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Radiotherapy enhances laser palliation of malignant dysphagia: a randomised study

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Abstract

***Background/Aims*—A major drawback of laser endoscopy in the palliation of malignant dysphagia is the need for repeated treatments. This study was designed to test whether external beam radiotherapy would reduce the necessity for repeated laser therapy.**

***Patients/Methods*—Sixty seven patients with inoperable oesophageal or gastric cardia cancers and satisfactory swallowing after initial laser recanalisation were randomised to palliative external beam radiotherapy (30 Gy in 10 fractions) or no radiotherapy. All patients underwent a 'check' endoscopy five weeks after initial recanalisation and were subsequently re-endoscoped only for recurrent dysphagia, which occurred in 59 patients.**

***Results*—Dysphagia was relieved equally well in both groups and the improvement was maintained with further endoscopic treatment. The initial dysphagia controlled interval and the duration between procedures required to maintain lifelong palliation (treatment interval) increased from five to nine weeks (median) in the radiotherapy group ($p<0.01$ both parameters). Radiotherapy was well tolerated in all but three patients. One perforation occurred and two fistulae opened after dilatation in patients who received radiotherapy.**

***Conclusion*—Additional radiotherapy reduces the necessity for therapeutic endoscopy for a patient's remaining life. It has an important role in relatively well patients who are likely to survive long enough to benefit.**

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Keywords: palliation, oesophageal cancer, radiotherapy, laser, randomised study.

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The most common and distressing symptomatic problem for patients with oesophageal and gastric cardia cancer is profound dysphagia. This has several major consequences including cachexia, local discomfort and aspiration pneumonia. Laser treatment offers rapid relief of the dysphagia, can often be performed as an outpatient procedure and does not have systemic effects. Serious complications are rare. The major drawback is the need for repeated treatments every five weeks or so, to maintain good swallowing. Although laser is effective at tumour debulking, disease is inevitably left in the oesophageal wall and beyond the lumen in local nodes; tumour regrowth usually occurs fairly rapidly. Radiotherapy, however, has the potential for treating the whole oesophageal tumour and the local regional draining sites,[1] and thus should be complementary to laser treatment.

External beam radiotherapy alone relieves dysphagia slowly, often taking several weeks for maximal effect.[2] Palliative radiotherapy may prolong survival in patients with comparatively good swallowing at presentation but does less well in those who are not swallowing well initially.[3] There is thus both theoretical and clinical evidence to support the concept that a patient whose swallowing has been improved by laser recanalisation should benefit further from radiotherapy. There have, however, only been a few studies[4–6] that have investigated the combination of laser and radiotherapy, and intraluminal (brachytherapy) rather than external beam radiotherapy has generally been used. Bader[4] also gave external beam treatment to those with squamous cell cancers. Brachytherapy causes more superficial damage to the tumour as there is a rapid fall off in dose with distance from the source, and is not generally as effective in terms of irradiating the whole tumour depth (and length) as external beam treatment. These studies did, however, report prolonged dysphagia-free intervals, although only the first was randomised and the benefit was limited to patients with squamous cell cancers.

A pilot study from our unit,[7] using palliative external beam radiotherapy, a more widely available and practical technique than brachytherapy, showed an encouraging reduction in the frequency of follow up therapeutic endoscopies compared with laser treatment alone. This randomised study was initiated to discover whether palliative external beam radiotherapy at the dose which causes minimal distress to these seriously ill patients may reduce the need for frequent follow up therapeutic endoscopies compared with laser treatment alone.

Methods

PATIENT SELECTION

The patients entered into this study were recruited from patients presenting at or referred to University College Hospital London between January 1990 and May 1992. Patients with predominantly exophytic carcinomas of the oesophagus and gastric cardia thought suitable for laser treatment were eligible. All patients recruited were deemed

inoperable because of advanced disease or unacceptable anaesthetic risk. Twenty seven had squamous cell carcinomas of the oesophagus and 40 adenocarcinomas of the cardia. None had previously received radiotherapy or chemotherapy. Patients with malignancy arising in organs other than the oesophagus or gastric cardia and causing dysphagia by direct invasion or metastatic spread were excluded.

Dysphagia was graded as in our previous publications (0=normal; 1=most solids; 2= semi-solids; 3=liquids only; 4=difficulty with liquids). Patients with dysphagia scores of 3 or worse after maximal laser treatment were considered unsuitable for study. Such patients were intubated as this subgroup had not done well with radiotherapy in the pilot study. Abdominal ultrasound was performed in all patients and 59 underwent intra-oesophageal endoluminal ultrasound after initial laser recanalisation.

