

CHANGES IN SERUM GLYCOPROTEIN LEVEL DUE TO RADIOTHERAPY IN CARCINOMA CERVIX.

H.R.MALI • CHANDRAWATI • S.M.NATU • M.L.B.BHATT

SUMMARY

Serum glycoprotein level were determined in 65 individuals which included 40 patients of carcinoma cervix before treatment and 25 healthy adult women. Patients were treated by external beam radiation with a dose of 50 - 65 Gy in 5-6 1/2 weeks. Glycoprotein level were again estimated after the treatment. Serum glycoprotein level was significantly elevated in patients as compared to controls ($P < 0.001$). Stage of disease had no effect on serum glycoprotein levels. Radiotherapy caused a significant fall in serum glycoprotein level in patients ($P < 0.001$). It was also observed that there was a higher fall in serum glycoprotein level in early stage patients as compared to late stage and the difference was significant statistically ($P < 0.001$). A positive correlation was also observed in the dose of radiation and decline in serum glycoprotein level. The decline in serum glycoprotein level was significantly higher in patients with complete response as compared to partial or no response ($P < 0.001$).

INTRODUCTION

Serum glycoprotein levels are found to be elevated in cases of malignancy (Macbeth & Bekesi, 1962; Lipton et al. 1979). The clinical use of this biochemical parameter as a diagnostic aid was hampered because

of the fact that they are found to be elevated in various other inflammatory, degenerative, metabolic and auto-immune disorders (Winzler, 1955; Macbeth & Bekesi, 1962). Later, investigators identified that the elevated level of this parameter returns back to normal or near normal level after the successful treatment of the malignancy (Joshi et al. 1989; Vladimir et al. 1989; Ogoshi et al,

Depts. of Radiotherapy, Pathology, King George's Medical College, Lucknow.
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1989). Lately rapid strides have been made in the treatment of cancer. But we lack a precise parameter to monitor the therapy. Researchers are interested in biochemical parameters for two reasons: firstly, to monitor the outcome of therapy and secondly, to monitor the progress of disease. As the investigators found that serum glycoprotein level declines after the treatment of cancer, they got interested in the changes in serum levels of this parameter to serve the above two objectives. The present study investigates the effect of radiotherapy on serum glycoprotein level in carcinoma cervix patients.

MATERIAL AND METHOD

A total of 65 individuals were included in the present study. Out of this, 25 individuals were healthy adult women whose blood samples were taken from the State Blood Bank, Lucknow and remaining 40 had biopsy proved squamous cell carcinoma of cervix. Patients were those referred to the Radiotherapy Department, King George's Medical

College, Lucknow. FIGO, staging was done prior to the start of radiotherapy. Patients were treated by external beam radiation (Telecobalt Machine-Theratron-780-C). Patients were given 50-65 Gy of radiation in 5 to 6 1/2 weeks in 25-33 fractions. Serum samples were collected before the start of radiation treatment and after the completion of therapy. Serum glycoprotein (Protein-bound hexose) was estimated by Winzler's Method (Winzler, 1955).

RESULTS

Serum glycoprotein levels of healthy women and patients of cancer cervix are shown in Table I. Serum glycoprotein level (190 ± 4.35 mg%) in patients of cancer cervix was significantly higher ($P < 0.001$) as compared to healthy women. A comparison was made between the patients of early malignancy (stage I & II) with patients of advanced disease (stage III & IV). No statistical difference was observed in serum glycoprotein levels in early and advanced disease.

TABLE I
STAGE-WISE SERUM GLYCOPROTEIN LEVEL
IN CANCER CERVIX PATIENTS
(n-65)

	No. of cases	Serum glycoprotein level (Mean \pm standard deviation mg%)
Control	25	85 ± 3.00 (72 - 109 mg%)*
Stage I & II	21	191 ± 8.04 (161 - 240 mg%)
Stage III & IV	19	189 ± 5.05 (170 - 214 mg%)

* Range of serum glycoprotein levels.

TABLE II
EFFECT OF RADIOTHERAPY ON SERUM GLYCOPROTEIN LEVEL
IN CARCINOMA CERVIX PATIENTS

(n - 40)

	Serum glycoprotein level (Mean \pm standard deviation mg%)	
Pretherapy	190 \pm 4.35	(161 - 240 mg%)*
Post therapy	120 \pm 4.82	(83 - 216 mg%)
Mean fall	70 \pm 4.48	(14 - 104 mg%)

* Range of serum glycoprotein levels.

