

High Sensitivity C-reactive Protein as a Predictor of Severity, Rehospitalization and Prognosis in Heart Failure

Thesis
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بروتين سى التفاعلى ذو الحساسية العالية كوسيلة للتنبؤ بخطورة المرض وإعادة الحجز بالمستشفى والتقدم المرضى فى مرضى فشل عضلة القلب

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List of Abbreviations

AHA	American Heart Association
AVP	Arginine vasopressin
ANP	Atrial natruretic peptide
ATP	Adenosine triphosphate
ATPase	Adenosine triphosphatase
ACS	Acute coronary syndrome
ACC	American Colleague of Cardiology
AMP	Adenosine monophosphate
ACEIs	Angiotensin converting enzyme inhibitors
ARBs	Angiotensin receptor blockers
Bark \	Beta adrenergic kinase \
BNP	Brain natruretic peptide
CRT	Cardiac resynchronization therapy
cAMP	Cyclic adenosine monophosphate
cGMP	Cyclic guanisine monophosphate
CNP	C-type natruretic peptide
CABG	Coronary artery by-pass graft .
CRP	C-reactive protein
CONSENSUS	Cooperative North Scandinavian Enalapril Survival Study
CHARM	Candesartan in Heart Failure- Assessment of Reduction in Mortality and Morbidity
COPERNIUS	Carvedilol Prospective Randomized Cumulative Survival
CAPRICON	Carvedilol Post-Infarct Survival Control in Left Ventricular Dysfunction
CIBIS	Cardiac Insufficiency Bisoprolol Study
DM	Diabetes mellitus
DIG	Digoxin Investigator Group
ECG	Electrocardiography
ELISA	Enzyme linked immunosorbent assay
ELITE-II	Losartan Heart Failure Survival Study-II
ET	Endothelin
ECM	Extracellular matrix
EF%	Ejection fraction%
GIIb/IIIa	Glycoprotein IIb/IIIa
HF	Heart failure

H+	Hydrogen ion
HTN	Hypertention
Hs-CRP	High sensitive C-reactive protein
IL-γ	Interleukin – γ.
IL-δ	Interleukin – δ.
IL-IB	Interleakin-IB
IL-$\gamma\gamma$	Interleukin-$\gamma\gamma$
IgG	Immunoglobulin G
IVST	Interventricular septal wall thickness.
ICDS	Implantable cardioverter defibrillator
IABP	Intra aortic ballon pump
K+	Potassium ion
LV	Left ventricle
LVDD	Left Ventricular diastolic diameter
LVPWT	Left ventricular posterior wall thickness
LVSD	Left Ventricular systolic diameter .
LILA	Liposome immunolysis assay
LAT	Latex agglutination test
LN	Laser nephlemetry
MI	Myocardial infarction
MR	Mitral regurgitation
NYHA	New York Heart Association
NPR-A	Natruetic peptideA-receptor
NPR-B	Natruetic peptide B- receptor
NE	Norepinephrine
Nacl+	Sodium chloride ion
Na+	Sodium ion
PKA	Protein kinase A
PCI	Percutaneos coronary intervention
PROVED	Prospective Randomized Study of Ventricular Function and Efficacy of Digoxin
RAS	Renin angiotensin system
RIA	Radial immunodiffusion assay
RIE	Rocket immuno-electrophoresis
RADIANCE	Randomized Assessment of Digoxin and Inhibitors of Angiotensin-Converting Enzyme
SWMA	Segmental wall motion abnormality

 *List of Abbreviations*

SAVE	Survival and Ventricular Enlargment
SOLVD	Studies of Left Ventricular Dysfunction
TNF	Tumour necrosis factor
TRACE	Trandolapril Cardiac Evaluation
VAD	Ventricular assist devices
Val-HeFT	Valsartan Heart Failure Trial
VALIANT	Valsartan in Acute Myocardial Infarction Trial
V-HeFT-II	Vasodilator in Heart Failure II
6MWD	6 minute walk distance

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Introduction

C-reactive protein (CRP) is a pentameric protein (pentaraxin) comprised of five identical units (**Osmand et al., 1997**).

In humans, the gene for CRP subunits is encoded in chromosome-1. A similar protein has been identified in virtually all mammals and in fish and chickens (**Volanakis et al., 1990**), indicating great evolutionary conservation (**Whitehead et al., 1983**).

Several functions have been attributed to C-reactive protein: CRP is capable of binding various biological substrates (**Ballou and Kushner, 1992**); it participates in the activation of the complement system and modulates the function of phagocytic leukocytes. CRP is also located at sites of inflammation (**Kushner and Kaplan, 1961**); it enhances macrophage action on tumours (**Zanedi and Mortensen, 1986**); it is implicated in the synthesis of interleukine-1 and tumour necrosis factor (**Barna et al., 1989; Vetter et al., 1983**) and is capable of binding and blocking platelet activating factor. CRP is mainly produced in the liver in response to interleukine-6.

Recently, evidence suggesting a process of low grade systemic inflammation has been implicated in atherosclerotic disease (**Chen et al., 1999**). Heart failure is one of the main consequences of atherosclerosis, and is a frequent cause of hospital admission (**Senni et al., 1999**) and mortality, despite recent developments in therapy (**Pitt et al., 1999**).

Elevated levels of CRP have been observed in patients with heart failure (**Wordan**, 1998), and activation of the immune response may play a role in heart failure through modifications in the renin-angiotensin-aldosterone and sympathetic systems (**MacGowan et al.**, 1999). We studied the role of CRP in patients admitted due to heart failure, with a follow-up of 6 months.

Aim of the work

١. To determine the correlation between high sensitivity C-reactive protein and severity of heart failure (according to NYHA class and signs of heart failure).
٢. To determine the usefulness of high sensitivity C-reactive protein in predicting the prognosis and the need for readmission in patients with heart failure as detected by ٦ months follow-up.