Twenty four (36%) patients were over 75 years, a figure comparable with that for the overall incidence of these cancers in England and Wales but higher than in other hospital series.[8] Table I shows the demographic data according to randomisation. The distribution of patient characteristics in the two groups was very similar. Fourteen had documented metastatic disease and 13 known advanced local disease (four detected at computed tomography scan, two unresectable at laparotomy, and all 13 endoscopically large tumours, of which 12 were subsequently found to be stage 4 tumours on endoluminal ultrasound). The remaining 40 patients were considered unsuitable for surgery because of age or general debility, or both, or coexistent medical conditions (mainly cardiopulmonary) which were considered to confer an unacceptable surgical risk. Eight of these 40 (four in each arm) had anastomotic recurrences.

TABLE I *Demographic details of laser and laser plus radiotherapy groups*

	Laser only (n=30)	*Laser+radiotherapy (n=37)*
Sex (M/F)	20/10	26/11
Age median (range)	71 (55–88) years	72 (50–85) years
Metastases	8 (27%)	6 (16%)
Known extensive local disease	5 (17%)	8 (22%)
SCC/adenocarcinoma	12/18	15/22
Tumour length median (range)	7 (3–17) cm	6 (2–16) cm
Tumour location		
Cervical	0	2 (Both SCC)
TO	10 (All SCC)	10 (All SCC)
Upper/lower	(4/6)	(1/9)
Cardia lower TO	20 (18 adenocarcinomas, 2 SCC)	25 (22 adenocarcinomas, 3 SCC)
Symptom duration* median (range)	3 (1–12) months	3 (1–12) months

*Reliable data on 55/67 patients.
SCC=squamous cell carcinoma.

ESTIMATION OF SAMPLE SIZE

Sample size was estimated using data from the pilot study. This was to ascertain the number of patients required in the study to detect a worthwhile effect, if it exists, and to be reasonably sure that no benefit exists if it is not detected. The parameter we chose to assess was the time from 'check' endoscopy to the next therapeutic procedure (initial dysphagia-free interval='check' to first repeat interval). We considered a worthwhile effect to be a doubling of the dysphagia-free interval from five to 10 weeks. The plotted data from the pilot study approximates to a normal distribution and for calculations of sample size we assumed a normal distribution. Using a nomogram,[9] and assuming that a power of 85% and a level of significance of 0·05 are required then n=45 – that is, a minimum of 23 patients are required in each group.

ETHICAL ASPECTS AND RANDOMISATION

Formal approval was obtained from the local hospital ethical committee. Consent was also obtained from referring physicians or surgeons before inclusion of their patients. Once a suitable patient had reached the dysphagia criteria (semi-solid diet) after laser recanalisation, the study details were explained by a doctor and the research sister who returned to the patient later to ensure that they had understood completely. An approved patient information sheet was also provided. All patients gave fully informed consent. Patients were stratified according to histology (squamous cell cancer or adenocarcinoma) before randomisation by sealed envelopes. Early in the study, three patients with adenocarcinoma of the cardia randomised to receive radiotherapy were subsequently considered unfit, two before treatment was started and one who had received only two fractions (6 Gy). One patient in the laser only arm subsequently requested and was given radiotherapy shortly after 'check' endoscopy. All patients randomised are included in the analysis on an intention to treat basis.

ENDOSCOPIC TECHNIQUE

The laser technique has been published in detail.[7] Treatment was performed under sedation with diazemuls/pethidine using an Olympus 1T 20 endoscope (KeyMed Ltd, Southend, UK). A flexilase 100 Nd:YAG laser (Living Technology, Glasgow, UK) was used in conjunction with a delivery system comprising a 0·4 mm quartz fibre contained in a 2·2 mm Teflon catheter. During initial treatment, patients underwent laser endoscopy sessions as appropriate to destroy intraluminal tumour and restore oesophageal patency. Oesophageal dilatations were performed for strictures as clinically indicated.

ENDOLUMINAL ULTRASOUND

A deliberate decision was made not to perform computed tomography scans as endoluminal ultrasound alone is currently the best technique to assess depth of penetration, local node involvement, and for diagnosing direct infiltration of adjacent structures.[10]

Examinations were performed following laser recanalisation in order to ensure passage of the probe beyond the tumour. To minimise the number of procedures for any individual, ultrasound often had to be performed at the

same time as therapeutic endoscopy under the same sedation. Diazemuls alone was used as sedation in those patients not undergoing therapeutic procedures. An Aloka 5 MHz curved linear array probe was used in this study. We had obtained considerable previous experience with this probe which has been published elsewhere.[11] The probe is almost square in cross section and can be steered in one plane at 5 cm from the tip. It connects directly to a standard Aloka SSD 650 ultrasound console. It is considerably narrower (8 mm *v* 13 mm) than the standard Olympus endoscopic ultrasound probe which permits direct vision of the lesion and gives a circumferential view. The probe is passed blindly into the oesophagus and down to tumour level and beyond. At each level, it was necessary to rotate the probe through 360 degrees to image the tumour through all four quadrants. Hard copies were obtained of the images of areas of maximal wall thickness, tumour infiltration into surrounding tissues and lymph nodes. The intention was to perform examinations on as many patients as possible after initial recanalisation and again at 'check' endoscopy to assess the changes in tumour and involved nodes. Fifty nine patients underwent an endoluminal ultrasound examination after initial laser recanalisation and 42 of them had a second procedure after appropriate treatment at the 'check' endoscopy.

