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Analysis of Interleukin-6 in Cardiac and Non-Cardiac Post-Menopausal Women

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Abstract

Background: The primary cause of cardiovascular illnesses, atherosclerosis, is largely caused by the interleukin-6 (IL-6) pathway. Our goal was to evaluate the prognostic power of inflammatory biomarkers for long-term cardiovascular death in patients having percutaneous coronary intervention (PCI) who have acute coronary syndrome (ACS) with post menopause .

Methods: This paper focuses on analyzing the importance of biochemical parameters in post-menopausal heart disease including Interleukin -6 and their implications in the evolution of the disease by using standard procedure of selected biochemical parameters.

Results: The present study showed that the value of Interlukin-6 was significantly high in post-menopausal heart disease patient compare to normal patients.

Conclusions: Our study also shows that post-menopausal heart disease patient patient have a high risk of critical condition, heart attack and developing sever disease and also show poor prognosis compared normal patent.

Keywords: IL-6, MT, PMHD

Introduction

For women, cardiovascular disease (CVD) is the main cause of death. [1]. Based on statistics from the Women's Heart Alliance survey conducted in 2017 with 1011 US women aged 25 to 60, and the American Heart Association's 2012 survey on female awareness, knowledge, and perceptions on CVD. [2], only 56% of women are aware of this fact. [3].

CVD and Menopause:

Men are more likely to get coronary heart disease (CHD) than women, and women are more likely to acquire CHD throughout midlife, which is also the time when menopause transitions (MT). The suggestion that the MT adds to the rise in this risk was prompted by this observation. [4].

Longitudinal studies of women going through menopause over the past 20 years have made significant contributions to our understanding of the connection between the MT and CVD risk. Along with negative changes in body fat distribution, lipids, and lipoproteins, these studies have also shown clear patterns of altered endogenous sex hormones and structural and functional indicators of vascular health across the MT. [5] The published results highlight the MT as a period of rapidly increasing CVD risk, which highlights the relevance of midlife monitoring and possible intervention.

Epidemiology of Menopause

Menopause marks the end of ovarian function permanently and the shift in women's life cycles from

one of reproduction to nonreproduction. It denotes a crucial phase marked by striking adjustments to menstrual and hormonal rhythms, along with physical and psychological problems.

Natural menopause is defined as the occurrence of amenorrhea for 12 consecutive months, independent of external factors. A 2018 study that combined data from 17 cross-sectional and observational studies with 234 811 postmenopausal women from 7 different countries revealed that the median age of natural menopause was 50.0 years (interquartile range: 48.0–53.0 years).[6]. When a woman experiences her natural menopause, it is deemed premature if it happens before the age of 40 and early if it happens between the ages of 40 and 45.9. 10% of women go through menopause before the age of 45 (1.9% before the age of 40 and 7.3% between the ages of 40 and 45).[6]. Given that a US woman's mean life expectancy at birth is 81 years, many of these women will spend as much as 40 percent of their lives as postmenopausal. [7,8]

It is thought that the proper amount of endogenous estrogen released throughout the menstrual cycle has a cardioprotective impact on premenopausal women. This may be the cause of fertile women's lower incidence of coronary heart disease than that of males [9]. But as a person reaches menopause, their ovaries stop producing a considerable quantity of estrogen, making them more vulnerable to conditions like osteoporosis, dyslipidemia, and heart disease that are linked to low estrogen levels [10, 11]. Following menopause, there are major hormonal changes that impact plasma lipid and lipoprotein metabolism, ultimately leading to cardiac-related diseases. These changes include reduced plasma estrogen levels and higher levels of luteinizing hormone (LH) and follicle stimulating hormone (FSH) [12, 13].

By preserving low levels of TAG and LDL-C and high levels of HDL-C, estrogen has a cardioprotective impact. Increased expression of LDL receptors on cell surfaces and an accelerated conversion of hepatic cholesterol to bile acids are likely the causes of the mass clearance of LDL-C from the plasma. HDL-C is made more abundant when apolipoprotein A-I is produced more and hepatic lipase activity is reduced [14].

