



## CLINICAL STUDY OF INFLAMMATORY BOWEL DISEASE WITH REFERENCE TO CRP, ESR, ALBUMIN

**Dr. P. Srujan.**

M.D., Assistant Professor of Medicine; Osmania General Hospital / Osmania Medical College, Hyderabad

**Dr. K. Sreekanth\***

M.D., Associate Professor of Medicine; Osmania General Hospital / Osmania Medical College, Hyderabad \*Corresponding Author

### ABSTRACT

Inflammatory bowel disease (IBD), which includes Crohn's disease and ulcerative colitis (UC), is a relapsing and remitting condition characterized by chronic inflammation at various sites in the GI tract, which results in diarrhea and abdominal pain.

**Aims of the Study** The aim of the study the correlation of CRP, ESR, ALBUMIN in relation to the disease activity of IBD.

**Material & Methods** Patients who come to the outpatient department of general medicine and gastroenterology as well as to the emergency department are taken up for the study.

**Results** A total of 47 cases are studied, Out of 47 cases, 42 (89.36%) are ulcerative colitis 5 (10.63%) are crohn's disease.

**KEYWORDS :** Inflammatory Bowel Disease, CRP, ESR, Albumin

### INTRODUCTION

The immune reaction involves the release of inflammatory mediators, including cytokines, interleukins, and tumor necrosis factor (TNF).<sup>1</sup>

The introduction of biological therapies in IBD has renewed interest in inflammatory markers (especially C reactive protein (CRP)), given their potential to select responders to these treatments. Furthermore, CRP correlates less well with disease activity in patients with ulcerative colitis (UC) as compared with CD. Crohn's disease is a condition of chronic inflammation potentially involving any location of the alimentary tract from mouth to anus but with a propensity for the distal small bowel and proximal large bowel.<sup>2</sup>

One of the more notable environmental factors in IBD is smoking. Ulcerative colitis is largely a disease of ex-smokers and nonsmokers, whereas Crohn's disease is associated with smoking. Smokers have more surgery for their disease and a greater risk of relapse after resection.<sup>3</sup>

In as many as 24% of patients with Crohn's disease, perianal disease may precede the intestinal manifestations of Crohn's disease with a mean lead time of 4 years.<sup>4</sup>

Contributing factors may include thrombocytosis, increased levels of fibrinogen, fibrinopeptide A, factor V, and factor VIII, antithrombin III deficiency, and free protein S deficiency, all related to active bowel inflammation.<sup>5</sup>

Intubation and biopsy of the terminal ileum should be attempted in all patients and greatly increase the sensitivity and specificity of the examination.<sup>6</sup>

The risk of infectious complications is increased, particularly at doses of prednisone higher than 40 mg, whereas doses lower than 10 mg confer no appreciable increased risk of infection.<sup>7</sup>

The drug possesses a variety of other immune-modulating and anti-inflammatory effects, including inhibition of IL-1, IL-2, IL-6, and IL-8 and induction of adenosine, which has direct immunosuppressive properties.<sup>8</sup>

ESR is the rate at which erythrocytes migrate through the plasma. Inevitably, ESR will depend on the plasma concentration and on the number and size of the erythrocytes. Compared with CRP, ESR will peak much less rapidly and may also take several days to decrease, even if the clinical condition of the patient or the inflammation is ameliorated. Increases in ESR with age have been described.<sup>9</sup>

### AIMS OF THE STUDY

To study the correlation of CRP, ESR, ALBUMIN in relation to the disease activity of inflammatory bowel disease. To study the correlation of the above three parameters in monitoring the effect of treatment.

### MATERIAL AND METHODS

Patients who come to the outpatient department of general medicine and gastroenterology as well as to the emergency department are taken up for the study.

### INCLUSION CRITERIA

1. Patients, who are known cases of inflammatory bowel disease, coming with active disease either to the outpatient department or to the emergency department.
2. Known cases of inflammatory bowel disease, who are on stable doses of 6 mercaptopurine, azathioprine are included.
3. Both males and females between age groups of 21 to 45 years, who meet the above criteria, are included.