RADIOTHERAPY

Patients were irradiated using a 5 M-V linear accelerator. The target volume was determined by the length of tumour (radiological criteria) with a 5 cm margin at the upper and lower border of the tumour and a 3 cm margin circumferentially. Radiotherapy was delivered by anterior and posterior opposed fields. Patients were given 30 Gy in 10 fractions which was the dose given with most success in the pilot study. The median treatment related hospital stay for those receiving radiotherapy was 19 days (range three to 53) compared with 14 days (range zero to 28) for those treated with laser only.

FOLLOW UP

All patients underwent a 'check' endoscopy five weeks after initial recanalisation (three weeks after completion of radiotherapy in those so treated). Further endoscopic therapy was given as appropriate (laser for polypoid tumour, dilatation for stricture) and endoluminal ultrasound examination was repeated as often as practicable. All patients were provided with telephone access to the research nurse and given instructions to telephone if they noticed deterioration in swallowing. In addition, all patients were contacted monthly by the research nurse to assess progress, and record dysphagia grade. If this deteriorated by one grade or more, patients were re-endoscoped for assessment and further treatment given as appropriate. Patients who were having difficulty managing a semi-solid diet for most of the time were intubated with Celestin tubes.

STATISTICAL METHODS

The Wilcoxon rank sum test was used compare intervals between treatments, the Wilcoxon signed rank test for paired ultrasound data, the χ^2 test with Yates's correction (for proportions), and the log rank test for survival. The unpaired *t* test was also used for comparison of 'check' to repeat data.

Results

DYSPHAGIA

A dysphagia grade of 2 or better after initial laser recanalisation was required for randomisation. In the event, the swallowing of all but five of the patients had improved by at least one dysphagia grade after initial recanalisation. Figure 1 shows the grades for each arm of the study at each stage. The median dysphagia grade improved from 3 to 1, and almost 60% of patients were swallowing some solids for most of their lives. Comparing the proportion of patients benefiting from dysphagia grade 0 or 1 after treatment with those with 2 or 3 there is no significant difference between the laser plus radiotherapy and laser only groups at any stage (χ^2 test with Yates's correction).

DYSPHAGIA CONTROLLED INTERVAL AND TREATMENT INTERVAL

The initial dysphagia controlled interval or 'check' to first repeat was the duration of time between the 'check' endoscopy and the next follow up procedure, performed when the patient complained of further deterioration in swallowing, or death if a further procedure was not required. The figures for all patients according to histology and treatment arm are given in Table II and dysphagia controlled interval data are shown graphically in Fig 2. Overall, the dysphagia controlled interval in the laser only group was five weeks and was nine weeks in those also receiving radiotherapy. Eight patients who did not survive long enough to have a 'check' endoscopy, of whom three were in the radiotherapy group, are excluded from this analysis.The treatment interval was defined as the mean time between hospital attendances for procedures after 'check' endoscopy for the remainder of the patient's life or until intubation. Overall, this was also five weeks (medium) in the laser only group and nine weeks (median) in those also receiving radiotherapy (Table II).

ENDOLUMINAL ULTRASOUND

Staging was performed using the Aloka 5 MHz curved linear array probe. It was also used in as many patients as possible to monitor response to radiotherapy and in the control group to see how the tumour had progressed.

