EFFECT OF RADIOTHERAPY ON SERUM MUCOPROTEIN LEVEL IN CARCINOMA LARYNX AND PHARYNX

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ABSTRACT : Serum mucoprotein level was determined in 61 individuals including 36 untreated patients of carcinoma Larynx & Pharynx and 25 healthy adults. Patients were treated by standard doses of radiation. Serum mucoprotein was again estimated following therapy. Patients showed a highly significant elevation in serum mucoprotein level as compared to controls ($P<0.001$). Radiotherapy caused a significant decline in the serum level of this biochemical ($P<0.001$). Stage of the disease had no correlation with the serum level of the mucoprotein. The dose of the radiation also had no relation with the decline in serum mucoprotein after irradiation. The fall in serum mucoprotein level was significantly higher in patients having complete response as compared to partial response ($P<0.001$), however there was no difference between the patients having partial response or no response.

INTRODUCTION

Serum mucoprotein levels are elevated in several pathological conditions including malignancy (Stern and Willhelm 1943, Seibert et al 1947, Winzler and Smyth 1948, Shetlar et al 1952 and Arcadi 1958). Earlier workers did not find any significant change for diagnostic purposes. However, in recent years a search is on for a chemical parameter for monitoring the therapy of cancer. Dobryszczyka et al, 1991, investigated several biochemical parameters including serum mucoprotein during the therapy of ovarian carcinoma. They did not find changes in mucoprotein level during therapy to be of any value in the surveillance of disease status. However, several authors have found serum sialoglycoprotein and mucoprotein levels useful for monitoring radiotherapy (Arcadi 1958, Joshi et al 1989). Hence, present study was undertaken to investigate the changes in serum mucoprotein level during the radiotherapy of carcinoma larynx and pharynx.

MATERIAL AND METHOD

Serum mucoprotein was evaluated in 61 individuals including 36 untreated biopsy proved patients of Carcinoma Larynx & Pharynx and 25 healthy controls. Patients were those referred to the Radiotherapy Department, K. G. Medical College, Lucknow. Serum samples were collected before the start of radiotherapy. Serum samples were also collected from 25 healthy adults whose blood sample was taken from the State Blood Bank, Lucknow. Patients were treated by 4000-6500 cGy of radiation in 4-6¹/₂ weeks in 20-33 fractions by telecobalt machine (Theratron 780C). Serum samples were again collected from the patients after the completion of radiotherapy. Serum mucoprotein level was determined by Winzler's Method (Winzler, 1955).

OBSERVATIONS AND DISCUSSION

Table No. I depicts the serum mucoprotein levels of untreated patients of carcinoma larynx & pharynx and controls. The mean Serum mucoprotein level in patients was 37 ± 3.20 mg%. Serum mucoprotein level ranged from 14-60 mg% in patients. This elevated level of serum mucoprotein level was highly significant ($P<0.001$) when compared to healthy persons. The highest mean level of serum mucoprotein was observed in the patients where both the sites-larynx and pharynx were involved. This higher value of serum mucoprotein in laryngopharyngeal cancer, as compared to carcinoma pharynx was highly significant ($P<0.001$), however the difference between carcinoma laryngopharynx and larynx was not significant.

Effect of radiotherapy on serum mucoprotein level is shown in Table no. II. Radiotherapy caused a decline in serum mucoprotein level in 35 patients, whereas one patient showed an elevation of 1 mg% in serum mucoprotein level following therapy. The decline in serum mucoprotein level in 35 patients who showed a fall in serum mucoprotein level ranged from 1-34 mg%.

The post-therapy serum mucoprotein level was significantly lower as compared to pretherapy level ($P<0.001$). However, post-therapy level ...ained considerably higher than controls ($P<0.001$).

Stage-wise effect of radiotherapy in larynx & pharynx malignancy was analysed. It was found that the stage of the disease has no correlation with the serum mucoprotein level in untreated patients. Joshi et al (1989) in their study of base tongue malignancy did not find any correlation in mucoprotein level and various stages of the disease. It was found that decline in serum mucoprotein level was

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Table - I**Site-wise Serum Mucoprotein Level in Carcinoma Larynx & Pharynx (n-61)**

	No. of Cases	Serum mucoprotein level (Mean $\pm$ standard deviation mg%)
Control	25	13 $\pm$ 0.80
Larynx	27	36 $\pm$ 2.23
Pharynx	5	25 $\pm$ 2.11
Laryngopharynx	4	47 $\pm$ 11.48

Table - II**Effect of Radiotherapy on Serum Mucoprotein Level in Carcinoma Larynx & Pharynx (n-36)**

	Serum Mucoprotein (Mean $\pm$ standard deviation mg%)
Pretherapy	37 $\pm$ 3.20
Post therapy	23 $\pm$ 2.22
Mean Fall	14 $\pm$ 2.11

higher in early stage patients as compared to those of late stage, however, this difference was not statistically significant.

Effect of dose of radiation on serum mucoprotein level was also studied. Fall in serum mucoprotein level was analysed in relation to various doses of radiation. There was no significant correlation between the various doses of radiation and decline in serum mucoprotein level following irradiation.

Relation between clinical response to therapy and decline in serum mucoprotein level is depicted in Table no. III. Complete clinical response is defined as the complete disappearance of tumour on clinical examination. Partial response is described as more than 50% reduction in tumor size and no response as less than 50% reduction in tumor on clinical examination. The highest decline in serum mucoprotein level was observed in patients with complete response. The patients with partial response showed a mean decline of 13 mg% as compared to 15 mg% in patients with complete response. This difference between the two categories is significant ($P < 0.01$). There was no difference in decline of serum mucoprotein level in patients having partial response and no response.

Joshi et al (1989) while studying sialoglycoproteins found that serum mucoprotein level can be used as a biomarker to monitor the radiotherapy of base of tongue malignancy.

Table - III**Relationship Between Clinical Response and Fall in Serum Mucoprotein Level in Carcinoma Larynx & Pharynx**

Clinical Response	No. of Cases	Mean fall in serum mucoprotein (Mean $\pm$ standard deviation mg%)
Complete Response	12	15 $\pm$ 2.69
Partial Response	20	13 $\pm$ 1.89
No Response	4	13 $\pm$ 6.23

The present study also shows that the fall in serum mucoprotein level following therapy is correlated to clinical response to the radiation treatment, hence this biochemical parameter can be used to monitor the progress of disease in combination with other parameters during the radiotherapy of larynx & pharynx malignancy.

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