approximately 2% to >10% per patient per year 10 years after initial treatment, and that only 7% of patients with SCLC survive 2 years or more.[10]

In this issue of *Thorax* (***see p 386***) the probability of death at 5 years in a patient with a completely resected pathological stage I NSCLC was shown to be increased by 1.5 times if that patient had had a previous tumour in a multi-institution study in which data from 2991 patients with lung cancer were collected prospectively from the time of diagnosis to the time of death, or at least to the time of last follow-up.[15]

Das and colleagues showed that CT screening for lung cancer may increase survival and quality-adjusted survival among Hodgkin's lymphoma survivors, with a benefit and incremental cost-effectiveness ratio for smokers comparable to that of other recommended cancer screening strategies such as biennial mammography for breast cancer screening in 50-year-old women, annual Papanicolaou smears for cervical cancer screening in 20-year-old women, and colorectal cancer screening in 50-year-old men.[16] Surprisingly, Duchateau and colleagues found that the 5 year survival rate was significantly better for patients with NSCLC who had more than two primary malignancies than for patients with NSCLC without any other primary malignancies and those with one other tumour in their history. They also found that the 5 year survival rate in patients with NSCLC with a second tumour in the follow-up period was better than in those without a second tumour.[12] Liu and colleagues also showed that the stage and median survival of patients with lung cancer who developed a second primary lung cancer were better than in patients who first had a non-lung cancer and who subsequently developed a subsequent primary lung cancer.[9] Koppe and colleagues initially found similar results when their univariate analysis showed that a history of a previous malignancy was a favourable prognostic factor in the survival of patients with lung cancer.[17] However, multivariate analysis showed tumour diameter, female gender and pathological TNM stage to be the major potential confounders. When adjustments were made for these three variables, the prognostic advantage of the previous malignancy disappeared, but nor was a prognostic disadvantage seen.[17]

Because of the increased risk of developing a second lung cancer, careful follow-up and intensive treatment is suggested for patients with lung cancer who are also deemed an important population for study of surveillance strategies and chemoprevention agents.[9 10] Although there is no clear consensus for postoperative follow-up for patients with lung cancer or other malignancies, Brock and colleagues have recommend close (every 3–6 months) monitoring of the thorax with radiological imaging such as chest radiography or CT scanning, especially for the first 2 years when almost 75% of second primary tumours occurred.[11] Koppe and colleagues also concluded that second primary NSCLC has a similar prognosis to first primary NSCLC and recommended that NSCLC diagnosed during the follow-up of a previous malignancy and deemed operable warrants the same diagnostic and therapeutic approach as NSCLC as first malignancy.[17]

Thorax 2007;**62**:373–374.
doi: 10.1136/thx.2006.073478

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Competing interests: None.

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PDT in early central lung cancer

PDT in early central lung cancer

Lutz Freitag

Resources are needed to use the full potential of photodynamic therapy

In this issue of *Thorax,* Moghissi *et al*[1] report their experience of treating a selected group of patients with porphyrin-based photodynamic therapy (PDT) (***see p 391***). These patients had localised early bronchogenic carcinomas without lymphadenopathy or distant metastases. They could not undergo surgery because of their overall clinical condition and half of them had been operated on before. Recognised as a world class thoracic surgeon, Mr Moghissi is certainly not questioning the value of surgery. Only after alternatives such as parenchymal-sparing bronchoplasty had been definitely excluded was PDT with curative intent offered. PDT was applied with a single laser light illumination using rigid bronchoscopy under general anaesthesia. Such a treatment usually takes less than 20 minutes, and at the Yorkshire Laser Centre it is performed as a day case procedure.

This is a solid and honest report from probably Europe's most active PDT centre. At first sight the statement that "complete response was achieved in all of the 21 patients" builds a strong case for this type of treatment. However, the problem is hidden in the second part of the statement: "for variable duration". As always, it depends on how you digest the data. Yes, these were patients with a poor prognosis and poor performance status, and complete response was achieved in all of them with a simple short endoscopic treatment. However, seven of the 21 patients had required a second or even a third treatment within 15 months because of tumour recurrence. Two patients had died by then from unrelated diseases.

PDT is not a magic cure. The results from the Yorkshire Laser Centre are in line with earlier findings from other groups who had treated comparable patients such as Okunaka *et al*[2] who reported a 100% immediate response rate in 1991. However, all groups are struggling with the relatively high rate of tumour recurrences. Imamura *et al*[3] could only achieve 64% long-term eradication of early cancers in 1994. It was soon recognised that the extent of the tumour is a key factor. Curing tumours with lengths <1 cm is obviously easy,[4] but in longer tumours the response rate falls from 98% to 43%.[5] New imaging techniques, especially fluorescence endoscopy, may prevent undertreatment as it visualises the tumour extension along the bronchial wall. However, prognostic factors which are probably more important in determining whether a tumour recurs are its thickness, degree of submucosal invasion and possible peribronchial extension. The chance of eradicating carcinomas in situ can be as high as 100%. In early but invasive tumours (T1A) recurrences must be expected, even if the cancer respects the bronchial wall.[6] There are pathological and physical reasons for this. The chance of lymphatic and submucosal spread increases with tumour thickness. More important, all endoscopic treatments have a limited depth of penetration. Red light with a wavelength of 630 nm (as used in the current study) cannot penetrate much deeper than 4 mm into the bronchial tissue. Only truly superficial lesions can therefore be reliably cured with such surface treatment.

However, determining the depth of invasion is difficult with standard bronchoscopic or imaging techniques including high-resolution CT scanning. The most promising method for determining the true thickness of a tumour is endobronchial ultrasonography (EBUS). The pivotal studies of EBUS by Miyazu *et al*[7] and Takahashi *et al*[8] showed that, in half the apparently superficial lesions, the tumour had extended beyond the cartilaginous layer; only in those where this had not occurred was long-term cancer eradication achieved. EBUS was not available for the current study but, in the future, it should be considered state of the art and be used as a selection criterion for PDT. Longer and thicker tumours should be treated with different approaches or combined treatments such as PDT plus brachytherapy.[9]

However, this raises the question of cost-effectiveness. The authors point out that PDT is cheaper than surgery. It would be fairer to compare PDT with other local treatments. Brachytherapy has been proved to be equally effective[10] but it is more expensive than PDT alone. Far cheaper but comparably successful treatments for eradicating early cancer are cryotherapy[11] or electrocautery.[12] Eradication rates of >85% have been reported in cases of superficial cancers. Cancers that are more invasive cannot be treated with these cheaper alternatives.

There is no doubt that more early cancers will be found in the future as a result of screening programmes, especially with autofluorescence or narrow band imaging. There will be a growing need for therapeutic stategies. PDT could be one of them. However, those of us who do PDT perform it with mixed feelings. In most countries the drug alone costs more than the reimbursement we receive. We can hardly justify it to our administrators. We know that photosensitisers exist that could be activated with infrared light which reaches deeper. This would probably increase the cure rate "for longer durations" but unfortunately these sensitisers are not approved for endobronchial treatment. The industry spends incredible amounts of money on chemotherapy drugs. It would be appropriate to spend some money on the development and approval of more sophisticated PDT drugs. A multicentre study using these new weapons together with EBUS is needed. The method deserves it and, more importantly, we owe it to our patients.

Thorax 2007;**62**:374–375.
doi: 10.1136/thx.2006.067892

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Competing interests: None.

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