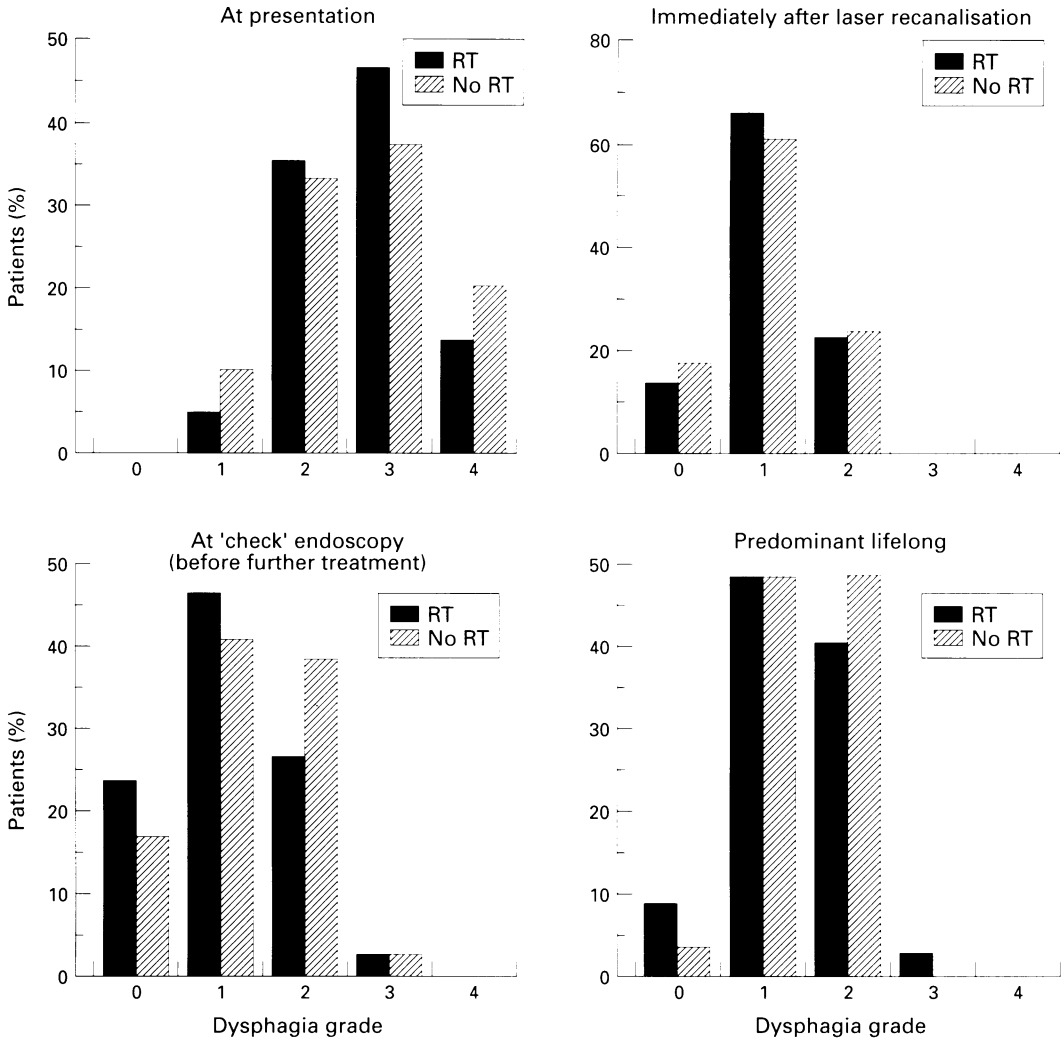

Figure 1: Dysphagia grades with time for all patients. Dysphagia grades deteriorated before repeat procedures. Predominant lifelong grade was the grade enjoyed for at least two thirds of the time. RT=radiotherapy.

Of 59 initial examinations, 37 were performed after laser and two after dilatation; of 42 examinations at 'check' endoscopy, 22 were performed after laser and eight after dilatation. Performing examinations after laser may result in an exaggeration of oesophageal wall thickness as a result of swelling so the response to radiotherapy was also assessed on lymph node size. In two patients the Aloka probe could not be passed. One had a pharyngeal pouch and the other a cervical tumour. Occasionally, the probe would not pass a stricture but after waiting for swelling to settle or further laser treatment, or both, we usually managed to perform a complete endoluminal staging examination.

Initial examination demonstrated full thickness oesophageal involvement in all 59 patients. Forty four (75%) had nodes which showed malignant characteristics (hypoechoic pattern with clearly delineated boundaries). Table III shows details of the initial and repeat (at 'check') ultrasound in 42 patients. Survival and treatment data were similar in this group and in the 25 patients in whom ultrasound data were not obtained.

TABLE II *Frequency of therapeutic endoscopy required to control symptoms according to age and randomisation group*

	Squamous cell carcinomas			*Adenocarcinomas*			*All patients*		
	Laser	*Laser+ radiotherapy*		*Laser*	*Laser+ radiotherapy*		*Laser*	*Laser+ radiotherapy*	
Patient number	11	15		16	17		27	32	
DCI (weeks)									
Mean (SEM)	5·0 (0·9)	9·2 (1·6)		5·3 (0·9)	11·0 (2·6)		5·0 (0·7)	10·1 (1·5)	
Median	5	9	p<0·05	5	9	p<0·01	5	9	p<0·01
Range	(0–10)	(0–24)		(0–15)	(3–48)		(0–15)	(0–48)	
TMI (weeks)									
Mean (SEM)	5·5 (1·1)	10·0 (1·8)		5·5 (1·0)	8·6 (1·4)		5·5 (0·7)	9·2 (1·1)	
Median	6	10	NS	4·5	7	p<0·01	5	9	p<0·01
Range	(0–12)	(0–25)		(1–15)	(3–23)		(0–15)	(0–25)	

Statistical analysis performed using the Wilcoxon rank sum test; eight patients who died without requiring further intervention are excluded.
DCI=dysphagia controlled interval; TMI=treatment interval.

