

## A STUDY ON C-REACTIVE PROTEIN (CRP) AND ERYTHROCYTE SEDIMENTATION RATE (ESR) IN AYURVEDA

<sup>1\*</sup>Dr. Srushti Hitesh Kumar Pandya and <sup>2</sup>Dr. Hemen Kalita

<sup>1</sup>PG Scholar, Department of Roga Nidan, Government Ayurvedic College and Hospital, Guwahati-14.

<sup>2</sup>Associate Professor, Department of Roga Nidan, Government Ayurvedic College and Hospital Guwahati-14.

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**\*Corresponding Author**

**Dr. Srushti Hitesh Kumar  
Pandya**

PG Scholar, Department of  
Roga Nidan, Government  
Ayurvedic College and  
Hospital, Guwahati-14.

### ABSTRACT

Biomarkers of inflammation are defined as an indicator of a certain physiological or pathophysiological condition inside the body. They are essential to know diagnosis and treatment plan. In routine practice we found many patients of acute inflammation came for Ayurvedic treatment having raised ESR and CRP. So it is essential to interpret ESR and CRP in Ayurveda to give an evidence based treatment. So the present study can provide valuable insights into relation between Ayurveda concepts and modern biomarkers of inflammation.

**KEYWORDS:** Inflammatory biomarker, ESR, CRP, Rasa dhatu, Rakta dhatu, Preenan karma, Jeevan karma, Agantujashoth.

### INTRODUCTION

Inflammation is defined as the local response of living mammalian tissues to injury from any agent.<sup>[1]</sup> Biomarkers of inflammation are

defined as an indicator of a certain physiological or pathophysiological condition inside the body. Biomarkers may also inform about prognosis and therapeutic effectiveness.<sup>[2]</sup> CRP and ESR is one of the important biomarkers to assess the inflammation.

Erythrocyte sedimentation rate (ESR) is an important routine examination test which measures the rate at which the red blood cells (RBCs), in a whole blood sample, fall to the bottom of the Westergren tube/ Wintrobe tube. It is a commonly performed hematology test that indicates and monitors an increase in inflammatory activity within the body.

A CRP test measures the amount of C-reactive protein in blood and can indicate whether one has acute inflammation in the body.

The pathophysiology of ESR and CRP is not directly mentioned in Ayurveda, but different signs and symptoms, dosha and dhatu vikriti can be assessed to study the same.

## MATERIAL AND METHOD

For the study a review on different Ayurvedic classics, modern textbooks, research articles, journals etc was done to find out the possible interpretation.

## REVIEW AND DISCUSSION

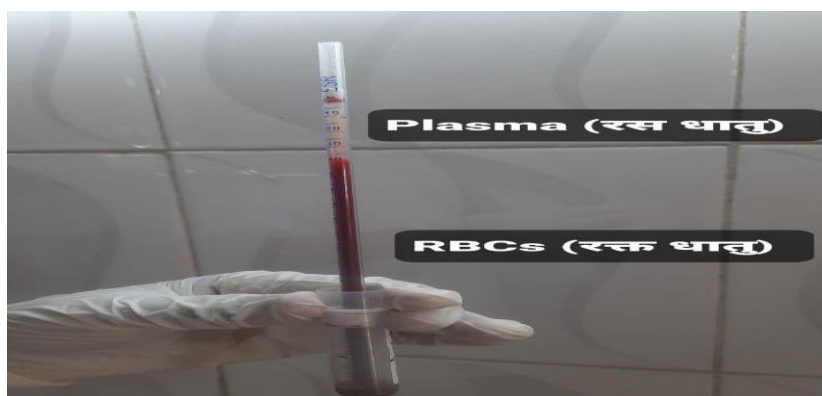
The erythrocyte sedimentation rate (ESR) is a commonly performed haematology test that indicates and monitors an increase in inflammatory activity within the body. The ESR test measures the rate at which the red blood cells (RBCs), in a whole blood sample, fall to the bottom of the Westergren tube/ Wintrobe tube.

In an ESR column, the plasma which includes fibrinogen, plasma proteins etc can be correlated with rasa dhatu in Ayurveda as plasma protein nourishes the tissues, similarly rasa dhatu have prenanam karma (nourishment of tissue).<sup>[3]</sup> On the other hand the sedimented RBCs seen in ESR column can be correlated with rakta dhatu. As RBCs carry oxygen to the tissue so it can be correlated with Rakta dhatu which have jeevanam karma.<sup>[3]</sup> (Figure-1)

As per Ayurveda due to mandaagni aam<sup>[4]</sup> is produced and it can come in contact with any dhatu like rasa dhatu. Whenever there is aam there will be presence of kapha dosha. Now both aam.<sup>[5]</sup> and kapha<sup>[6]</sup> are guru in nature. Thus due to aam and kapha, the guruta of rasa dhatu increases.

According to modern, when concentration of fibrinogen, alpha and beta globulin increases, ESR will be increased and vice- versa.<sup>[7]</sup>

So guruta of rasa dhatu (plasma) can be interpreted with rise of ESR. Thus when ESR increases agnivardhak, kapha and aam chikitsa may be helpful.



**Figure 1: Shows Rasa dhatu (plasma) as top portion of westergren tube and Rakta dhatu (RBCs) as sedimented part of it.**

CRP is an acute phase reactant protein that increases during inflammation. A CRP test measures the amount of C reactive protein in blood and can indicate whether one has acute inflammation in the body. Five cardinal signs of inflammation includes rubor, calor, dolor, tumor and function laesa, these symptoms can be seen in shotha vyadhi as Spashtaruka (dolor, pain).<sup>[8]</sup> Brushamouhma (calor, heat), Lohitabhasa (rubor, redness), shotha (tumor, swelling).<sup>[9]</sup> etc. (Figure-2)

Again in Ayurveda some symptoms of acute inflammation like callor (Brushamouhma), rubor (Lohitabhasa) are closely related to Agantuja Shoth.<sup>[9]</sup> This is a condition where there is aggravation of Tridosha and rakta dhatu.<sup>[10]</sup>

So increase in CRP may be interpreted as an aggravated condition of Tridosha and rakta dhatu. Thus in such cases where CRP is high Shothhara mahakashaya drugs may be helpful.<sup>[11]</sup>



**Figure 2: Five cardinal signs of inflammation which can be correlated with lakshans present in shotha.**

## CONCLUSION

From the study it can be concluded that ESR can be interpreted as guruta of rasa dhatu. Thus when ESR increases agnivardhak, kapha and aam chikitsa may be given. Whereas CRP can be interpreted as the aggravated condition of tridosha and rakta dhatu. Thus in such cases where CRP is high Shothhara mahakashaya drugs may be helpful.

Further research on this topic is crucial to develop a comprehensive protocol.

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