

Correlation of Pre Operative and Post Operative Albumin Level Changes With Clinicopathological Features in CA Stomach

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Abstract

Chronic inflammation helps tumor development and aids metastasis. They produce pro inflammatory factors that Inhibit immune surveillance, enhance the permeability of blood vessels and lymphatics and degrade extracellular matrix by cytokines, chemokines, prostaglandins, and active amine, causing tumor development and metastasis. Inflammatory factors which may have significant prognostic value include NLR (neutrophil/lymphocyte ratio), PLR (platelet/lymphocyte ratio) and CRP (C-reaction protein).

Albumin and globulin are the major protein components in serum. They play an important role in inflammation. A decreased ALB level and increased GLB level had been reported to reflect chronic inflammation. They are mainly used for the diagnosis of liver function and immunological diseases.

Recently Albumin has been reported as a novel inflammatory indicator for prognosis in colorectal cancer, lung cancer, esophageal cancer, and breast cancer.

AIM

To assess the pre-operative, post-operative albumin and fall in albumin levels in carcinoma stomach in terms of

1. Sex
2. Location of the tumor
3. Pathological type of tumor - lauren's classification
4. T stage of the disease

5. N stage of the disease

6. M stage of the disease

Materials and Methods

It is a retrospective study of 70 patients who underwent surgery for Carcinoma stomach in SRMC between 2015-2017.

Patients demographic data, pre-operative and post-operative albumin were collected. The histopathological report of the patient was also collected.

Significance of correlations between albumin levels and the clinic pathological characteristics was analyzed by χ^2 test or Kruskal-Wallis H test and Mann-Whitney Test. Statistical analyses were performed using the SPSS 17.0. A two-tailed p value of <0.05 was considered significant.

Inclusion Criteria

1. Patients who underwent surgery for carcinoma stomach in SRMC.
2. All the patients above the age of 18 years.

Exclusion Criteria

1. Patients whose post-operative albumin was not included.

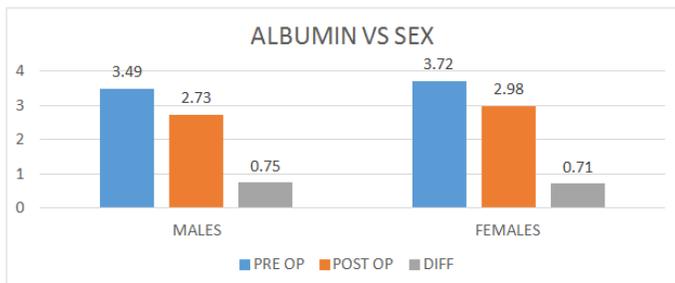
Results

Gender Distribution with Albumin

TABLE 1 : SEX

	Frequency	Percent	Valid Percent	Cumulative Percent
F	27	38.6	38.6	38.6
Valid M	43	61.4	61.4	100.0
Total	70	100.0	100.0	

SEX	N	Mean	Std. Deviation	Std. Error Mean
PRE OP M	43	3.493023	.6426861	.0980087
ALBUMIN F	27	3.725926	.4266079	.0821007
POST OP M	43	2.734884	.6331643	.0965566
ALBUMIN F	27	2.985185	.5544947	.1067126
DIFFERENCE M	43	.758140	.6755007	.1030129
DIFFERENCE F	27	.711111	.4475002	.0861214

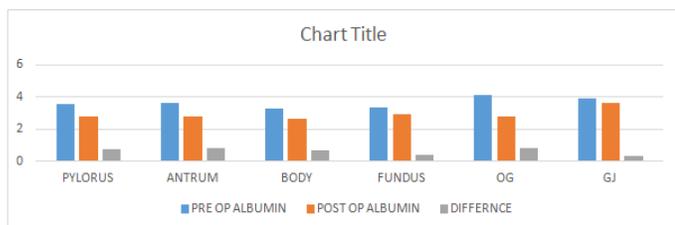


- A total of 70 patients were included in the study.
- Out of 70 patients 43 patients were males (61.4%) whereas 27 were females (38.6%).
- Pre-Operative Albumin was found to be higher in Females (3.72) as compared to males (3.49). The data was found to be statistically significant ($p < 0.01$).
- Post-operative fall in albumin was higher in males (0.75) as compared to females. However, the data was not found to be clinically significant ($p < 0.08$).