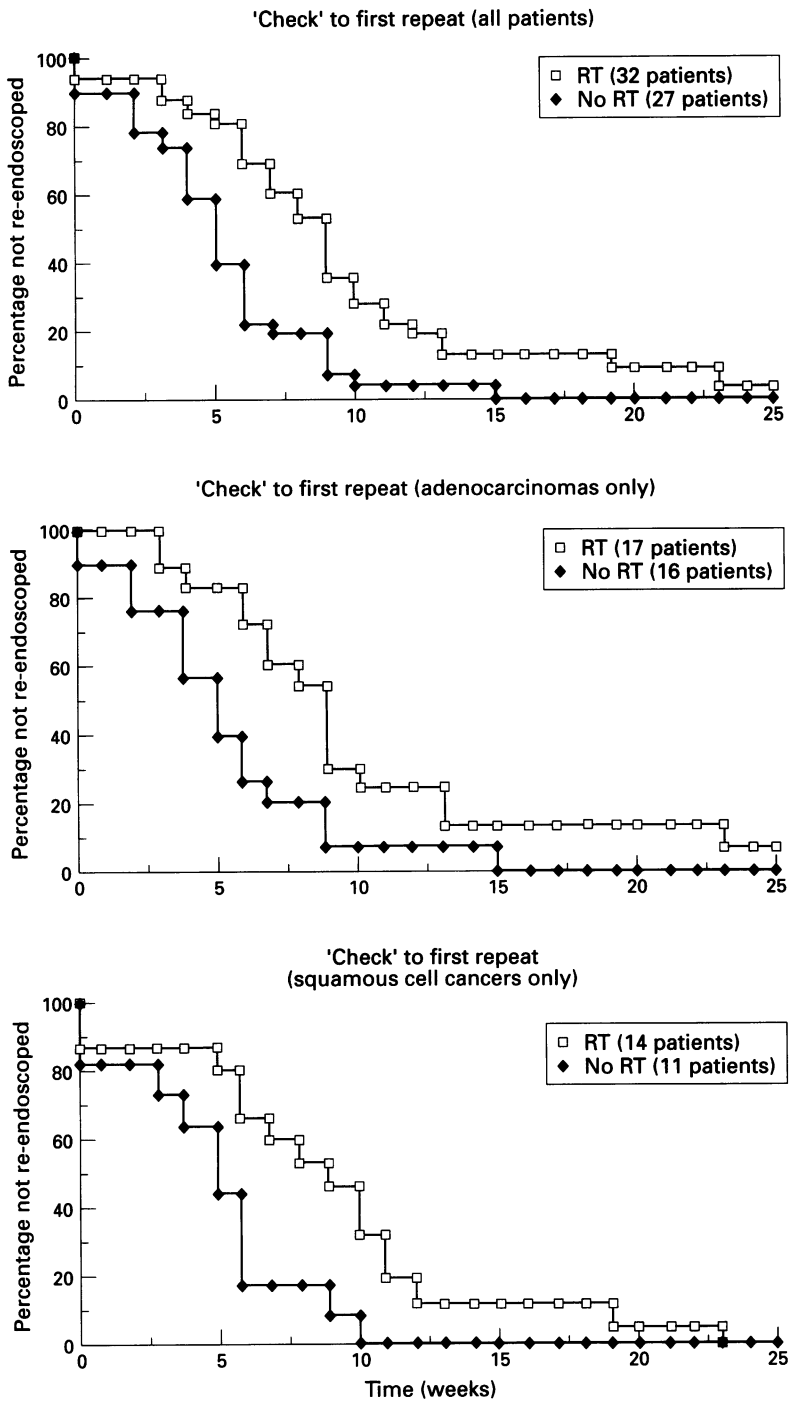

Figure 2: Initial dysphagia controlled intervals for all patients and according to histology and trial arm. Statistical analysis performed using the Wilcoxon rank sum test (see Table II). RT=radiotherapy.

There was little change in maximum oesophageal wall thickness for either group between the two scans. The node size did reduce in those receiving radiotherapy and increase slightly in those treated with laser only, but on comparing all parameters for the 42 patients in whom ultrasound was repeated (Wilcoxon signed rank test) this difference is not significant. Of 13 patients with nodes greater than 1 cm in diameter who received radiotherapy, three (23%) showed a reduction in node size of 50% or more (two adenocarcinomas, one squamous cell cancer). In contrast, there was no reduction in node size in similar patients treated with laser only.

