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FROM THE DEPARTMENT OF RADIATION THERAPY, POSTGRADUATE INSTITUTE OF MEDICAL EDUCATION AND RESEARCH, CHANDIGARH 160012, INDIA.

MANAGEMENT OF MEDIASTINAL COMPRESSION DUE TO BRONCHOGENIC CARCINOMA

A. K. ANAND, S. AYYAGARI, S. C. SHARMA, F. D. PATEL and B. D. GUPTA

Abstract

Fifty-six cases of bronchogenic carcinoma with mediastinal compression were analyzed retrospectively. Microscopic confirmation was obtained in 23 patients and small cell carcinoma was most frequent. Radiation treatment gave complete remission in about 70 per cent when the total tumour dose exceeded 35 Gy fractionated during 3 weeks. Addition of cyclophosphamide marginally increased the remission rate to about 85 per cent. Total tumour doses of less than 35 Gy gave obviously poorer results. The response rate was highest in small cell carcinoma.

Mediastinal compression is an emergency situation in radiation therapy practice and is usually caused by a malignant neoplasm, most commonly bronchogenic carcinoma. Other causes include malignant lymphoma, metastatic carcinoma and benign conditions (7, 8). The cases present in acute or subacute form depending on the growth rate of the tumour and the amount of compensation. Radiation therapy usually offers the best relief for the distressing symptoms (7, 9). However, combination chemotherapy has recently been found to be equally effective in cases of small cell anaplastic carcinoma causing mediastinal compression (5, 11).

The factors which need to be considered in radiation treatment of mediastinal compression are total dose, dose per fraction, severity of compression, and histology (3). In the following report, a retrospective analysis of patients with mediastinal compression is presented.

Material and Methods

Seventy-two patients with the diagnosis of mediastinal compression were registered at this Department during the years 1975 to 1980, out of a total of 368 patients with bronchogenic cancer. Sixteen cases were excluded because of inadequate or incomplete treatment. A right-sided lesion was more common than a left-sided lesion, with a ratio of 4.6: 1. Forty-three patients had acute onset while 13 had a subacute form with some degree of compensation. The diagnostic work-up was limited to essential investigations, and an effort to obtain a histopathologic diagnosis was made in 23 patients. Bronchoscopy could be performed in 2 patients only, while in the other patients the microscopic diagnosis was obtained from lymph node aspiration biopsy, sputum cytology, or skin nodule biopsy. The most frequent microscopic types were small cell carcinoma (11 patients), followed by squamous cell carcinoma (8 patients). Three patients had large cell anaplastic carcinoma and one patient a carcinosarcoma. Thirty-three cases had only a clinical and roentgenologic diagnosis (Table 1).

Radiation therapy was delivered by a tele-cobalt unit against two anterior and posterior parallel opposed fields covering the primary lesion and the mediastinum. In 41 patients a total tumour dose of 35 Gy or more with 5 fractions per week during about 3 weeks was given. Thirteen of these patients

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received in addition oral cyclophosphamide 100 mg/m^2 daily, which was started after completion of radiation therapy. Fifteen patients were given either a single fraction varying from 8.0 to 12.5 Gy or a fractionated course of 20 to 25 Gy over about 2 weeks. In this group, 5 patients received cyclophosphamide in addition (Table 2).

Results

The response to treatment was clinically evaluated immediately following radiation therapy and at monthly intervals. The overall response rate was 90 per cent. Complete clinical remission was achieved in 20 out of 28 patients (71%) in the group receiving fractionated irradiation with 35 Gy or more. Addition of chemotherapy marginally increased the remission rate (85%). The complete remission rate in the group receiving a single fraction or a fractionated course with a low total dose was 30 per cent and with addition of chemotherapy 60 per cent (Table 2).

Survival figures revealed a similar trend. None of the patients treated with less than 35 Gy survived for 6 months after completion of irradiation. The best results were seen in the group receiving 35 Gy or more and chemotherapy, with 54 per cent of the patients surviving for 6 months or more. Irradiation alone yielded a survival of 18 per cent. No complications attributable to irradiation were observed. The best survival figures were observed in small cell carcinoma—6 out of 11 patients survived for 6 months or more. Of 13 patients who received 35 Gy or more and chemotherapy, 8 had small cell carcinomas and 6 of them survived for 6 months or more. Chemotherapy did not seem to affect the survival in the other histologic sub-types. None of the patients with squamous cell carcinoma or large cell anaplastic carcinoma survived for 6 months. One patient with a carcinosarcoma showed an unusual response and survived for more than 2 years (Table 3).

