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Split Course Radiation in Inoperable Carcinoma of the Bronchus

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Abstract—*The results of split course irradiation in inoperable carcinoma of the bronchus are analysed. Median survival figures are generally better than those from studies using conventional fractionation. Moreover, 58% of patients improve symptomatically on treatment. In view of the ease with which this regime is tolerated, we consider that its use in this group of patients is fully justified.*

INTRODUCTION

THE PLACE of radiotherapy in the management of carcinoma of the bronchus has been well established since the advent of megavoltage radiation: the consensus of opinion is that it is the treatment of choice in primary oat cell carcinoma (Medical Research Council, 1969) and its role in palliation of metastases is undisputed. However in the management of primary non oat cell carcinoma the role of radiotherapy is less certain. Surgery is the treatment of choice for operable cases but for inoperable cases it may be asked whether the palliation of symptoms and prolongation of life achieved are sufficient to compensate for the ordeal of a full course of treatment. Roswitt [2] reported the results of a randomized trial of patients with inoperable carcinoma of the bronchus (308 irradiated patients; 246 untreated controls): the 1 yr survival of patients receiving radiotherapy to a dose of 4000–5000 rad in 4–6 weeks was 18.2 against 13.9% in those who received placebo. The median survivals in these groups were 142 and H2 days resepctively—a small difference but statistically significant. Data on symptomatic improvement following radiotherapy has varied widely and results in the range of 22–75% have been reported. Laing *et al.* [3]; Abramson and Cavanaugh [4].)

Against this rather depressing background, variations on the conventional treatment approaches have been developed; Scanlon [5] proposed split course therapy and this has been adopted by several workers. Abramson and Cavanaugh claimed an improved survival over patients receiving conventional fractionation and recorded an incidence of 75% symptomatic improvement in their cases, with a low incidence of complications. We have adopted a similar scheme at the Westminster Hospital.

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MATERIALS AND METHODS

Methods

Following accurate localization of the tumour from bronchoscopy and chest X-ray a volume was defined for treatment with opposed fields. Both fields were treated daily. In most cases the field size was less than 150 cm^2.

Patients were treated on the ^{60}Co Mobaltron unit and received 400 rad midplane dose daily for 5 days (or 435 rad skin dose, whichever was the least), to the primary lesions and mediastinal nodes. No spinal cord protection was used. A month later the patient was reviewed and if there had been objective or subjective response and the patient was considered fit, a repeat course was given. Using Orton's TDF system this yields a partial tolerance of 87%.

Patients

Most patients were referrals from several Physicians in the Group; some were referrals from Surgeons, but only one of these had a resection of tumour. Most patients had histological confirmation of carcinoma of the bronchus, but it has been our policy to treat on clinical grounds certain cases in whom

histological proof has been difficult to obtain and in whom immediate palliation of symptoms is required. Patients with evidence of metastatic disease were excluded from the study. Cases who had been referred to the Westminster Hospital from January 1974 to June 1977 inclusive were reviewed retrospectively in this study. During this time fifty-three patients were started on treatment. Forty-three patients, of whom thirty-one were male and twelve were female, completed the treatment and constitute the material for the study. Ten patients did not receive their second course owing to deterioration following the first course.

RESULTS

Of the 43 patients who completed the full course of treatment there were eighteen squamous cell carcinomas, three adenocarcinomas, seven oat cell carcinomas and three were anaplastic carcinomas. The remaining twelve patients were undiagnosed histologically. The median survival was 7 months with a mean of 7.5 months. Of the histologically proven non oat cell carcinomas the median survival was 6 months and the mean was 8 months. Seven patients survived more than a year and a histogram of all survival times is presented in Fig. 1.

Fifty-three patients received at least one course of treatment and of these significant palliation of symptoms occurred in 31 (58%). One of our patients who survived more than a year developed radiation myelopathy. No other serious complications were encountered.

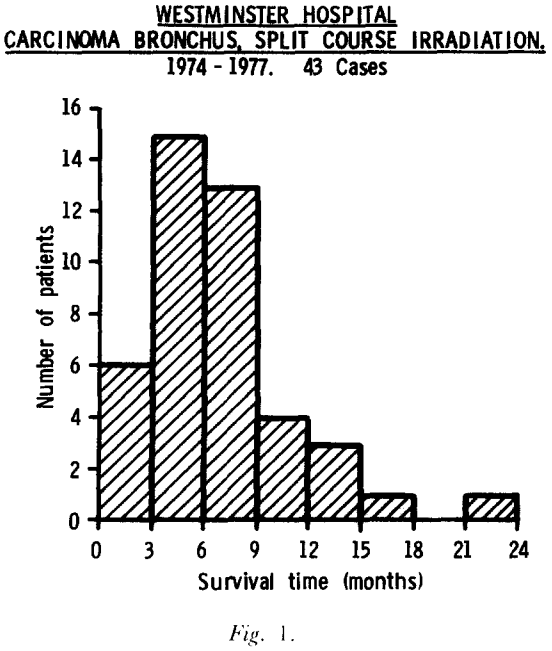

Fig. 1.

DISCUSSION

Split course radiation given in this manner has several advantages over conventional fractionation. Firstly it is better tolerated and none of our cases developed significant radiation reactions, furthermore few patients found a week's radiotherapy a severe incursion into their lives. Secondly on reviewing patients a month after the first course of treatment a group of patients who are very unlikely to be benefited by the second course can be identified. Finally there is the possibility that re-oxygenation occurring between courses will be a factor in eradicating the tumour.

The median survival of 7 months in this group compares favourably with other series; Laing *et al.* report a median survival of 125 days in a group with inoperable carcinoma of the bronchus receiving 4000 rad in 20 fractions; Roswitt reports a median survival of 142 days in a similar group of patients. Our 1 yr survival was 16% and is comparable with many other series but is much lower than the 43% achieved by Abramson and Cavanaugh using a similar fractionation scheme to our own.

Of the patients who started treatment 58% improved symptomatically. Many reports do not mention this important statistic but Laing *et al.* report 22% with conventional fractionation and Abramson and Cavanaugh 75% with their regime.

An interesting feature of this series moreover is that of those cases who survived for more than a year one out of seven developed radiation myelopathy. Although the numbers are small this is consistent with the predicted risk of 20% obtained if the concept of Myelopathy Equivalent Single Dose (MESD) shortly to be reported from this Department [6], is applied to this fractionation scheme. The MESD is analogous to NSD but applied to the risk of Myelopathy and is determined by a different formula in which the number of fractions is relatively more important. The question remains whether a risk of 20% is acceptable. We feel that in this group of patients it is acceptable but opinions will differ on this point.

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