TABLE III *Endoluminal ultrasound data for maximum wall thickness and node size*

	Initial ultrasound	*Ultrasound at 'check' endoscopy (5 weeks later)*
Oesophageal wall thickness		
Laser+radiotherapy		
median	1·6 cm	1·6 cm
22 patients; range	0·8–2·4 cm	0·6–3·2 cm
Laser only		
median	1·5 cm	1·7 cm
20 patients; range	1·0–4·2 cm	1·0–3·2 cm
Para-oesophageal node size		
Laser+radiotherapy nodes	14/22 patients	16/22 patients
median size	1·2 cm	0·9 cm
range	0·7–2·4 cm	0·5–2·3 cm
Laser only nodes	16/20 patients	14/20 patients
median size	1·0 cm	1·3 cm
range	0·5–1·9 cm	0·8–1·8 cm

The data on 42 patients in whom paired data are available were compared using the Wilcoxon signed rank test (before and after treatment for each arm). No significant differences were found. Twenty two of these patients (10 undergoing radiotherapy) required laser before ultrasound to permit probe passage.

PATIENTS WITH BULKY TUMOURS AND METASTASES

Nineteen patients had bulky tumours at initial endoluminal ultrasound (>2 cm wall thickness). Sixteen of these had radiologically malignant nodes and seven had known distant metastases. The tumour length in this group was greater than the rest of the patients in the study (median tumour length 8 cm *v* 6 cm, range 4–16 cm *v* 2–17 cm, $p<0·05$, Mann Whitney U test). Nine were randomised to receive radiotherapy but the two patients subsequently deemed unfit were in this group so only seven were treated. Two of the seven tolerated radiotherapy poorly and died within a few weeks. Dysphagia in this group was generally well palliated (dysphagia grade 0 or 1) except for six of 11 (55%) patients with bulky cardia cancers who could manage no better than a semi-solid diet despite good recanalisation. The difference in swallowing between these patients and the rest of the group is not significant (Wilcoxon rank sum test) but the numbers are small. The dysphagia controlled interval data and weeks of follow up per endoscopy for this group are very similar to those for the group as a whole.

SURVIVAL

All patients in this study have now died. Survival curves have been plotted for all patients and for each histological group separately (Fig 3). There is no significant difference between equivalent groups with or without radiotherapy (log rank test). Overall survival for patients with metastases or bulky tumours, or both, was reduced compared with the rest of those in the study (18 *v* 30 weeks). However, there is no difference in survival of patients in these subgroups between the laser plus radiotherapy and laser only regimens.

COMPLICATIONS AND INTUBATION

Radiotherapy was generally tolerated well. Mild nausea, lethargy, and odynophagia were not uncommon during treatment but this did not amount to more than a minor

