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CARDIOMAG NEWSLETTER

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IN THIS ISSUE

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you "Cardio Mag" which contains latest and interesting news in the field of Cardiology

Evaluate the Moderate-Intensity Continuous Training Versus Moderate-Intensity Interval Training Effect on cardiovascular Risk Factors in Obese patients

Introduction: Worldwide, a total of 1.9 billion adults are estimated to be overweight and 609 million adults are obese, represents around 39% of the world's population. Individuals with a genetic predisposition and sedentary lifestyle present an advanced risk of developing cardiovascular diseases, including arteriosclerosis, arterial hypertension, stroke, and heart attack, as well as metabolic diseases, such as metabolic syndrome and type 2 diabetes, and pulmonary diseases. Physical exercise and caloric restriction are important factors for the treatment of overweight and obesity[1]. Usually, physical activity guidelines have focused on moderate-intensity continuous training (MICT), and more recently have involved resistance training. Since the 2008 Physical Activity Guidelines Advisory Committee (PAGAC) Scientific Report there has arisen interest in use of interval training[2]. The objective of this study was to evaluate and compare the effect of caloric restriction (1300–1400 kcal) plus a moderate-intensity Interval training (MIIT) or MICT program on Cardiometabolic risk factors after 12 weeks.

Method: The MICT and MIIT groups trained for 4 sessions a week for 12 weeks while performing the diet. The MICT group trained for 32 minutes per session in a cycloergometer, initially at 60% highest oxygen uptake during the first month and increasing by 10% every 4 weeks. The MIIT group performed 4 - 4 intervals at 60% highest oxygen uptake and active rest at 60% highest oxygen uptake minus 20 Weeks, with a 10% increase every 4 weeks. The study lasted 30 months, and the interventions lasted for a period of 12 weeks. All participants were evaluated under the same environments. The assessment was carried out at 4 points in time: before the intervention, at 4 weeks, at 8 weeks, and upon completion of the intervention.

Results: A total of 159 obese adults participated in this study. Study results show that BMI decreased in the intervention groups compared with the control group (CG) at 8 weeks with no significant differences between the MICT and MIIT groups as shown in figure:1. A significant decrease in systolic arterial pressure was observed in both groups as early as week 4 which was more marked in MICT. At 8 weeks, no differences were observed in systolic arterial pressure between the MICT and MIIT groups, and this was considerably lower than the CG continuing to decrease at 12 weeks. The triglycerides levels decreased in the MICT group compared with the other 2 groups at 8 weeks and 12 weeks. Fasting glycaemia decreased at 8 weeks in the MICT group compared with the CG and MIIT group. At 12 weeks, both the MICT and MIIT groups' fasting glycaemia were significantly lower than that of the CG.

The control group did not present any significant changes during the study. The MICT and MIIT group significantly improved in all the variables ($P < .05$) except for high-density lipoproteins. The MIIT group lost weight in a smaller amount of time than the MICT group

Discussion: The 2 intervention groups decreased systolic arterial pressure, specifically MICT decreased by 14.07 ± 4.59 mm Hg and MIIT decreased by 14.90 ± 3.6 mm Hg, with no significant changes among them. Although MICT improved in less time at 4 weeks compared with 8 weeks observed in MIIT, the results were similar at the end of the study and same results were observed in other studies[3].

