ISCHEMIC HEART DISEASE- Definition, epidemiology, pathophysiology, risk factor, diagnosis, treatment and side effects

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ABSTRACT :

Around the world, ischemic heart disease (IHD) is a major cause of death and a major contributor to chronic illness. The goal of this review is to present a thorough analysis of IHD, covering its definition, pathophysiology, epidemiology, risk factors, diagnosis, treatment, and adverse effects. The study emphasizes the significance of revascularization operations, medication therapy, and lifestyle changes in the treatment of IHD. It is essential to comprehend the intricacies of IHD in order to create prevention and treatment plans that work.

Introduction :

Coronary artery disease (CAD) is another name for ischemic heart disease. IHD is a disorder where a section of the myocardium does not receive enough blood or oxygen. In western nations, it is one of the main causes of death and a significant contributor to chronic illness. High blood pressure, high cholesterol, chronic diabetes mellitus, abdominal obesity, insufficient exercise, a diet low in fruits and vegetables, excessive alcohol consumption, and stress can all contribute to the development of ischemic heart disease.

Epidemiology :

An estimated 17.6 million Americans aged 20 or older have congenital heart disease (CHD), with a prevalence of 7.9 percent overall (9.1 percent in males and 7 percent in women), according to data from the National Health and Nutrition Examination Survey (NHANES) for the years 2003 to 2006. MI affects 3.6 percent of people overall (2.7 percent of women and 4.7 percent of males). An estimated 935,000 MIs occur each year, comprising 325,000 recurrent and 610,000 new MIs. Angina pectoris affects 4.6% of people overall, with women experiencing a higher age-adjusted frequency than males. More than half of all cardiovascular events in men and women under 75 are caused by CHD. After age 40, the lifetime chance of acquiring coronary heart disease is 49.

Pathophysiology :

A pathophysiological condition known as ischemic heart disease is brought on by an imbalance between the myocardial oxygen supply and demand. The amount of coronary flow and the blood's oxygen capacity determine the myocardium's nutrition (7). Ischemia is brought on by an intravascular blood clot at the location of ruptured atherosclerotic plaque or a myocardial oxygen demand during coronary artery spasm. This causes the coronary flow to be limited. All of those mechanisms can be combined simultaneously. Large coronary arteries are typically affected by the pathology, where stenosis lowers the coronary reserve proportionately to the level of vasoconstriction. Spasms that increase its size may accompany stenosis. Acute coronary events are frequently caused by intravascular coagulation that uses ruptured atherosclerotic plaque as a substrate (2). Because oxygen shortage hinders the oxidation of glucose and free fatty acids (FFA) during acute ischemia, enzymatic cytoplasmic glycolysis takes over as the primary energy source. The hydrolysis of lipids is accelerated by catecholamines released, such as norepinephrine and adrenaline, which travel to the heart. Because there is less glucose available, it encourages the oxidation of free fatty acids and becomes the only energy source. As oxygen consumption rises and the reserve rapidly depletes, the cell is forced to switch to anaerobic glycolysis. Lactates and hydrogen ions build up as a result. Ischemia for a few seconds reduces contractility.

Risk factors :

Male gender, age (the risk of disease increases with age), family history, and co-morbidities (kidney disease, thyroid disease, hormonal therapy, hypercholesterolemia, type I and type II diabetes, and chronic conditions inflammatory) comprise the first category of non-modifiable factors. These include stress, alcohol, smoking, and the so-called metabolic syndrome, which includes thrombotic diseases, lipid abnormalities, visceral obesity, inflammation of many causes, high blood sugar, and hypertension.

