

Correlation of hsCRP with Edmonton's Obesity Staging System: A Cross Sectional Study

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Abstract

Background: Obesity comes with a huge number of co-morbidities such as type 2 diabetes mellitus (T2DM) and cardiovascular diseases. The most usually used factor for segregating different degree of adiposity is Body Mass Index (BMI) and Waist Circumference (WC). Despite being a convenient and commonly used method it doesn't show the occurrence of essential obesity-related co-morbidity & deplete quality of life. Hence, Edmonton's Obesity Staging System has been proposed which incorporates such co-morbidities and functional status of individual. Serum levels of high-sensitivity CRP (hs-CRP) can be calculated using highly sensitive assays and has ability to detect augmented inflammation in vasculature. Thus, chronic systemic inflammation linked to the metabolic syndromes. The Study aims to correlate such factors.

Aims: To estimate hsCRP levels in obese population.

Material and Method: After thorough anthropometric and biochemical evaluation obese individuals will be classified accordingly into Edmonton's obesity staging system and their hs-CRP will be evaluated and then correlation between two will be done.

Result: A linear correlation between hs-CRP and Edmonton's Obesity Staging System is expected.

Conclusion: With the help of correlation between hs-CRP and EOSS co-morbidities of obese individuals can be tracked efficiently.

Keywords: Obesity, hs-CRP, Edmonton's, Co-morbidity.

Introduction

There has been a dramatic increase in occurrence of overweight and obese, which is of a major concern to most of the countries.^[1] Obesity comes with a large number of cardiac and other systemic co-morbidities. Communal prejudice against fatness has grave impact for psychosocial health.^[2]

The most frequently used restriction for segregating various degree of adiposity is Body Mass Index (BMI).^[3] WHO has proposed race specific cut off values for Asians^[4-8]. According to revised guidelines overweight is BMI of 23.0–24^[9] and obesity BMI \geq 25.^[10] According to WHO cutoff points for waist circumference: 90 cm for men and 80 cm for women.^[11]

A new clinical staging system; Edmonton Obesity Staging System (EOSS), describes obese phenotype on a 5-point ordinal scale in order to determine obesity treatment.^[12] Therefore, it has been proved to be an improved tool in predicting morbidity and mortality than BMI.^[13] It consist of 5 stages from 0-4.^[14]

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Studies through various modes have now shown

a state of low-grade chronic inflammation in obese individuals, making them vulnerable for various co-morbidities, which is visible through various inflammatory markers in serum.^[15] C-reactive protein (CRP) is a typical acute-phase protein that is formed in the liver under the incentive of cytokines such as tumor necrosis factor, interleukin-1, 2, 4, 6 & 7. One of the most important study conducted to assess Cardiovascular risk in middle aged individual males at high risk with help of hs- C reactive protein was the **Multiple risk factor Interventional trial (MRFIT)**^[16-23]. A major study involving 17,800 individuals (ages ranging from middle age – elderly age) who are at low to intermediate risk, the trial was known as the **JUPITER randomized trial**, suggested that to estimate the benefit of statin therapy is best to utilize hs-CRP as an indicator marker. ^[24]The present study aims to find association between hsCRP and Edmonton's staging.

Aim:

To estimate hsCRP levels in obese population.

Objective:

1. To classify obese according to Edmonton's Obesity Staging System (EOSS).
2. To correlate hsCRP with Edmonton's Obesity Staging System (EOSS).

Method and Material

Study design:

Cross sectional study

Selection of Cases: All cases will be randomly selected from the university students, staff, workers, subjects attending the health camps, patients attending OPD and inpatients of medicine having minor illnesses.

Informed consent will be taken: History of Diabetes mellitus, systemic hypertension, anxiety and depression will be taken. Detailed drug history will be obtained. Detailed physical examination and anthropometric measurement in form of BMI, Waist circumference will be calculated. Biochemistry analysis including fasting Blood sugar (FBS), serum triglyceride (TG), high density lipoprotein (HDL) and HSCRIP will be done after fasting for 10-12 hours.

Classification in Edmonton's Obesity Staging System: Based on factors such as FBS, LDL Cholesterol,

HDL cholesterol and Total cholesterol, triglycerides, history of liver disease, kidney disease, osteoarthritis and physical health, subjects will be classified as mentioned in the table, the score of the higher side will be considered in case an individual presented with multiple co-morbidities.^[25-32]

Inclusion Criteria:

All people falling into criteria of:

- Metabolic syndrome
- BMI >23
- Age group 18-70 years

Exclusion Criteria:

- BMI within normal range
- Subjects with no indicators of metabolic syndrome
- Major infections/sepsis/critically ill
- Rheumatologic and Collagen vascular disorders
- Women on oral contraceptive pills
- Persons with hs-CRP levels more than 10 mg/L (presuming occult infections)
- Subjects not willing to consent

Procedures: Anthropometric measures including weight, height, BMI, waist circumference (WC) will be measured by standard method.

- i. Weight will be estimated according to protocol. ^[33]
- ii. Height will be measured according to protocol. ^[33]
- iii. Body mass index will be calculated according to Quetelet formula [Weight (in Kgs)/Height (in m²)]
- iv. Waist circumference (in cms) will be estimated. ^[33]
- v. Blood pressures (BP): The WHO protocol will be used. ^[34]

Estimation of Glucose in Plasma: Fasting plasma glucose will be estimated by the GOD/POD method by the machine Robonic Semi Automatic Chemical Analyzer.

Estimation of Serum Lipids: PAP method by machine Robonic Semi Automatic Chemical Analyzer

Direct Enzymatic Method will estimate serum HDL.

Method of measuring hs-CRP: A solid phase ultra-sensitive EIA will be used.

Expected Results: Through this study we expect linear correlation bet hsCRP and Edmonton's obesity staging system. Implying a raised hs-CRP for patients with higher EOSS.

Discussion

Ju-Yeon Yu et al, in their study related hsCRP to visceral obesity and cardio-metabolic diseases.^[35]

In study by Gregory Pavela et al, hs CRP was increased in Obesity.

There was conclusion of Edmonton's obesity staging system being better than BMI for the health service use and polypharmacy, in study done by Evan Atlantis et al.

Jennifer L Kuk, et al. and Raj S Padwal et al. in their study stated that EOSS provides clinicians a powerful tool for detecting obese phenotypes at the risk of mortality.

Moreover Soinja Chiappetta, et al. in their study proposed that patients with EOSS more than 3 shows increased complication post operatively and high mortality rate.

Ethical Clearance: Taken from institutional ethics committee.

Source of Funding: Self.

Conflict of Interest: Nil.

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