radio(chemo)therapy for REC in different studies**

Author	n	H	POR	pRT	MFT	MST	OS 1-year	OS 2-year	OS 3-year	OS 5-year
Raoul et. al.1995 [8]	31	SQ	LN/LR	No	14 (mean)	11	47%	17%	4%	–
Nishimura et. al. 2003 [15]	18	AD/SQ	LN/LR	11%	NA	10	NA	19%	NA	NA
Nemoto et. al. 2001 [16]	33	SQ	LN/LR	No	11	7	33%	15%	12%	NA
Nemoto et. al. 2003 [21]	7	SQ	LR/LN	No	11	NA	69%	69%	NA	NA
Jingu et. al.2006 [14]	30	SQ	LR/LN	no	18	39	61%	NA	56%	NA
Maruyama et al. 2010 [22]	28	SQ	LN	NA	NA	13	52%	31%	NA	24%
Nakamura et al. 2008 [6]	22	SQ	LN	No	24	20	NA	NA	27%	NA
Shioyama et. al. 2007 [5]	82	SQ	LR/LN	44%	NA	7	NA	22%	NA-	11%
Baxi et. al. 2009 [19]	14	SQ/AD	LR/LN	21%	13	16	NA	21%	NA	NA
Yamashita et. al. 2005 [20]	16	SQ	LR/LN	NA	NA	14	56%	19%	NA	NA
Current study	54	SQ/AD	LR/LN	39%	38	12	55%	29%	19%	NA

H histology, MST median survival time in months, OS overall survival, MFT median follow-up time in months, SQ squamous cell carcinoma, AD adenocarcinoma, NA not available, POR pattern of recurrence, LN lymph nodes, LR local recurrence, pRT previous radiotherapy in the initial treatment.

radiodermatitis (grade 2 = 6, grade 2 = 2). A grade 3 mucositis was observed in one patient.

Late toxicities were stenosis of the esophagus (1 patient, who had been treated previously with definitive radiochemotherapy), fibrosis of cervical muscles (1 patient), hoarseness (2 patients) and radiation pneumonitis (1 patient).

Discussion

Our data on salvage radiochemotherapy in patients with REC discloses a poor survival with only 19% of patients surviving beyond 3 years. Nevertheless, symptoms improved in 67% and treatment-related side effects were in an acceptable range.

Studies on the effectiveness of radiotherapy in patients with REC are listed in **Tab. 3**. Wide ranges in median survival times (7–39 months) as well as in 3-year OS (4–56%) are reported, which are comparable to published series of patients with esophageal cancer treated with primary radiotherapy or radiochemotherapy [2, 3, 9, 28].

Raoul et al. [8] combined chemotherapy with cisplatin and 5-FU with an RT dose of 60 Gy sequentially for 31 patients with postoperative REC. An objective response was observed in 65% of the patients, and the 2-year survival rate was 17% with a median survival time (MST) of 10.7 months. Jingu et al. [14] report in a prospective phase II trial (n = 30) 1-year and 3-year OS rates of 61% and 56%, respectively, with a MST of 39.0 months. The 1-year and 3-year relapse-free survival rates were 53% and 36%, respectively. The 3-year OS rate should be interpreted with caution as the median follow-up period was only 18 months. Combined radiochemotherapy was performed in the study of Nishimura et al. [15] for 18 patients with REC. For patients without distant metastases in their series, the 2-year survival rate was reported to be 19%.

There is little doubt about the palliative effect of RT in the management of REC. Improvement of symptoms with an objective response rate of 65–91% has been reported in several studies [5, 15, 16]. In our study, an objective improvement of symptoms was observed in 68% of patients, which is in line with other reports.

The optimal radiation dose for recurrent esophageal cancer has not been determined. In our study, the median survival of patients who received a radiation dose ≥ 45 Gy was 18 ± 4 months and that of patients who received <45 Gy was 7 ± 1 months. Of course, the outcome of patients in whom therapy was terminated earlier because of rapid progression and those who were treated with a palliative intention and received <45 Gy could lead to a bias. It is still of note that 2 patients, who were irradiated previously in the initial treatment, one with 30 Gy in a neoadjuvant concept and the other with 54 Gy as a definitive radiotherapy, lived more than 5 years after being treated with a salvage RT dose of 45 Gy. Re-irradition has also been proven feasible and effective in other tumor sites, e.g., head and neck tumors [26, 27].

Some authors suggest lower doses than a primary radiochemotherapy treatment, as the risk of necrosis of stomach or ilium conduitis increases with higher doses. Koide et al. [17] reported that in the case of esophageal cancer the incidence of ulcers in the gastric tube was not increased with a postoperative RT dose of 50 Gy. In a randomized study of adjuvant postoperative RT after curative resection of esophageal cancer [18], postoperative RT significantly increased the incidence of fibrotic strictures of the esophago-gastric or esophago-colonic anastomoses, although no increase in ulcers or fistulae was reported. Nemoto et al. [16] reported that 1 patient (3%) died of necrosis of the gastric tube 6 months after an RT dose of 66 Gy. Shioyama et al. [5] observed no significantly survival difference between the REC patients treated with 60 Gy or more and those treated with less than 60 Gy ($p = 0.10$), but a significant difference between doses <50 Gy and ≥ 50 Gy ($p = 0.04$). In our series, patients who were treated with conformal RT had a longer survival compared to those with conventional plan. Of note is that conventional planning was used in the late 1980s and early 1990s at our clinic; thus, diagnostic approaches were not as sophisticated as they currently are. Therefore, a more advanced disease is possible in patients who were treated in the era of conventional RT planning.