TABLE III
STAGE-WISE EFFECT OF RADIOTHERAPY ON SERUM
GLYCOPROTEIN LEVEL IN CARCINOMA
Cervix

Stage of disease	No. of cases	Decline in serum glycoprotein (Mean \pm standard deviation mg%)
I & II	21	75 \pm 5.66 (16 - 104 mg%)*
III & IV	19	64 \pm 5.85 (14 - 98 mg%)

* Range of serum glycoprotein levels.

Table II depicts the changes in glycoprotein level due to radiotherapy. Radiotherapy caused a decline in serum glycoprotein level in all the patients. This fall in glycoprotein level was statistically highly significant ($P < 0.001$). However, post-therapy serum glycoprotein level remained considerably higher as compared to controls ($P < 0.001$).

Table III shows the decline in serum glycoprotein level in early and advanced

disease following radiotherapy. There was a greater fall in serum glycoprotein level in early patients as compared to advanced disease and the difference was statistically highly significant ($P < 0.001$).

An attempt was made to observe a correlation between the dose of radiation and fall in serum glycoprotein level (Table IV). A positive correlation existed and decline in glycoprotein level was higher with a dose of 6000 cGy or more as compared

TABLE IV
EFFECT OF DOSE OF RADIATION OR SERUM
GLYCOPROTEIN LEVEL IN CANCER
CERVIX PATIENTS

Dose of Radiation (cGy)	No. of cases	Fall in serum glycoprotein (Mean \pm standard deviation mg%)
Upto 5500	25	67 \pm 5.35 (24 - 104 mg%)*
6000 and more	15	76 \pm 6.32 (14 - 99 mg%)

* Range of serum glycoprotein levels.

TABLE V
RELATIONSHIP BETWEEN CLINICAL RESPONSE
AND FALL IN SERUM GLYCOPROTEIN LEVEL
IN CARCINOMA CERVIX PATIENTS

Clinical Response	No. of cases	Fall in serum glycoprotein (Mean \pm standard deviation mg%)
Complete response	11	81 \pm 6.15 (33 - 104 mg%)*
Partial response	20	66 \pm 6.37 (14 - 99 mg%)
No response	9	67 \pm 9.73 (19 - 90 mg%)

* Range of serum glycoprotein levels.

to a dose of 5500 cGy or less, and the difference was highly significant ($P < 0.001$).

Clinical response and fall in serum glycoprotein levels due to radiotherapy are shown in Table V. Complete clinical response was defined as the complete disappearance of tumour on clinical examination. Partial response was described as more than 50% reduction in tumour size and no response as less than 50% reduction in tumour on clinical examination. The highest decline

in serum glycoprotein level was observed in cases with complete response. There was almost no difference in fall in glycoprotein level in cases with partial or no response. The decline in cases with complete response was significantly higher as compared to cases with partial or no response ($P < 0.001$).

DISCUSSION

Malignancy causes elevation of serum

glycoproteins. Macbeth & Bekesi (1962) observed that elevated levels of serum glycoprotein returned to normal after surgical removal of tumour in 3 out of 4 patients. Lipton et al (1979) reported similar findings after surgery in 38 patients of malignancy. Recently, Vladimir et al (1989) have confirmed these findings in 20 operated patients of malignancy.

However, in advanced disease radiotherapy and chemotherapy are the modalities of treatment. Mali et al (1977) in a study of 155 patients of head and neck malignancy reported that radiotherapy caused a decline in serum glycoprotein levels after therapy. Joshi et al (1989) also noticed a fall in serum glycoprotein levels following radiotherapy of base tongue malignancy. Ogoshi et al (1989) suggested that serum glycoprotein levels may play a potential role as a prognostic indicator.

In the present study of patients of cancer cervix, radiotherapy produced statistically significant decline in serum glycoprotein

levels. This decline was higher in patients of early disease. The significant observation in the present study was that decline in serum glycoprotein levels and clinical response was positively correlated suggesting, that serum glycoprotein levels can be used as a biomarker to monitor the efficacy of radiation treatment.

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