

# C-Reactive Protein in the Detection of Inflammation and It's Role in Coronary Artery Disease

L.D. Hein, R.D. Muma

*Department of Physician Assistant, Wichita State University, Wichita, Kansas 67260, U.S.A.*

## 1. Introduction

Heart failure is becoming more common and increasing annually with coronary artery disease (CAD) being the number one cause [1]. Current research is focused on detecting more risk factors and markers for heart disease in order to develop interventions preventing its progression. C-Reactive Protein (CRP), the most widely studied inflammatory protein, plays a role in the atherosclerotic process of vessels, which subsequently can lead to infarct [2]. However, the exact role of CRP in the acute coronary situations is not completely understood.

## 2. Experiments and Results

The purpose of this study was to perform a systematic evidence-based literature review from peer-reviewed articles published in accredited journals that addressed the issue of CAD and CRP. The literature review was performed using the search engine of peer-reviewed articles obtained from Medline, utilizing certain, specific key terms, including C-reactive protein, coronary artery disease, inflammation, atherosclerosis, vessel injury, marker, history, and underlying cause. Articles were selected based on their content associated with CRP and CAD; other articles used contained a variety of inflammatory markers and acute heart diseases in order to provide evidence that inflammatory markers are used to detect a variety of heart conditions such as stable and unstable angina. Articles were categorized into levels of evidence and separated into categories to answer the two main research questions: Is CRP a better marker for detection of inflammation? Is the presence of CRP associated with CAD?

Forty-eight articles matched the desired criteria and were reviewed using evidence-based methods. All forty-eight articles determined that CRP was a superior marker in the detection of inflammation. Twenty-four articles correlated CRP with CAD along with other mediated factors of vessel disease, with most being level-one evidence [Figure.1].

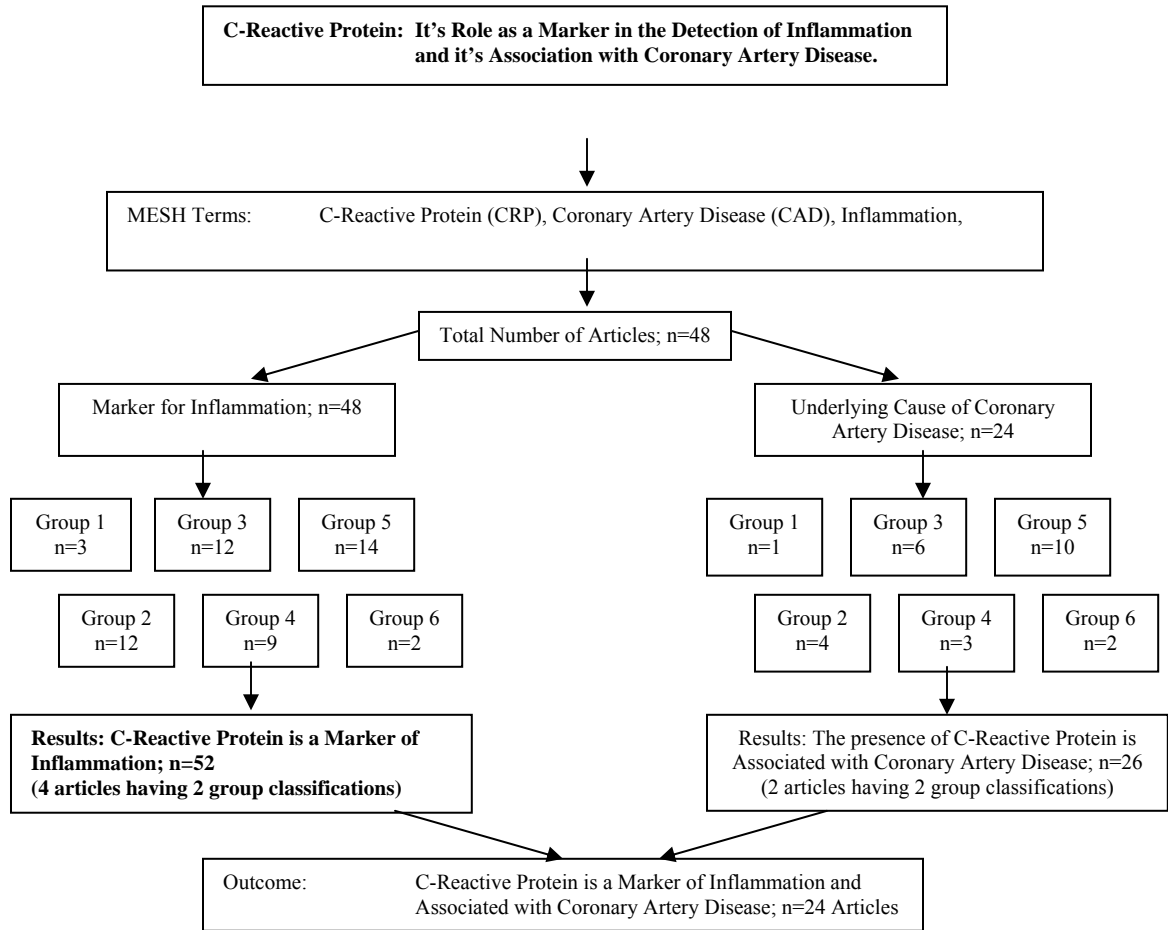
## 3. Discussion, Significance, and Conclusions