Several prognostic factors of patients with postoperative recurrences who were

treated with radiotherapy have been reported, with some controversial results. For example, Baxi et al. [19] report that patients <60 years old have a better outcome, whereas Nemoto et al. [16] and Jingu et al. [14] report a better outcome in patients >62 years.

In definitive RT for esophageal cancer, a combination with chemotherapy seems to be effective [9], but the advantage of simultaneous chemotherapy in the treatment of REC needs to be investigated. Although statistically not significant, the OS and RFS rates in our series of patients who received chemotherapy were better than those of patients who did not (3-year OS 21±7% vs. 15±8%, p=0.066; 3-year RFS 17% vs. 5%, p=0.07). In the series of Yamashita et al. [20], the median survival of patients who received concomitant chemotherapy was 10.0 months and that of patients who did not was 14.6 months in the REC group (P=0.19). When interpreting these results, one has to bear in mind that chemotherapy is usually administered in patients who have a better performance status or those with more advanced disease and rapid progression, which might lead to controversial biases in retrospective analysis.

According to Nemoto et al. [16], the time interval between surgery and the onset of locoregional recurrence (the cut off was 8 months) was the only significant prognostic factor selected by both univariate and multivariate analysis. In our study, patients with recurrence in the same time interval (<8 months) had a poorer OS, although statistically not significant (**Tab. 2**). In the series of Shioyama et al. [5], the 2-year OS rate was 15% for patients who received radiotherapy in the initial treatment and 49% for patients without RT (p=0.005)

In our study, patients with a previous RT did not have a poorer OS than patients with no previous irradiation (**Tab. 2**). In fact, 2 patients with a history of RT in the initial treatment lived for more than 5 years and another one for more than 3 years. Of note, 2 of the 3 patients had received neoadjuvant radiochemotherapy as the initial therapy and in 1 patient recurrence occurred above the previously irradiated region.

Several studies report higher accuracy, sensitivity and specificity for the diagnosis of pathological lymph nodes and distant metastasis with FDG-PET than with conventional techniques [23, 24, 25]. PET-CT is important to detect distant metastases, which can be present in up to 20% of patients who appear to be cM0 with conventional staging and, hence, to select patients suitable for local therapy PET-CT can result in a smaller GTV [24], which can reduce the toxicity. Both advantages (more accurate patient selection and less toxicity) of PET staging are helpful in the management of patients with REC, especially for those having undergone radiotherapy in the initial treatment. In our study, PET staging was associated with a statistically non-significant improvement of OS; however, PET staging was only performed 28% of patients.

This is a retrospective analysis with a limited number of patients. However, data on the survival benefit of radiotherapy for REC patients are scarce and our data does provide evidence that radio(chemo)therapy can lead to increased long-term survival in REC patients who are usually referred to radiation oncologists for palliation.

Conclusion

RT is feasible and effective in the management of REC, especially for relief of symptoms. Toxicity is in an acceptable range. The outcome of REC is poor; however, long-term survival of patients with REC after radiochemotherpy might be possible, even with a previous history of radiotherapy in the initial treatment. In case reirradiation of esophageal carcinoma is contemplated, 3D conformal techniques and a minimum total dose of 45 Gy are recommended.

Corresponding address

K. Fakhrian
Radiation Oncology, Klinikum rechts der Isar,
Technische Universität München
Ismaninger Str. 22, 81675 Munich
Germany
khfmed@yahoo.com

Conflict of interest. The corresponding author states that there are no conflicts of interest.

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30. Deutscher Krebskongress

Berlin, 22. – 25. Februar 2012

Der „neue" Deutsche Krebskongress

Der Deutsche Krebskongress ist der einzige interdisziplinäre Kongress in Deutschland und der weitgrößte Kongress dieser Art weltweit. Neue Formate wie „best-of"-Sitzungen und moderierte Diskussions-Postersitzungen bieten die Gelegenheit, aktuelle wissenschaftliche „Highlights" mit Teilnehmern der verschiedensten Fachrichtungen zu diskutieren. Die Zusammenarbeit mit der ASCO und anderen großen internationalen Gesellschaften sowie die höchst erfolgreich eingeführten internationalen „Key-Note-Lectures" werden den DKK zukünftig prägen.

Kongresspräsident ▸ Prof. Dr. Peter Albers

Auskunft

Kongress- und Kulturmanagement GmbH
Postfach 3664
99407 Weimar
Fon:+49 (03643) 2468-0
Fax:+49 (03643) 2468-31
dkk2012@kukm.de
www.dkk2012.de

Plenarsitzung „Tumoren der Atemwege" | 24.2.2012

Lunge 1 | 09:00 – 09:45

Vorsitz: Wolf, M. (Kassel); Eberhardt, W. (Essen)

- Targeted therapy – Status quo, Thomas, M. (Heidelberg)
- Targeted therapy – Diagnostik, Sauter, G. (Hamburg)
- Targeted therapy – künftige Entwicklung, Schuler, M. (Essen)

Key-Note-Lecture | 09:45 – 10:30

Vorsitz: Thomas, M. (Heidelberg)

- Lung Cancer – Management 2020, Hanna, N. (Indianapolis)

Pro- und Contra | 10:30 – 11:30

Vorsitz: Budach, V. (Berlin); Schirren, J. (Wiesbaden)

- Chirurgie beim Pleuramesotheliom,
  Pro, Stamatis, G. (Essen) – Contra, Dienemann, H. (Heidelberg)

Lunge 2 | 11:30 – 12:15

Vorsitz: Flentje, M. (Würzburg); Hoffmann, H. (Heidelberg)

- Management von Patienten mit N2-Status, Deppermann, K. (Erfurt)
- Prognostisch begründete Grenze für die Chirurgie? Stremmel, C. (Freiburg)
- Wie kann die Strahlentherapie weiter optimiert werden, Stuschke, M. (Essen)