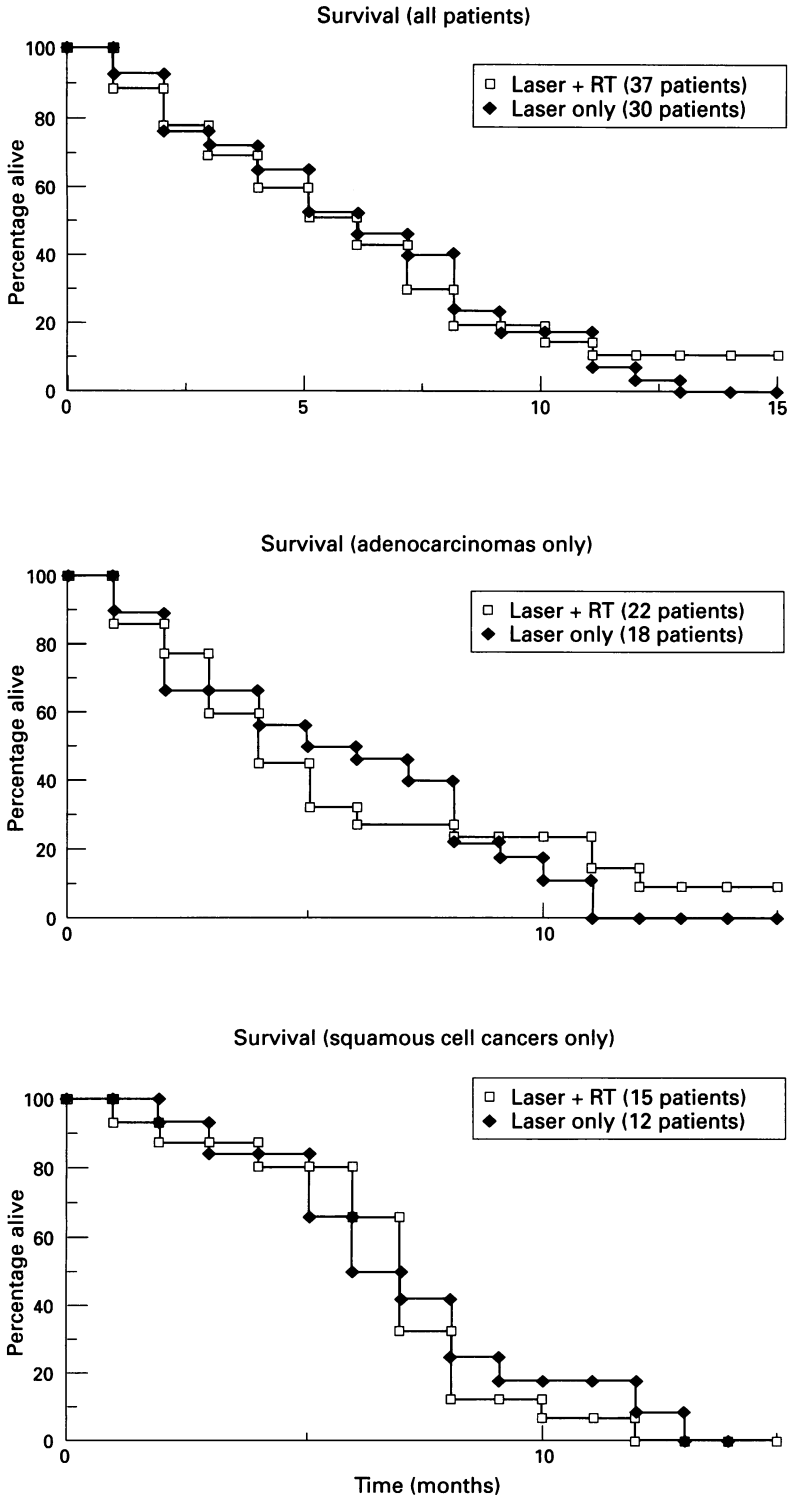

Figure 3: Survival curves for all patients and according to trial arm (not significant, log rank test). RT=radiotherapy.

irritant for most patients. Three patients did, however, suffer deterioration following radiotherapy: two deteriorated fairly rapidly after treatment and died within a few weeks (see later) and one suffered with pain probably because of oesophagitis which was only partially relieved by acid suppression with omeprazole. It is impossible to be certain whether the deterioration was radiotherapy or disease related. Four patients who did not receive radiotherapy deteriorated over a similar time interval following entry into the trial.

Patients with squamous cell cancers who received radiotherapy were more likely to develop predominantly fibrous strictures (10/14 *v* 3/11 who received laser only) and treatment of such strictures resulted in the opening up of fistulae in two patients (see later).

In all, 25 patients required oesophageal prostheses a median of 13 weeks (range 0–60 weeks) after 'check' endoscopy. Fourteen had received radiotherapy and 11 had not. Twenty four were used in patients who had difficulty managing a semi-solid diet for most of the time. Sixteen of these had troublesome extrinsic strictures and eight intraluminal tumour that was no longer adequately controlled with laser. Standard Celestin prostheses were used in all but three of these patients who received cuffed Wilson Cooke tubes. These three had tight strictures which developed after radiotherapy. Two developed fistulae (one oesophagobronchial, one oesophagopleural) and one a perforation after dilatation. Both fistulae occurred in elderly female patients with squamous cell cancers, one cervical and one lower thoracic, and both died shortly after intubation. Two of these patients, including one with a fistula, developed the complication within a few weeks of radiotherapy. The other fistula occurred late (20 weeks after radiotherapy). One further perforation occurred after dilatation in an elderly patient with a cardia cancer. She had also undergone radiotherapy over a year before the complication arose and survived a further 16 weeks with a Celestin tube.

The other intubation was performed for uncontrollable bleeding from a cardia cancer in a 75 year old man who had not received radiotherapy. A Wilson Cooke cuffed tube was used to splint the tumour and the life threatening bleeding was arrested. He survived a further six months swallowing most solids. Excluding those with fistulae, no patient died of aspiration pneumonia, but all later developed symptoms of progressive cancer, particularly cachexia and the effects of metastatic disease.

Discussion

Although there are known benefits from laser therapy in comparison with intubation both in terms of quality of swallowing and fewer complications, this study has attempted to tackle the main problem with laser: the necessity for frequently repeated treatments. The results show that the combination of laser and palliative external beam radiotherapy goes some way toward this aim. To increase the follow up period from five to nine weeks is a significant improvement, although in this group of patients this usually avoided only one hospital admission and a single further endoscopic procedure.