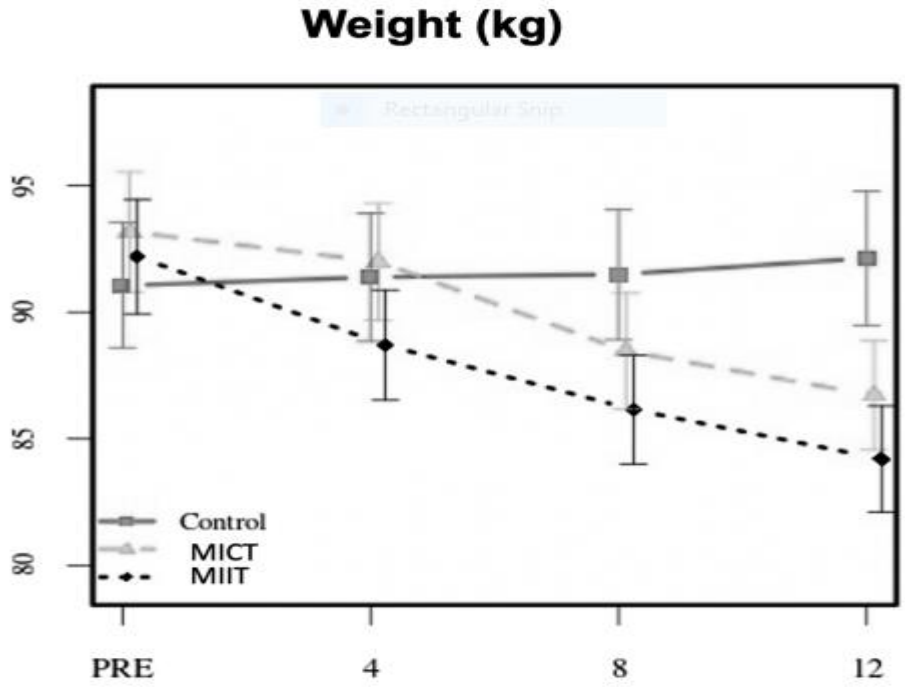

Figure 1 Evolution of weight loss during the 12-week

Conclusion: Study concludes that Overweight and obese adults of both the MICT and MIIT groups reduced their risk for cardiovascular disease, though the MIIT group lost weight in a shorter amount of time.

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Evaluate The Association Between Retirement and Cardiovascular Disease: A Longitudinal Study

Introduction:

Worldwide, population aging has led to reduction ratios of workers to pensioners and people are now spending longer in retirement. Cardiovascular disease (CVD) ranks as the leading cause of mortality worldwide, killing 16.5 million people aged 55, some literatures have explored the association between retirement and CVD but these findings are not consistent[1]. The potential health effects of retirement are largely neglected and studies found that retirees had a higher risk of being diagnosed with CVD than working people. Retirement may influence the development of CVD through behavioural pathways, such as changes in smoking, alcohol consumption, physical activity, and diet. The aim of this study is to investigate the association of retirement with CVD and various risk factors.

Method: Data comprised 396 904 observations from 106 927 unique individuals aged 50–70 years, with a mean follow-up period of 6.7 years. Fixed-effects instrumental variable regressions were performed using the State Pension Age (SPA) as an instrument. The outcomes comprised the occurrence of heart disease and stroke. A total of six CVD risk factors, namely hypertension, diabetes, obesity, physical inactivity, smoking and binge drinking were evaluated. Retirement status was analysed based on the harmonized variable of self-reported labour force status

Results:

A total of 106,927 individuals were followed up for a mean period of 6.7 year and the descriptive statistics by labour force status for 396 904 observations from 106 927 individuals, which consisted of 217 166 (54.7%) with working status and 179 738 (45.3%) with retired status. As shown in figure 2, subgroup analyses, some heterogeneous associations of retirement with CVD and risk factors was established. People who retired over 5 years ago exhibited larger reductions in heart disease risks and physical inactivity, whereas those who retired within 5 years presented a clearer reduction in stroke, compared with their equivalent.

Study found 2.2%-point decrease in the risk of heart disease and a 3.0%-point decrease in physical inactivity among retirees, compared with workers. In both sexes, retirement was associated with a decreased heart disease risk. People with high educational levels showed relations between retirement and decreased risks of stroke, obesity and physical inactivity. People who retired from non-physical labour exhibited reduced risks of heart disease, obesity and physical inactivity, whereas those who retired from physical labour indicated an increased risk of obesity