LOCATION OF TUMOR WITH ALBUMIN

TABLE 2

LOCATION	NUMBER	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
PYLORUS	16	3.575000	2.812500	.775000
ANTRUM	43	3.613953	2.774419	.820930
BODY	19	3.310526	2.647368	.663158
FUNDUS	5	3.360000	2.960000	.400000
OG	2	4.100000	2.800000	.800000
GJ	1	3.900000	3.600000	.300000
TOTAL	70			



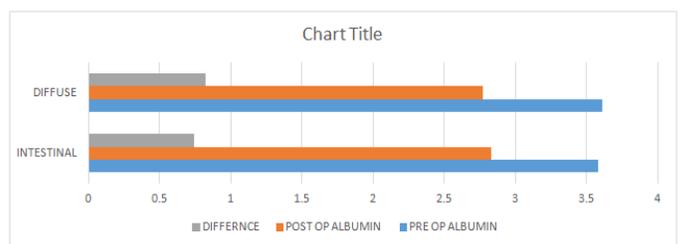
- Out of 70 patients with Ca stomach 43 (61.4%) patients had tumour located in the antral region of the stomach, 16 tumours (22.8%) in the pylorus of the stomach, 19 tumours (27.1%) in the body of the stomach. Antrum was the most common location of the tumour.
- Maximum fall in albumin levels post operatively were seen in tumours that were located in the antral region (.820930).
- However there was no statistical significance and no correlation between location of tumour and albumin levels.

VARIANT OF TUMOUR WITH ALBUMIN

TABLE 3 : VARIANT

	FREQUENCY	PERCENT	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
Valid AL	51	72.9	3.582857	2.831429	.740000
DIFFUSE	19	27.1	3.613953	2.774419	.820930
Total	70	100.0			

	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
Mann-Whitney U	477.000	450.000	471.000
Wilcoxon W	667.000	1776.000	1797.000
Z	-.099	-.457	-.179
Asymp. Sig. (2-tailed)	.921	.647	.858



- Out of 70 patients with carcinoma stomach, 51 (72.9%) were found to have intestinal variant of Ca stomach whereas 19 (27.1%) were found to have diffuse variant of Ca stomach.
- Postoperative fall in albumin levels were found to be higher in diffuse variant of carcinoma stomach.

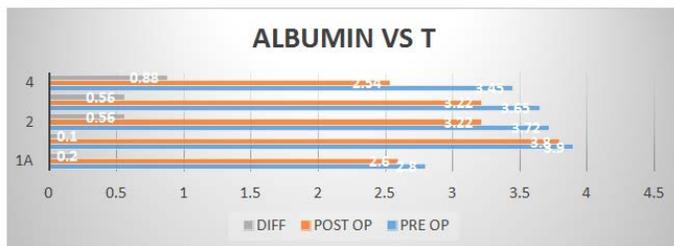
- However there was no statistical significance and no correlation between variant of tumour and albumin levels.

T STAGE WITH ALBUMIN

TABLE 4: T STAGE

	FREQUENCY	PERCENT	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
0	1	1.4	2.8	2.6	0.2
1	1	1.4	3.9	3.8	0.1
2	15	21.4	3.72	3.22	0.56
3	26	37.1	3.65	3.22	0.56
4	27	38.6	3.45	2.54	0.88
Total	70	100.0			

	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
Chi-Square	5.011	13.341	4.933
df	4	4	4
Asymp. Sig.	.286	.010	.294



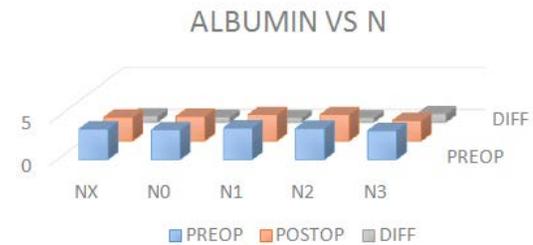
- Out of 70 patients with carcinoma stomach, 27(38.6%) belonged to T4 stage, 26(37.1%) belonged to T3 stage, 15 (21.4) belonged to T2 stage and 1 patient in T1 stage.
- T4 was the most common stage of the tumour in our study.
- Fall in post-operative albumin levels was found to be higher in T4 stage (0.88). Fall in albumin level was found to increase as the stage of the tumour increased.
- The correlation between T stage and albumin level was found to be statistically significant in our study ($p < 0.01$)

N STAGE WITH ALBUMIN

TABLE 5 : N

	Frequency	Percent	Pre Op Albumin	Post Op Albumin	Difference
NX	3	4.3	3.6	2.8	0.76
N0	17	24.3	3.5	2.9	0.63
N1	13	18.6	3.71	3.11	0.55
N2	22	31.4	3.67	3.11	0.55
N3	15	21.4	3.4	2.4	1.02
Total	70	100.0			

	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
Chi-Square	3.661	9.139	3.370
df	4	4	4
Asymp. Sig.	.454	.05	.498