The use of the Aloka probe for endoluminal ultrasound confirmed late stage disease in almost all patients. It is a far cheaper option than the standard Olympus echo-endoscope such as the EU M2 (purchase price around

£70 000). It need only involve the additional expense of purchasing an oesophageal transducer (approximately £5000) if a suitable conventional console is available. The standard probe is 7·5 MHz and the Aloka probe only 5 MHz. Image resolution using this lower frequency is less good in the near range and was insufficient to show layers in normal oesophageal wall. It is possible that this problem could be resolved by the addition of a standoff balloon if patients with early oesophageal cancer were to be assessed. Discriminating between normal and diseased oesophagus, however, was not a problem and imaging of peri-oesophageal tissues, nodes and surrounding structures was good. On occasion, the finding of a thin oesophageal wall or close apposition of important structures such as trachea or aorta helped direct laser treatment away from such hazards.

The ultrasound suggested malignant lymphadenopathy in 75% of these patients (T4 tumours). Such patients are incurable even if fit for surgery (or radical radiotherapy) and have been appropriately selected for palliative therapy. Three of 13 (23%) patients with nodes >1 cm in the radiotherapy group showed a partial response (node size reduced by 50% or more). Overall, there was no statistically significant change in wall thickness or node size at 'check' endoscopy in either arm of the study. There was, however, a trend toward a reduction in node size in the radiotherapy group and an increase in node size in the laser only group but these differences were not significant. The measurements of oesophageal wall thickness must be treated with some caution in view of the necessity to perform examinations immediately after laser treatment in many cases. It is disappointing that the macroscopic effect of a dose of 30 Gy external beam radiotherapy on local tumour seems limited, but this is only a palliative dose, and a full assessment of its effect would require serial ultrasound examinations in both groups throughout their survival. In a previous study from this unit,[12] a number of patients did not swallow well despite apparently adequate laser recanalisation. This was ascribed to pseudoachalasia in patients with bulky cardia tumours. It is interesting that six of 11 patients with such tumours in the present study swallowed no better than they would have done with a tube. The ultrasound may be useful in identifying those patients who would benefit from early intubation unless swallowing solids after laser. Radiotherapy was poorly tolerated in two of seven patients with bulky tumours and the survival in those receiving radiotherapy was the same as those treated with laser only (median 20 weeks). Such patients probably should not receive radiotherapy even if laser treatment is pursued. Patients with metastases survived 18 weeks (median) and there was a trend to shorter survival in the radiotherapy group which did not reach statistical significance. Such patients are probably best treated with laser alone.

The survival data in this randomised study show a similar spectrum regardless of the treatment arm. If patients with metastases and large tumours are excluded, the median survival is identical in both groups. It is worth noting, however, that two patients with adenocarcinomas of the cardia who received radiotherapy survived for long periods (76 and 98 weeks). This prolonged survival is seen as a tail on the survival curve. Both were elderly women and had neither bulky tumours (>2 cm thick) nor metastases at presentation, but otherwise had no clear characteristics different from the rest of the group.

It is disappointing that a more definitive difference in survival did not emerge in view of the results in the pilot study. However, the main aim of giving radiotherapy in addition to laser was to prolong the dysphagia controlled interval and length of survival is a secondary concern in this group of patients.

Comparatively few complications occurred, though it is of concern that the major ones were in patients undergoing radiotherapy. This may be partly because of the tendency for tight fibrous strictures to develop in patients with squamous cell cancers treated with external beam radiotherapy. It is important to be aware of the potential for this problem as extra care during dilatation may avert it. Intubation was performed late in patients in whom the preferred treatment was unsuccessful and the relative lack of complications for such procedures was encouraging. The only two treatment related deaths occurred in patients who had known fistulae after dilatation.

Overall, these results suggest an average of only one therapeutic endoscopy saved per patient by the use of external beam radiotherapy; however, in those who live longer, two or more procedures may not be necessary. On the basis of these results, it is unlikely that external beam radiotherapy would benefit most patients undergoing palliation for malignant dysphagia, but it could be argued that additional palliative external beam radiotherapy (at the doses used) is worthwhile for selected patients who are inoperable and who do not have bulky disease or metastases. In particular, those who are relatively fit but may have to travel long distances for each treatment might prefer a single more lengthy admission to hospital at the start of treatment. Such patients are likely to live long enough to benefit. Perhaps more importantly this study has shown that external beam radiotherapy in addition to laser is capable of prolonging the dysphagia controlled interval. This effect might be further improved by addition of local endo-oesophageal radiotherapy (brachytherapy) or regimens for internal radiotherapy that provide higher doses in a smaller number of fractions which can be administered more rapidly, and without prolonged hospitalisation.

Other endoscopic techniques for relieving swallowing such as alcohol injection or BICAP probe have also been shown to be partially effective in the palliation of malignant dysphagia.[13 14] It is likely that the benefit of dual modality radiotherapy in combination with laser would be mirrored for such techniques and appropriate studies with these combinations should be encouraged.

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