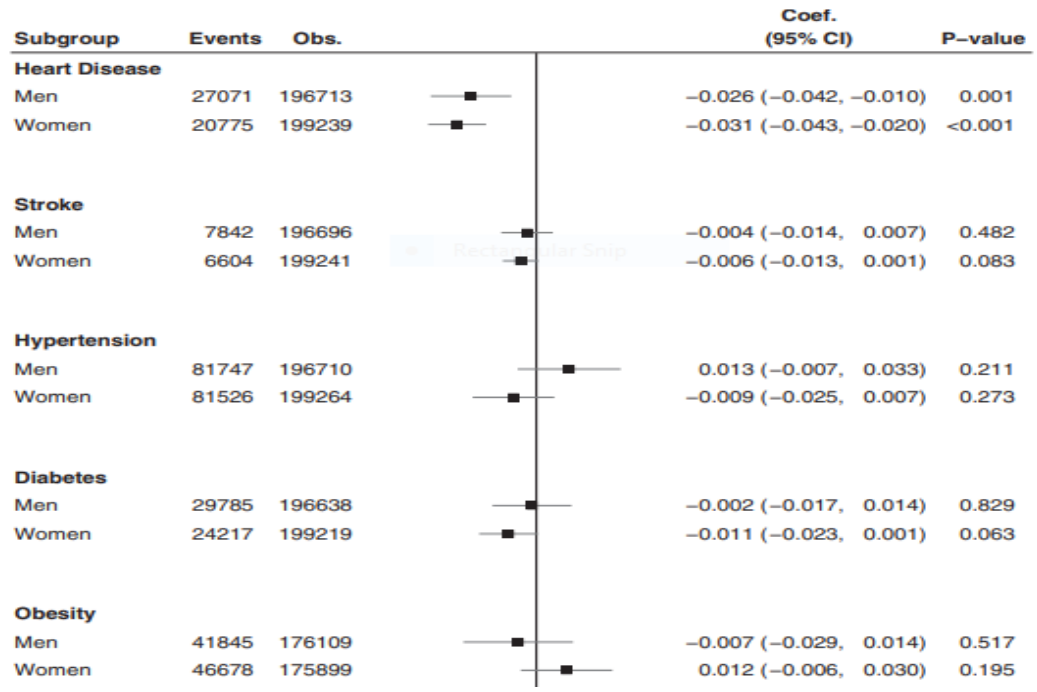

Figure 2 Analysis by sex for the association of retirement with cardiovascular diseases and risk factors

Discussion: Updated results and highlights the importance of reassessing the possible beneficial retirement effects on cardiovascular health. In this study FEIV models also presented decreased physical inactivity after retirement, consistent with previous findings[3].

Conclusion:

The study concludes that retirement was associated with a decreased heart disease risk. Policy makers need to consider the benefits of raising SPA and allowing older people to continue working versus the costs.

References

1. Sato K, Noguchi H, Inoue K, Kawachi I, Kondo N. Retirement and cardiovascular disease: a longitudinal study in 35 countries. International Journal of Epidemiology. 2023 May 8: dyad058.
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The study concludes that retirement was associated with a decreased heart disease risk. Policy makers need to consider the benefits of raising SPA and allowing older people to continue working versus the costs.

Assess the predictors of long-term absence of coronary artery calcium (CAC) in individuals with high Blood Pressure

Introduction:

Worldwide, High blood pressure (BP) is a major risk factor for atherosclerotic cardiovascular disease (ASCVD) accounting for an estimated 8.5 million deaths from stroke, coronary artery disease, other vascular diseases, and chronic kidney disease. Assessment of coronary artery calcium (CAC) is a highly specific feature of coronary atherosclerosis and a powerful tool for ASCVD risk stratification, with a consistent prognostic value for cardiovascular morbidity and mortality[1]. In particular, about 40% of individuals with Metabolic syndrome and/or T2D do not have coronary artery calcium. The absence of CAC, is associated with a very low risk for incident ASCVD. It is important recognize the predictors of healthy arterial aging among individuals with Metabolic syndrome and/or T2D to develop a more precise approach for the primary prevention of ASCVD. The aim of this study is to predictors of long-term absence of coronary artery calcium (CAC) in individuals with high BP, which is an indicator of healthy arterial aging

Method:

Study enrolled 6,814 multi-ethnic participants aged 45–84years who did not have ASCVD at baseline. MESA used either a multi-detector computed tomography or a cardiac-gated electron-beam computed tomography to assess CAC. ASCVD events were categorized as incident coronary artery disease, stroke, or other incident ASCVD according to the protocol. Study analysed data from participants with high BP in the Multi-Ethnic Study of Atherosclerosis who had baseline CAC = 0 and underwent a second CAC scanning after 10 years. Multivariable logistic regression was used to evaluate the association between various risk factors for atherosclerotic cardiovascular disease (ASCVD) and long-term CAC.

Results:

The baseline characteristics of 830 participants with high BP and no detectable CAC were included in the study. During a follow-up of 9.4±0.5 years, 46.5% of participants maintained

persistent CAC = 0. Concomitant to those with incident CAC, participants with long-term CAC = 0 were younger and had fewer ASCVD risk factors, such as lower levels of systolic BP and fasting glucose, more favourable lipid profiles, and lower 10-year ASCVD risk scores. Similar incident CAC, there was a tendency for the incidence of ASCVD to increase with a graded elevation of systolic BP rather than diastolic BP. As shown in figure 3 tendency towards an association between long-term CAC = 0 and incident ASCVD events in this high-BP sample. A lower incidence of ASCVD events was observed in high-BP participants with long-term CAC = 0 compared to those with incident CAC.