Such cardio defensive effect is lost after menopause driving postmenopausal women towards high risk of debilitating and often fatal complications of cardiovascular disease (CVD) [15].

According to American Heart Association report (2002), after menopause 70% of women develop cardiovascular disease and 30% develop osteoporosis in USA [11].

Materials And Methods

A study was conducted in Pacific Institute of Medical Sciences, Rajasthan, from March 2019 to December 2021 on Post Menopause with cardiovascular disease patient. The source population was all cases of cardiovascular disease admitted at PIMS with a confirmed diagnosis of cardiac disease reported by central laboratory and cardiology department.

A total number of 100 patients admitted at Pacific Institute of Medical Sciences Udaipur, was form the subjects of the present study. Out of these 50 patients were suffering from heart disease, and 50 were normal patients. Efforts will be made to match all anthropometric factors comparable to both the groups of patients.

Group 1: Confirm post-menopausal 50-70 years' healthy women patients.

Group 2: Confirm post-menopausal women with coronary heart disease age 50-70 years.

Inclusion Criteria

1. Patient who are willing to participate.
2. Post-menopausal women with coronary heart disease diagnosed by cardiology department.

Exclusion Criteria: -

1. Patients below 50 years and above 70 years of age will be excluded in the study.
2. The individuals with metabolic diseases, malnutrition, or histories of consuming vitamins or minerals supplements, regular steroids will be excluded from the study.
3. Diagnosed cancer patients will be excluded.
4. Individuals with Diabetes mellitus, liver diseases, kidney disease, rheumatoid arthritis, patients will be excluded.
5. To minimize the effect of life style on lipid profile trained athletes or sports women will be excluded from the study.

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6. Post-menopausal women with thyroid dysfunction and those who are taking antihypertensive drug will be excluded

Clinical Methodology: Serum Interlukin -6 was recorded by using Autoanalyzer Maglumi 2000 plus

Statistical Analysis: For the quantitative analysis, we used the software SPSS software. In this meta-analysis, all p values reported were two-tailed with the statistical significance set at ⩽ 0.05.

