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A randomised multicentre trial of CHART versus conventional radiotherapy in head and neck cancer

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Abstract

Background and purpose: Continuous, hyperfractionated, accelerated radiotherapy (CHART) has shown promise of improved tumour control and reduced late morbidity in pilot studies and has now been tested in a multicentre randomised controlled clinical trial.

Material and methods: Patients with squamous cell cancer in the main sites within the head and neck region with the general exception of early T1 N0 tumours were entered into the study by 11 centres. There was a 3:2 randomisation to either CHART, where a dose of 54 Gy was given in 36 fractions over 12 days, or to conventional therapy where 66 Gy was given in 33 fractions over 6.5 weeks. A total of 918 patients were included over a 5 year period from March 1990.

Results: Acute morbidity: Acute radiation mucositis was more severe with CHART, occurred earlier but settled sooner and was in nearly all cases healed by 8 weeks in both arms. Skin reactions were less severe and settled more quickly in the CHART treated patients. **Tumour control and survival:** Life table analyses of loco-regional control, primary tumour control, nodal control, disease-free interval, freedom from metastasis and survival showed no evidence of differences between the two arms. In exploratory subgroup analyses there was evidence of a greater response to CHART in younger patients ($P = 0.041$) and poorly differentiated tumours appeared to fare better with conventional radiotherapy ($P = 0.030$). In the larynx there was evidence of a trend towards increasing benefit with more advanced T stage ($P = 0.002$). **Late treatment related morbidity:** Osteoradionecrosis occurred in 0.4% of patients after CHART and 1.4% of patients after conventional radiotherapy. The incidence of chondritis or cartilage necrosis was similar in both arms. Life table analysis showed evidence of reduced severity in a number of late morbidities in favour of CHART. These were most striking for skin telangiectasia, superficial and deep ulceration of the mucosa and laryngeal oedema.

Conclusion: Similar local tumour control was achieved by CHART as compared with conventional radiotherapy despite the reduction in total dose from 66 to 54 Gy supporting the importance of repopulation as a cause of radiation failure. The effects seen in advanced laryngeal cancer and those related to histological differentiation need further study. Reduced late morbidity is a factor which together with patient preference should be considered in the decision as to the programme of radiotherapy to employ in the curative treatment of head and neck cancer.



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Keywords

CHART; Head and neck; Controlled trial; Accelerated radiotherapy

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2 On behalf of the CHART Steering Committee.

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