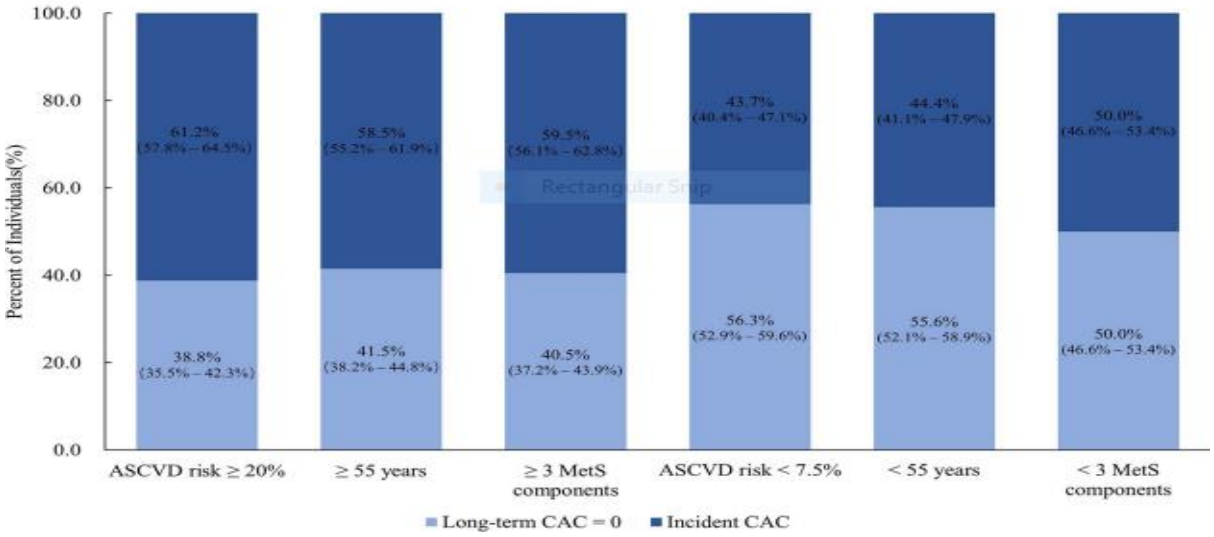

Figure: 3 Percentage of participants with and without long-term coronary artery calcium (CAC)

Discussion:

Study found that about 30% MESA participants with high BP have a baseline CAC = 0, among whom 46.5% maintain long-term CAC = 0 afterward a follow-up of 10 years and analysis of ambulatory BP has established that higher asleep systolic BP and higher awake and asleep diastolic BP were associated with higher CAC scores[3].

Conclusion:

Study found that over 40% of individuals with high BP and no detectable CAC at baseline remained CAC = 0 over a decade of follow-up and analysis of cardiometabolic profile in the hypertensive population helps to prevent or delay the development of CAC and subsequent ASCVD events

Reference:

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Aggregatibacter Segnis Infective Endocarditis- Rare Case Report

Infective endocarditis (IE) is an uncommon disease with diverse presentations and a poor diagnosis and the acronym HACEK denotes a group of Gram-negative fastidious organisms, including Haemophilus and Aggregatibacter spp., Cardiobacterium spp., Eikenella corrodens, and Kingella spp[1]. Infective endocarditis (IE) is an infection of the endothelium of the heart. It has an annual occurrence of 3–10/100,000 of the population with a mortality of up to 30% at 30 days. The symptoms of IE are highly variable and may present as an acute, subacute or chronic condition reflecting the variable causative microorganisms, underlying cardiac conditions and pre-existing comorbidities. Most of patients present with fevers, night sweats, fatigue, and weight and appetite loss, and approximately 25% having evidence of embolic phenomena at presentation. The aim of this study is to present a rare case of endocarditis infected by A. Segnis and the first successful bacteria identification from both peripheral blood and valve vegetation's