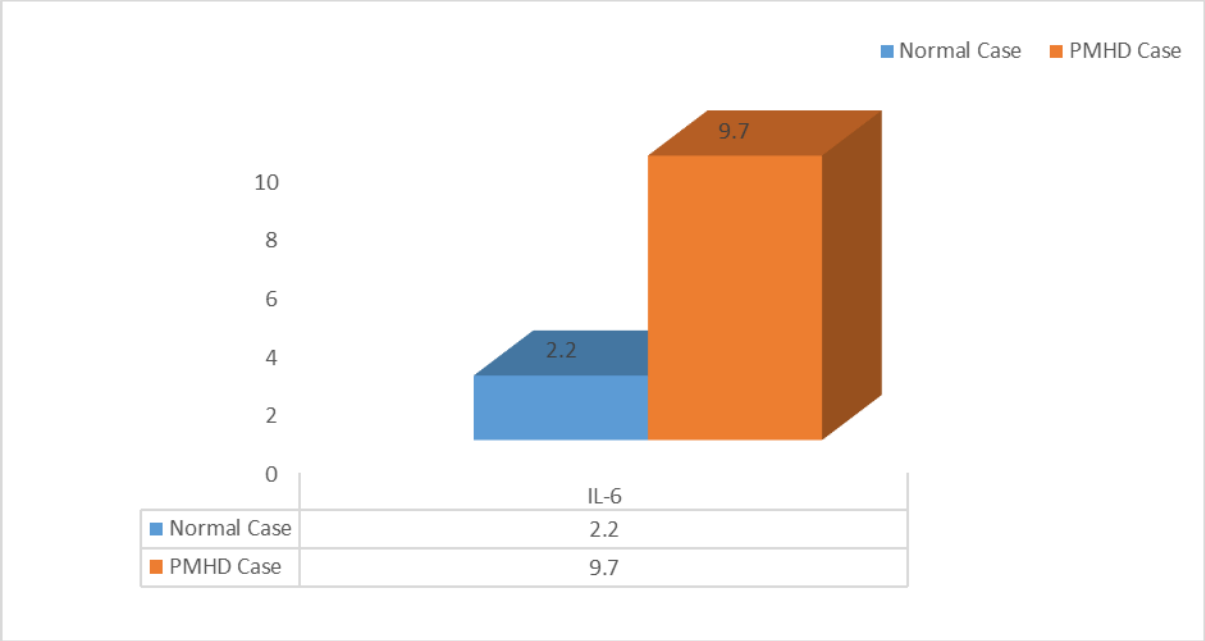
Result

The present study showed that the mean value and standard deviation of Interleukin -6 (9.7±6.2) was significantly high in post menopause cardiac women with P value (< 0.0001) compare to normal women with post menopause (2.2± 0.74). (Showed in Table .1 and Figure.1).

Table 1: Comparison of Interleukin -6 between Normal Patient and post-menopausal heart disease patients

S.No	Test	Normal Patient		Pmhd Cases		P Value
		Mean	SD	Mean	SD	
1	IL-6	2.20	0.74	9.7	6.2	P < 0.0001

Fig 1: Comparison of Interleukin -6 between Normal Patient and post-menopausal heart disease patients



Discussion

The present study showed that the mean value and standard deviation of Interleukin -6 (9.7±6.2) was significantly high in post menopause cardiac women with P value (< 0.0001) compare to normal women with post menopause (2.2± 0.74).

And this study also showed that the post-menopausal women had an increased hazard to die from heart attack after menopause.

Numerous studies have previously documented the connection between elevated blood IL-6 and postmenopausal cardiovascular diseases (CVD) [16,17,18–20]. For example, prior studies have demonstrated that individuals with IL-6

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concentrations more than 1 pg/mL had higher incidences of CAD than patients with lower IL-6 values [21]. The link between elevated concentrations of IL-6 and an increased risk of cardiovascular death throughout a mean follow-up duration of 7 years in persons without documented CVD at study entrance was again underlined by a recent meta-analysis synthesizing 11 studies [22].

Moreover, there is a correlation between increased IL-6 and CVD and higher rates of both cardiovascular and all-cause mortality [23]. In an aged population, the MEMO study evaluated several cytokines (IL-1beta, IL-4sR, IL-6, IL-8, IL-10, IL-12, TNF-alpha), and it showed that only IL-6 was consistently linked to death, regardless of the tertile (lower, middle, and upper) and correction. Notably, these results were restricted to men [24].

The Women's Health and Aging Study, however, also provided evidence in favor of the relationships between IL-6 levels and mortality in older, handicapped women with common CVD [25]. Increased IL-6 levels were found to be strongly correlated with the occurrence of adverse events (such as MACE, cardiovascular and all-cause mortality, and cancer mortality) in patients with stable coronary heart disease, according to data from the STABILITY trial [26]. A comparable set of findings was observed in a another study, which reported that individuals with stable angina who had IL-6 concentrations ≥3.67 pg/mL were three times more likely to suffer cardiovascular events over a mean follow-up period of 6.3 years [27].

Conclusion

The present study done on Normal patient and post menopause heart disease patient admitted in Pacific Institute of Medical Sciences, Umarda, Udaipur. Total 100 patients were included for this study .50 was normal patient and 50 was post menopause heart disease patient. 50-70 age group was taken for this study. Present study showed that the mean value and standard deviation of Interleukin -6 (9.7±6.2) was significantly high in post menopause cardiac women with P value (< 0.0001) compare to normal women with post menopause (2.2± 0.74).

And this study also showed that the post-menopausal women had an increased hazard to die from heart attack after menopause.

Ethical Issues

Research project approved by the ethics committee of Pacific Institute of Medical Sciences, Umarda Udaipur- 313005, Rajasthan, INDIA**.**

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