



## Assessment of serum albumin in carcinoma cervix patients and its correlation with treatment outcome

Authors

Anjali Bhola, Manjulata Kumawat, Ashok K Chauhan, Paramjeet Kaur, Abhishek Soni

### Abstract

**Introduction:** Cervical cancer ranks fourth most common diagnosed cancer in women worldwide and fourth leading cause of cancer death in women worldwide. Serum albumin is closely correlated with degree of malnutrition and is simple marker of nutrition status.

**Material and Methods:** Sixty patients of carcinoma cervix were assessed for nutritional status at time of presentation, at the end of treatment and three months after completion of treatment.

**Results:** Before treatment, 5% patients were having hypoalbuminemia and 95% were having normal serum albumin levels. At the end treatment, 35% patients had hypoalbuminemia and 65% patients had normal serum albumin levels. At third month follow up, 18.3% had hypoalbuminemia and 81.7% had normal serum albumin levels. Mean values of serum albumin before treatment, at the end of treatment and at third month of follow up were 4.07, 3.53 and 3.63 respectively. Repeated measure ANOVA test was applied and difference in means is found to be statistically significant with  $p$ -value  $< 0.001$ .

**Conclusion:** Pretreatment serum albumin can be used as a prognostic factor in cervical cancer patients. Low levels of serum albumin are associated with poor outcome in cancer patients, perhaps serum albumin can be used as an independent indicator of the need for aggressive nutrition intervention.

**Keywords:** carcinoma cervix; serum albumin; nutritional assessment.

### Introduction

Cervical cancer ranks fourth most commonly diagnosed cancer in women worldwide and fourth leading cause of cancer death in women worldwide<sup>1</sup>. Serum albumin is closely correlated with degree of malnutrition and is regularly used, simple marker of nutritional status<sup>2</sup>. Normal range of serum albumin is defined as 3.5-5.0 g/ dL and levels  $< 3.5$  g/dL is called hypoalbuminemia<sup>3,4</sup>. There is slight or no hypoalbuminemia in early stages of cancer but as the disease progresses albumin levels drop significantly and serve as

good indicators of prognosis of cancer<sup>5,6</sup>. Serum albumin has also been described as an independent prognostic factor of survival in various cancers<sup>7</sup>. The advantage of serum albumin level as a pretreatment prognostic factor in cancer patients is that it is inexpensive, reproducible and powerful<sup>8</sup>. Finally, because low levels of serum albumin are associated with poor outcome in cancer patients, perhaps serum albumin can be used as an independent indicator of the need for aggressive nutritional intervention<sup>9</sup>.

## Materials and Methods

The study was conducted on 60 patients of cervix carcinoma, attending the Department of Radiotherapy, Pt. B. D. Sharma Post Graduate Institute of Medical Sciences, Rohtak.

## Methodology

Sixty patients of carcinoma cervix were assessed for nutritional status at time of presentation, at the end of treatment and three months after completion of treatment. Patients received external beam radiotherapy 50 Gy in 25 fractions over 5 weeks with concomitant cisplatin 40 mg/m<sup>2</sup> intravenous weekly for 5 weeks. However, patients received intracavitary brachytherapy one week after completion of External Beam Radiation Therapy, three fractions of 7 Gy each, once in a week. The nutritional assessment of patients was performed by estimation of serum albumin at the time of presentation and at the end of treatment and at third month of follow up.

## Statistical analysis

The data thus obtained was used to evaluate nutritional status of patients with cervix carcinoma using Chi- Square test and ANOVA test.

## Results

Before treatment, 5% patients were having hypoalbuminemia and 95% were having normal serum albumin levels. At the end treatment, 35% patients had hypoalbuminemia and 65% patients had normal serum albumin levels. At third month follow up, 18.3% had hypoalbuminemia and 81.7% had normal serum albumin levels. Results are shown in table-1.

Mean values of serum albumin before treatment, at the end of treatment and at third month of follow up were 4.07, 3.53 and 3.63 respectively. Table 2 is the representation of the same. Repeated measure ANOVA test is applied and difference in means is found to be statistically significant with p-value < 0.001.

Table 3 shows correlation between pretreatment serum albumin and disease control at 6 month follow up. 3 patients had hypoalbuminemia before treatment and all of them developed progressive disease. 84% patients having normal serum albumin value before treatment had complete response. Chi square test was applied and the difference was found statistically significant with p- value 0.001.

Table 4 shows correlation between pretreatment serum albumin levels and acute skin toxicity noted at the end of 5<sup>th</sup> week of treatment. 66.66% of hypoalbuminemic patients had grade 2 skin reactions and 33.33% of hypoalbuminemic patients had grade 3 skin reactions. 70% patients who had normal serum albumin values before treatment, had grade 2 reactions and 30% had grade 3 reactions. Regression was found non significant with r- value- 0.098 and p- value- 0.0456.