### Exclusion criteria

1. Known cases of inflammatory bowel disease, but on drugs which reduce TNF- $\alpha$ .
2. Who recently commenced treatment for inflammatory bowel disease.
3. Fulminant disease requiring colectomy.
4. Infections in the past (within 12 weeks) requiring either oral or parenteral antibiotics.
5. Cases of gastrointestinal tuberculosis.
6. Surgery within 8 weeks.
7. Serious gastrointestinal infections within 12 weeks.

### STUDY PROTOCOL

Initially history was directed towards obtaining the details of –

- Chief complaints at the time of admission.
- Duration of inflammatory bowel disease.
- Significant past history, family history and drug history
- Addictions (particularly smoking)
- Diet history and nutritional status.

After that patient is investigated - CBP, ESR, serum proteins, CRP (by latex agglutination method) are sent.

Disease activity is assessed by using UCDAI (ulcerative colitis disease activity index) for ulcerative colitis, CDAI (Crohn's disease activity index) for crohn's disease. Then Patients are treated with intravenous glucocorticoids and/or infliximab for one week. Again disease activity is assessed by using UCDAI and CDAI. CRP, ESR and albumin sent to look for the reduction in the serum levels.

### RESULTS

**TABLE-1 :- AGE DISTRIBUTION**

AGE DISTRIBUTION	ULCERATIVE COLITIS	CROHN'S DISEASE
21 – 25	14 ( 33.33 % )	4 ( 80.0 % )
26 – 30	13 ( 30.95 % )	1 ( 20.0 % )
31 – 35	8 (19.04 % )	—
36 – 40	4 ( 9.52 % )	—
41 – 45	2 ( 4.76 % )	—

All are between 21 – 45 years of age group. 21 – 25 age group includes 14 (33.33 %) patients, 26 – 30 years of age group includes 13 (30.95 %) patients, 8 (19.04 %) , 4 (9.52 %) and 2 (4.76 %) patients were in age groups of 31– 35 , 36–40 and 41– 45 years respectively. Among 5 patients of crohns disease, four (80.0 %) patients fall in 21– 25 years of age group and one (20.0%) case belongs to 26 – 30 years of age group.

**TABLE-2:-CRPINULCERATIVECOLITISBEFORETREATMENT**

	UCDAI 2 - 10	UCDAI > 10
CRP < 12	19 (86.36 %)	3 (15.0 %)
CRP > 12	3 (13.63 %)	17 (85.0 %)

In 42 cases of ulcerative colitis , with UCDAI of 2 – 10 , 19 (86.36 %) patients are having CRP < 12 mg/l and 3 (13.63 %) cases have CRP > 12 mg/l .

Those with UCDAI of > 10, CRP < 12 mg/l seen in 3 (15.0%) and CRP > 12mg/l seen in 17 (85.0%). These results suggest that CRP levels correlate with disease activity (p value < 0.05).

**TABLE-3:-ESRINULCERATIVECOLITISBEFORETREATMENT**

	UCDAI 2 – 10	UCDAI > 10
ESR < 30 mm/hr	18 ( 81.81 % )	5 ( 25.0 % )
ESR > 30 mm/hr	4 ( 18.18 % )	15 ( 75.0 % )

In 42 cases of ulcerative colitis, with UCDAI of 2–10, 18 (81.81%) patients had ESR < 30mm/hr and 4 (18.18%) cases had ESR > 30 mm/hr. Those with UCDAI of > 10, ESR < 30mm/hr, seen in 5 (25.0%) and ESR > 30 mm/ hr seen in 15 (75.0%). These results suggest that ESR also correlates with disease activity.

**TABLE-4 :- ALBUMIN IN ULCERATIVE COLITIS BEFORE TREATMENT**

	UCDAI 2 – 10	UCDAI > 10
ALBUMIN < 3g/dl	3 (13.63 %)	4 (20.0 %)
ALBUMIN > 3g/dl	19 ( 86.36 %)	16 (80.0 %)

In 42 cases of ulcerative colitis, with UCDAI of 2 – 10, 3 (13.63%) patients had ALBUMIN < 3g/dl and 19 (86.36%) cases have ALBUMIN > 3 g/dl. Those with UCDAI of > 10, ALBUMIN < 3g/dl seen in 4 (20.0 %) and ALBUMIN > 3g/dl seen in 16 (80.0 %). ALBUMIN levels did not correlate well with the disease activity.