Due to the relevance of CRP in acute coronary situations, it has been demonstrated on many occasions where CRP is elevated in other acute situations, such as hypercholesterolemia [2], muscle injury [3], infection [4], myocardial infarction (MI) [5], hypertension [6], and diabetes [7]. It is apparent that CRP plays a role in acute coronary syndrome, yet its specificity is not significant like troponin I, which is specific for MI. Therefore, CRP is a superior marker of inflammation and plays an important role in the development of CAD [8]. However, its role in the development of CAD is currently still under investigation.

- [1] Tendera M. The epidemiology of heart failure. *Journal of the Renin Angiotensin Aldosterone System*. 2004 Sep; 5 Supplement 1:S2-6.
- [2] Ridker P, Rifai N, Rose L. Comparison of c-reactive protein and low-density lipoprotein cholesterol levels in the prediction of first cardiovascular events. *The New England Journal of Medicine*. 2002 Nov; 347(20):1557-1565.
- [3] Lindahl B, Toss H, Siegbahn A. Markers of myocardial damage and inflammation in relation to long-term mortality in unstable coronary artery disease. *The New England Journal of Medicine*. 2000 Oct; 343(16):1139-1147.
- [4] Fine A. Relevance of c-reactive protein levels in peritoneal dialysis patients. *Kidney International*. 2002; 61:615-620.
- [5] Ridker P, Rifai N, Rose L. Comparison of c-reactive protein and low-density lipoprotein cholesterol levels in the prediction of first cardiovascular events. *The New England Journal of Medicine*. 2002 Nov; 347(20):1557-1565.
- [6] Choi H, Cho D, Shin H. Association of high-sensitivity c-reactive protein with coronary heart disease prediction, but not with carotid atherosclerosis, in patients with hypertension. *Circulation Journal*. 2004 Apr; 68:297-303.
- [7] Leu H, Lin C, Lin W. Risk stratification and prognostic implication of plasma biomarkers in nondiabetic patients with stable coronary artery disease: the role of high-sensitivity c-reactive protein. *CHEST* 126:1032-1039.
- [8] Libby P. Inflammatory markers are useful risk assessment too *merican Journal of Managed Care*. 2003 Aug;6-7.

[Figure. 1]:

Research Diagram



KEY:

Group Classifications

- Group 1: random, control
- Group 2: retrospective/prospective cohort
- Group 3: case control
- Group 4: cross sectional
- Group 5: background information
- Group 6: not specified in article