Case Report

A 31-year-old male patient was admitted to the Infectious Disease department who had a 3 months' history of intermittent high fever up to 40 ℃, chills, and occasional dyspnea. Blood test showed a significant increase in white blood cell counts and C-reactive protein (CRP, 54 mg/L). He was prescribed cephalosporin, which helped subside the fever. But, the fever recurred 20 days later, treatment was given with levofoxacin and latamoxef. One month later, he had fever again with progressive shortness of breath. On examination reveals, the pulse was regular at 108 beats per minute, and the blood pressure was normal. Grade 3/6 systolic murmurs were audible in the aortic and mitral valve areas. Pitting edema was evident in the lower extremities. During hospitalization, blood tests demonstrated as follows: white blood cell count, 14.5× 109 /L, hemoglobin, 131 g/L, platelet count, 409× 109 /L, CRP, 80.1 mg/L and

PCT, 1.23ng/ml. Other laboratory tests were notable for a troponin T level of 0.748 ng per millilitre.

The rheumatoid factor (RF) tests showed elevated levels of RFIgA (131.7 U/ml) and RFIgM (31.3 U/ml). The electrocardiogram showed sinus tachycardia and ST-T Changes Chest computerized tomography (CT) scan suggested lung inflammation, pleural effusion, and lymphadenopathy in the mediastinum. In the mitral valve, the chordae tendineae were elongated and seeded by multiple vegetation's, of which the largest was 9 mm × 6 mm. A 23 mm × 10 mm semilunar anechoic zone in the aortic root was found. Striped vegetation's, abscesses, and severe regurgitation were detected in the aortic valve as shown in figure 4.

Two sets of blood cultures were obtained before antibiotic therapy. Meanwhile, considering the patient's symptoms of cardiac insufficiency and multiple valve vegetation's, we contacted the surgery department immediately to arrange a valve surgery. Combination of Matrix-assisted laser desorption ionization-time of fight (MALDI-TOF) mass spectrometry and metagenomics next-generation sequencing (mNGS) identified MALDI-TOF and mNGS can Both aerobic bottles confirmed positivity within 24 h. A subculture was performed and identified as Aggregatibacter spp. Based on Duke Criteria, the patient's final diagnosis was established to be infective endocarditis caused by A. Segnis. Ceftriaxone was prescribed for antimicrobial treatment and metoprolol was used to control the tachycardia and palpation. Diuretics were administered to decrease cardiovascular congestion.

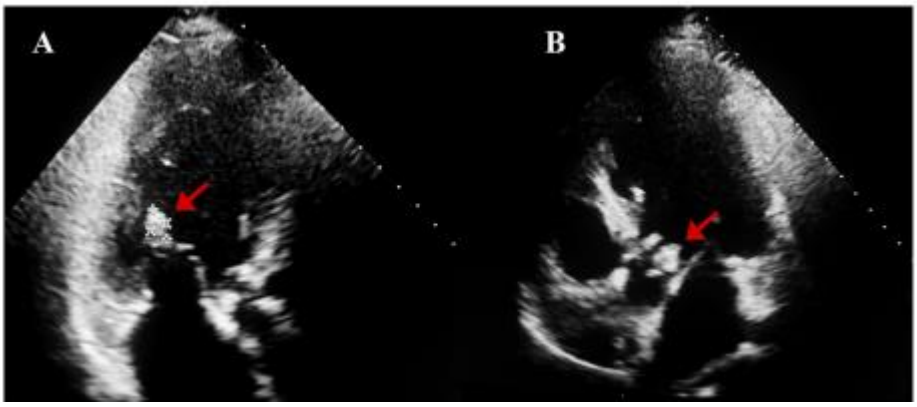

Figure 4 Transthoracic echocardiogram showing multiple vegetation's

When the condition stabilized, the patient received aortic valve replacement surgery. After the operation, the patient was treated with ceftriaxone for another four weeks and discharged. He remained clinically well in the outpatient follow-up, with laboratory results restored.

Discussion:

Fever is reported in 80% of infective endocarditis cases, with a higher occurrence rate in those caused by the HACEK group. The combination of MALDI-TOF and mNGS identified

MALDI-TOF and mNGS can effectively complement and reinforce each other, resulting in the identification of fastidious bacteria with high accuracy within a short timeframe.

Conclusion: Case study shows that MALDI-TOF and mNGS can provide alternative tools to identify microbiological evidence in a short turnaround time to prevent further pathogenic invasion in this case.

Reference:

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