1. **High blood pressure, or hypertension:** If left unchecked, high blood pressure can harm blood vessels and raise the risk of IHD.
2. **Hyperlipidemia (High Cholesterol):** The risk of IHD may be raised by elevated triglyceride and low-density lipoprotein (LDL) cholesterol levels.
3. **Diabetes Mellitus:** Diabetes raises the risk of IHD and damages blood vessels.
4. **Smoking:** Smoking tobacco raises the risk of IHD and damages blood vessels.
5. **Obesity:** Being overweight raises the risk of IHD by causing diabetes, high blood pressure, and high cholesterol.
6. **Physical Inactivity:** The risk of IHD may rise with a sedentary lifestyle.
7. **Unhealthy Diet:** The risk of IHD can be raised by eating a diet heavy in sodium, cholesterol, and saturated fats.

Diagnosis :

In order to determine the risk of obstructive CAD and the indication for revascularization, the general strategy for the initial diagnostic management of patients suspected of having CCS is based on choosing the most appropriate noninvasive functional or noninvasive anatomical test based on the patient's characteristics. There are various methods to diagnose CHD. CHD is present in patients who have had coronary artery revascularization (either with PCI or CABG) or documented (previous) MI. Furthermore, although the presence of classic angina indicates a clinical diagnosis of CHD, further diagnostic testing, such as coronary angiography, is typically necessary for confirmation. However, there is a small but real chance of an adverse outcome with this test, which is an intrusive and reasonably expensive operation. CTA stands for Coronary Computed Tomography Angiography. The 2019 ESC recommendations made a significant advancement in the recommendation of coronary CTA. One For appropriate patients with a low to intermediate clinical likelihood of CCS, coronary CTA is advised. A 64-slice scanner and an ideal scanning methodology, which includes ECG-triggering and ECG gated 3D reconstruction, are necessary to provide adequate and ideal image quality.39 Additionally, it is important to consider the features of the patient. Patients who are able to hold their breath should be preferred.

Treatment :

Pharmacological treatment

Reducing persistent symptoms and averting cardiovascular events are the primary objectives of pharmacological treatment for ischemic heart disease (11). Short- and long-acting nitrates, β-blockers, calcium channel antagonists, lipid-lowering medications, anticoagulants, and angiotensin-converting enzyme inhibitors (ACE inhibitors) are the primary pharmacological classes utilized. Drugs used to prevent cardiovascular events and at least one antianginal/anti-ischemic medication are part of general conservative treatment. Patients should be informed about the disease entity, risk factors, and treatment at this point in the course of treatment (12). Short-acting nitrates are advised when treating angina. Calcium channel antagonists and/or β-blockers are examples of first-line treatment. Long-acting nitrates are added based on arterial pressure and heart rate (12). All patients are on low-dose acetylsalicylic acid (ASA) to prevent cardiovascular events.

Non pharmacological treatments

Both active and passive smokers should abstain from tobacco smoke. The most successful preventive strategy may be quitting smoking (15). A sufficient, well-balanced diet should be added to the generally accepted definition of a healthy lifestyle. A Mediterranean diet is advised. Weight loss from a balanced diet should result in a body mass index (BMI) of less than 25 kg/m2. Blood pressure, glucose metabolism, and lipid problems are all improved by weight loss and consistent control. The recommended daily intake of fruit and vegetables for people with ischemic heart disease is 200 grams each. Unsaturated fatty acids should be avoided, according to dietary guidelines. 30 to 45 grams of fiber from fruits, vegetables, and whole grains. Fatty fish should also be consumed twice a week by patients.

Side effects :

Nitroglycerin and nitrates can lower blood pressure, create headaches due to vasodilation, and, in rare cases, cause severe hypotension with bradycardia. The phosphodiesterase inhibitors sildenafil (Viagra), vardenafil (Levitra), and tadalafil (Cialis) should not be used with nitrates because they may significantly increase and prolong the vasodilation caused by nitroglycerin.

Conclusion :

The management of ischemic heart disease necessitates a comprehensive strategy due to its complexity and multiple nature. Revascularization operations, medication therapy, and lifestyle changes are all essential elements of managing IHD. To avoid cardiovascular events and enhance results, early diagnosis

and treatment are crucial. To create more potent preventative and therapeutic approaches for IHD, further research is required. Healthcare providers can enhance the lives of those impacted by IHD and give the best care possible by being aware of its complexity.

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