Table 1

Spectrum of mediastinal compression

Total No. of cases of bronchogenic carcinoma seen during the years 1975–1980	368
No. of cases presenting with mediastinal compression	72
Cases evaluable	56
Mode of presentation	
Acute	43
Subacute	13
Site of lesion	
Right side	46
Left side	10
Histopathology	
Small cell carcinoma	11
Squamous cell carcinoma	8
Large cell anaplastic carcinoma	3
Carcinosarcoma	1
Unknown	33

Discussion

Malignant neoplasms account for approximately 97 per cent of all cases of mediastinal compression. Of these 97 per cent, bronchogenic carcinoma accounts for nearly 75 per cent, lymphoma for 15 per cent, and metastatic carcinoma for 7 per cent (6, 7, 8). In our material about 20 per cent of the patients with bronchogenic carcinoma presented with mediastinal compression, which is comparable to other series (3, 8). Attempts to establish a specific microscopic diagnosis must in these cases be weighed against the possible hazards of the diagnostic procedures and must sometimes be avoided due to the urgency of treatment. Among our 56 patients microscopic confirmation was thus obtained in 23 patients and small cell carcinoma was the most frequent type. Similar observations have been reported by ROSWIT et coll. (8) and SALSALI & CLIFFTON (10).

Concerning radiation therapy in the management of mediastinal compression some controversy exists with regard to dose per fraction and the total dose. The need for rapid tumour control has to be balanced against the risk of radiation induced oedema. RUBIN et coll. (9) have clearly shown in clinical and experimental studies that rapid tumour growth usually implies greater risks than radiation induced oedema and that a high dose per fraction gives better results than a low dose per fraction. Generally, however, radiation therapy has been regarded as the treatment of choice, and response rates of 80 to 90 per cent have been recorded (1, 3). In the present series the overall response rate was 90 per cent. In an earlier investigation from this Department DUTTA et coll. (2) practised a low dose per fraction—0.75 to 1 Gy—to start with, and depending upon the tolerance of the patient the dose per fraction was increased to 2.5 Gy. In the present analysis the dose per fraction varied between 2.3 and 4 Gy in a fractionated course, and in single-fraction treatment between 8.0 and 12.5 Gy, and no complications were observed.

In this series it seemed obvious that larger total

Table 2

Mediastinal compression. Treatment results. Figures in parentheses indicate percentage

Total radiation dose (Gy)	Chemotherapy	No. of cases	Response*		Survival (months)	
			Complete	Partial	6	12 or more
≥35	None	28	20 (71.4)	5 (17.9)	5 (17.9)	1
≥35	Cyclophosphamide	13	11 (84.6)	2 (15.4)	7 (53.8)	2
<35	None	10	3 (30)	4 (40.0)	–	–
<35	Cyclophosphamide	5	3 (60.0)	2 (40.0)	–	–

* Complete: Disappearance of all known disease for at least 4 weeks.
Partial: Estimated decrease in tumour size of 50% or more for at least 4 weeks.

Table 3

Mediastinal compression. Factors affecting survival. Figures in parentheses indcate percentage

	No. of cases	Alive 6 monhts or more
Radiation dose (Gy)		
>35	41	12 (29.3)
<35	15	–
Histopathology		
Small cell carcinoma	11	6 (54.5)
Squamous cell carcinoma	8	–
Large cell anaplastic carcinoma	3	–
Carcinosarcoma	1	1
Unknown	33	5 (15.2)

doses gave a better remission rate than low total doses (Table 2), and survival rates showed a similar pattern. Small cell carcinoma showed the best response, in consistence with its sensitivity to radiation and chemotherapy (Table 3).

Chemotherapy appears to be as successful as radiation therapy in the initial treatment of mediastinal compression caused by small cell carcinoma (5, 11). However, investigators at the National Cancer Institute have reported that response and palliation with irradiation delivered after failure of chemotherapy is considerably inferior to that expected after initial irradiation (4). According to our opinion radiation therapy should be the initial treatment in mediastinal compression irrespective of the microscopic type of bronchogenic carcinoma. Radiation therapy followed by single drug chemotherapy gave a better response and survival rate in the present investigation than radiation therapy alone, especially in cases of small cell carcinoma. Combination chemotherapy has not been used in this series but it is hoped that treatment results can be improved by radiation therapy followed by multiple drug chemotherapy, especially in small cell carcinoma.

Request for reprints: Dr A. K. Anand, Department of Radiation Therapy, Postgraduate Instiutute of Medical Education and Research, Chandigarh—160012, India.

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