Table 5 shows correlation between pretreatment serum albumin levels and acute mucosa toxicity noted at the end of 5<sup>th</sup> week of treatment. 100% of hypoalbuminemic patients had grade 2 mucosa reactions. 85.9% patients who had normal serum albumin values before treatment, had grade 2 reactions and 14% had grade 3 reactions. Regression was found non significant with r- value- 0.022 and p- value- 0.0869.

Table 6 shows correlation between serum albumin and treatment interruptions. 66.66% of hypoalbuminemic patients had treatment interruptions of  $\geq 1$  week and 33.33% of hypoalbuminemic patients had no interruptions. 14% patients who had normal serum albumin values before treatment, had treatment interruption and 86 % had no interruption. Regression was found significant with r- value- 0.418 and p- value- 0.001.

**Table -1** Serum albumin at various interval

Time interval		Serum Albumin		Total
		<3.5	≥ 3.5	
Before treatment	Number	3	57	60
	%	5.0%	95.0%	100.0%
End of treatment	Number	21	39	60
	%	35.0%	65.0%	100.0%
3 months	Number	11	49	60
	%	18.3%	81.7%	100.0%
p value		<0.001		

**Table 2** Serum Albumin value at pre-treatment, post treatment and after 3 months

Serum albumin	Mean ± Standard Deviation	p value
Before treatment	4.07 ± 0.353	<0.001
End of treatment	3.54 ± 0.367	
At 3rd month follow up	3.64 ± 0.345	

**Table 3** Correlation between serum albumin and disease control

Disease status	S. albumin <3.5 g/dl	S. albumin >3.5 g/dl
Complete response	0	48(84.2%)
Partial response	0	6(10.5%)
Progressive disease	3(100%)	3(5.3%)
p value		<0.001

**Table 4** Correlation between serum albumin and acute skin toxicity

Acute skin toxicity	S. albumin <3.5 g/dl (3)	S. albumin ≥3.5 g/dl(57)
Grade 1	0	0
Grade 2	2(66.66%)	40(70.17%)
Grade 3	1(33.33%)	17(29.82%)
Grade 4	0	0
p-value	0.456	
r-value	0.098	

**Table 5** Correlation between serum albumin and acute mucosa toxicity

Acute mucosa toxicity	S. albumin <3.5 g/dl (3)	S. albumin ≥3.5 g/dl(57)
Grade 1	0	0
Grade 2	3(100%)	49(85.96%)
Grade 3	0	8(14.03%)
Grade 4	0	0
p-value	0.869	
r-value	0.022	

**Table 6** Correlation between serum albumin and completion of intended treatment and treatment interruptions

Treatment interruption(≥1 week)	S. albumin <3.5 g/dl (3)	S. albumin ≥3.5 g/dl(57)
Interruption Present	2 (66.66%)	8(14.03%)
No Interruption	1(33.33%)	49(85.96%)
p-value	0.001	
r-value	0.418	

**Discussion**

Before treatment, 5% patients had hypoalbuminemia and 95% patients had normal serum albumin levels. Mean serum albumin value

was 4.07 ± 0.35. Chantragawee et al also found similar results in gynecological cancer patients, 5.8% patients had hypoalbuminemia and 94.2% patients had normal serum albumin levels<sup>10</sup>. Orr et

al found that mean serum albumin before treatment was  $3.8 \pm 0.6$  and 9% patients had hypoalbuminemia<sup>11</sup>. Das et al found that 5% patients had severe hypoalbuminemia of  $\leq 2$  g/dl and 95% patients had normal serum albumin levels or mild to moderate deficiency<sup>12</sup>.

At the end of treatment, 35% patients had hypoalbuminemia and 65% patients had normal serum albumin levels in our study. Mean serum albumin value was  $3.53 \pm 0.37$ . Orr et al found similar decrease in serum albumin levels post treatment. 55% patients had hypoalbuminemia post treatment in this study<sup>11</sup>.

At third month follow up, 18% patients had hypoalbuminemia and 82% patients had normal serum albumin levels and mean serum albumin value was  $3.64 \pm 0.35$ .

Three patients had hypoalbuminemia before treatment and all of them developed progressive disease. This explained poor prognosis in hypoalbuminemic patients. 84% patients having normal serum albumin value before treatment had complete response. Gupta et al also reported pretreatment serum albumin as a predictor of cancer survival<sup>13</sup>.

### Conclusion

Hypoalbuminemia is a predictor of poor prognosis in cervix cancer patients. Hypoalbuminemia before treatment can lead to poor tolerance to treatment in terms of treatment interruptions and can lead to poor treatment outcome as partial response or disease progression.

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