**TABLE-5:-CRPINULCERATIVECOLITASAFTERTREATMENT**

	UCDAI 2 – 10	UCDAI > 10
CRP < 12	20 (90.90 %)	17 (85.0 %)
CRP > 12	2 (9.10 %)	3 (15.0 %)

In 42 cases of ulcerative colitis, with UCDAI of 2 – 10, 20 (90.90 %) patients are having CRP < 12 mg/l and 2 (9.10 %) cases have CRP > 12 mg/l. Those with UCDAI of > 10, CRP < 12 mg/l seen in 17 (85.0 %) and CRP > 12mg/l seen in 3 (15.0 %). It suggests that CRP correlates well with monitoring the effect of treatment.

**TABLE-6:-ESRINULCERATIVECOLITASAFTERTREATMENT**

	UCDAI 2 – 10	UCDAI > 10
ESR < 30 mm/hr	19 ( 86.36 % )	5 ( 25.0 % )
ESR > 30 mm/hr	3 ( 13.63 % )	15 ( 75.0 % )

In ulcerative colitis, those with UCDAI of 2 – 10, 19 (86.36 %) patients had ESR < 30mm/hr and 3 (13.63 %) cases had ESR > 30 mm/hr. Those with UCDAI of > 10 , ESR < 30mm/hr, seen in 5 (25.0%) and ESR > 30 mm/ hr seen in 15 (75.0%). ESR does not correlate with monitoring of therapy.

**TABLE-7:-ALBUMININULCERATIVECOLITASAFTERTREATMENT**

	UCDAI 2 – 10	UCDAI > 10
ALBEMIN < 3g/dl	2 (9.10 %)	3 (15.0 %)
ALBUMIN > 3g/dl	20 ( 90.90 %)	17 (85.0 %)

In 42 cases of ulcerative colitis, with UCDAI of 2 – 10, 2 (9.10 %) patients had ALBUMIN < 3g/dl and 20 (90.90%), cases have ALBUMIN > 3 g/dl. Those with UCDAI of > 10, ALBUMIN < 3g/dl seen in 3 (15.0 %) and ALBUMIN > 3g/dl seen in 17 (85.0 %). ALBUMIN levels did not correlating well with the disease activity.

## DISCUSSION

In this study, cases of inflammatory bowel disease, who came to the outpatient departments of General Medicine as well as Gastroenterology and Emergency departments are included.

Among cases of ulcerative colitis, 22 (52.38 %) were males and 20 (47.61%) are females. All are between 21 – 45 years of age group. Out of them 14 (33.33%) patients fall in 21 – 25 and 13 (30.95 %) patients were between 26 – 30 years of age group. 8 (19.04 %) patients were in 31– 35 years , 4 (9.52 %) are in 36 – 40 years and 2 (4.76%) patients are 41– 45 years of age group.

Disease activity calculated by ulcerative colitis disease activity index (UCDAI) for ulcerative colitis and by Crohn's disease activity index (CDAI) for crohn's disease. UCADI of 2–10 score (with mild to moderate disease activity) seen in 22 (52.38%) cases and UCDAI of > 10 (severe disease activity) seen in 20 (47.61 %).

In 42 cases of ulcerative colitis, among those with UCDAI of 2 – 10, 3 (13.63 %) patients are having SERUM ALBUMIN < 3g/dl and 19 (86.36 %) cases have ALBUMIN > 3 g/dl. Those with UCDAI of > 10, ALBUMIN < 3g/dl seen in 4 (20.0%) patients and ALBUMIN > 3g/dl seen in 16 (80.0 %) patients. ALBUMIN levels are not correlating well with the disease activity<sup>10</sup>.

After treating the acute condition with intravenous glucocorticoids and/or infliximab according to the clinical condition, CRP, ESR, and ALBUMIN are sent to monitor effect of treatment.