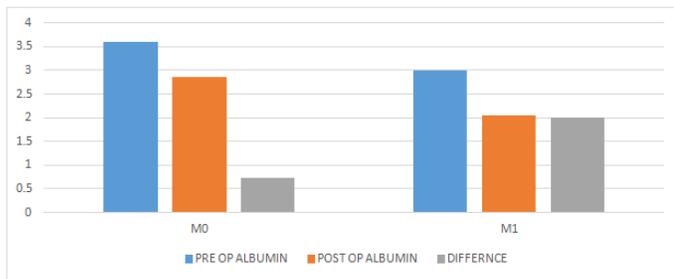
- Out of 70 patients with carcinoma stomach, 15(21.4%) belonged to N3 stage, 22(31.4%) belonged to N2 stage, 13 (18.6%) belonged to N1 stage and 17 (24.3) patients in N0 stage.
- N2 was the most common stage of the nodal stage in our study.
- Fall in post-operative albumin levels was found to be higher in N3 stage (1.02).
- The correlation between N stage and post-operative fall in albumin level was found to be statistically significant in our study ($p < 0.05$)

M STAGE WITH ALBUMIN

TABLE 6: M

	FREQUENCY	PERCENT	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
0	68	97.1	3.600000	2.854412	.730882
1	2	2.9	3.000000	2.050000	1.050000
Total	70	100.0			

	PRE OP ALBUMIN	POST OP ALBUMIN	DIFFERENCE
Mann-Whitney U	26.000	16.000	48.500
Wilcoxon W	29.000	19.000	2394.500
Z	-1.487	-1.840	-.689
Asymp. Sig. (2-tailed)	.137	.066	.491
Exact Sig. [2*(1-tailed Sig.)]	.162 ^b	.067 ^b	.518 ^b



- Out of 70 patients, 2 patients were found to have M1 disease and 68 patients were found to have M0 disease.
- Metastatic disease was associated with lower pre-operative albumin and higher post-operative fall in albumin.
- However, there was no statistical significance and no correlation between metastasis and albumin levels.

Discussion

- Low albumin level are associated with a higher postoperative recurrence rate (90.3% vs. 43.5%, $P < 0.01$). Overall 5-year survival rate in patients with a normal serum albumin level is significantly higher than that in patients with a low serum level (57.4% vs. 9.7%, $P < 0.01$).
- On multivariate analysis, preoperative serum albumin level is an independent factor associated with survival ($P < 0.01$). Hypoalbuminemia is associated with worse survival in patients with cancer in the lower stomach and adjuvant therapy should be considered.
- Albumin deficiency has been demonstrated to contribute to poor healing rates with reduced collagen formation and wound dehiscence.
- Postoperative decrease in serum albumin has been found to reflect the magnitude of surgery and the associated stress response, nutritional assessment and prediction of complications.

Gender Distribution with Albumin

- In this study pre operative albumin was found higher in females (3.72). The data was found to be statistically significant
- Post operative fall in albumin levels was more in male patients (0.75). However there was no statistical correlation between gender distribution and drop in post operative albumin in carcinoma stomach.
- In a study conducted by Sung Kang Chang et al, male patients were seen to have higher drop in albumin levels and increased risk of severe postoperative complications in gastric cancer patients^[1].
- Similar findings were also noted in a study conducted by Lipska MA et al; where it was noted that chance of anastomotic leakage after an anastomosis was higher in males as compared to females.^[2]

Location of Tumor With Albumin

- In our study maximum fall in albumin levels post operatively were seen in tumors that were located in the antral region (.820930).
- However there was no statistical significance and no correlation between location of tumour and albumin levels.

Variant of Tumour with Albumin

- In our study Postoperative fall in albumin levels were found to be higher in Diffuse variant of carcinoma stomach (0.82).
- However there was no statistical significance and no correlation between variant of tumour and albumin levels.

T Stage with Albumin

- In our study fall in post-operative albumin levels was found to be higher in T4 stage (0.88). Fall in albumin level was found to increase as the stage of the tumour increased.

- The correlation between T stage and albumin level was found to be statistically significant in our study ($p < 0.01$)
- Similar findings were noted in a study conducted by Xuexue You et al where large sized tumours were associated with higher drop in post operative albumin [3].

N Stage with Albumin

- Fall in post-operative albumin levels was found to be higher in N3 stage (1.02).
- The correlation between N stage and post-operative fall in albumin level was found to be statistically significant in our study ($p < 0.05$)
- Similar findings were noted in a study conducted by n a study conducted by Sung Kang Chang et al [1] and Arfon Powell et al [4]; where N3 stage was associated with higher fall in post operative albumin.

M Stage with Albumin

- Metastatic disease was associated with lower pre-operative albumin and higher post-operative fall in albumin.
- However, there was no statistical significance and no correlation between metastasis and albumin levels.

Conclusion

- Hence, in this study we conclude that post-operative fall in levels of albumin is significantly higher in Males, Advanced T stages (T4), Advanced Nodal disease (N3).
- There was no correlation between post-operative fall in albumin and variant of the tumour and location of tumour.
- This being a retrospective study in a small population, a similar study with a larger sample size may be required to substantiate the results of this study.

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