In 42 cases of ulcerative colitis, among those with UCDAI of 2–10, 20 (90.90%) patients were having CRP < 12 mg/l and 2 (9.10%) cases had CRP > 12 mg/l. Those with UCDAI of > 10, CRP < 12 mg/l seen in 17 (85.0 %) and CRP > 12mg/l seen in 3 (15.0%). It suggests that CRP correlates well with monitoring the effect of treatment as described in *Aliment Pharmacol. 2007; 25(3):247-255.*<sup>11</sup>

In case of ESR, among cases of ulcerative colitis, those with UCDAI of 2-10, 19 (86.36%) patients were having ESR < 30mm/hr and 3 (13.63%) cases have ESR > 30 mm/hr. Those with UCDAI of > 10, ESR < 30mm/hr, seen in 5 (25.0%) and ESR > 30 mm/hr seen in 15 (75.0%). ESR does not correlate with monitoring of therapy. Because of its long half-life it takes more time to come to normal levels and also ESR increases with age<sup>12</sup>.

In 42 cases of ulcerative colitis, among those with UCDAI of 2–10, 2 (9.10%) patients were having ALBUMIN < 3g/dl and 20 (90.90%) cases had ALBUMIN > 3 g/dl. Those with UCDAI of > 10, ALBUMIN < 3g/dl seen in 3 (15.0%) patients and ALBUMIN > 3g/dl seen in 17 (85.0%) patients. ALBUMIN levels are not correlating well with the disease activity. It is in consistent with previous studies<sup>13</sup>.

## CONCLUSIONS

1. CRP and ESR are useful markers in monitoring the disease activity of ulcerative colitis.
2. CRP is a valuable marker in monitoring the effect of treatment in ulcerative colitis. But ESR is not an attractive laboratory tool in monitoring the treatment because it takes long time (15 DAYS) to come to base line, in contrast to CRP (19 hours).
3. Serum albumin is not considered to be a good marker in monitoring disease activity and in monitoring the effect of treatment.
4. In case of crohn's disease, cases studied are very less as with the incidence of the disease in india. But CRP levels are very high when compared to those in ulcerative colitis and correlating better with disease activity. Rest of the things cannot be predicted owing to the small sample size.

## REFERENCES

1. HARRISON'S principles of internal medicine 17th edition.
2. Mazlam MZ, Hodgson HJ. Peripheral blood monocyte cytokine production and acute phase response in inflammatory bowel disease. *Gut* 1992;33:773–8.
3. Fiocchi C: Inflammatory bowel disease: etiology and pathogenesis. *Gastroenterology* 115:182, 1998)
4. Veloso FT, Carvalho J, Magro F: Immune-related systemic manifestations of inflammatory bowel disease. A prospective study of 792 patients. *J Clin Gastroenterol* 23:29, 1996).
5. Danzi JT: Extraintestinal manifestations of idiopathic inflammatory bowel disease. *Arch Intern Med* 148:297, 1988)
6. Sleisenger and Fordtran's gastrointestinal and liver disease 8 th edition p.2459 – 2548
7. Shephard HA, Barr GD, Jewell DP: Use of an intravenous steroid regimen in the treatment of acute Crohn's disease. *J Clin Gastroenterol* 8:154, 1986
8. Feagan BG, Rochon J, Fedorak RN, et al: Methotrexate for the treatment of Crohn's disease. The North American Crohn's Study Group Investigators. *N Engl J Med* 332:292, 1995
9. Sachar DB, Luppescu NE, Bodian C, et al. Erythrocyte sedimentation as a measure of Crohn's disease activity: opposite trends in ileitis versus colitis. *J Clin Gastroenterol* 1990;12:643–6.
10. Laboratory markers in IBD: useful, magic, or unnecessary toys? *GUT* 2006;55:426–431.
11. Biological Activity Markers in Inflammatory Bowel Disease; D.Desai; W.A. Faubion; W.J. Sandborn ; *Aliment Pharmacol. 2007;25(3):247-255.*
12. Performance of blood tests in inflammatory bowel disease ; ADC. *BMJ* 2004;89:69-71.
13. Clinical Trials and Therapeutics Assessment of Disease Activity in Ulcerative Colitis and Crohn's Disease Humphrey J. F. Hodgson and Mansoor Bhatti; *Inflammatory Bowel Diseases* 1:117-134 0 1995 Crohn's & Colitis Foundation of America, Inc.