ACUTE CORONARY SYNDROME SECONDARY PREVENTIVE TECHNIQUES

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ABSTRACT

Background: Cardiovascular illnesses are the leading cause of death and a significant contributor to healthcare costs in Asia and globally. Effective prevention strategies are critical for reducing mortality and recurrence of ischemic events, particularly in individuals who have experienced acute coronary syndrome (ACS).

Objectives: This article aims to review updated cardiovascular preventive strategies, highlight recent breakthroughs, and discuss the application of these strategies to individuals with ACS.

Methods: A comprehensive review of recent literature and guidelines was conducted to identify advancements in cardiovascular prevention and their implementation in high-risk populations, including those with obesity, diabetes mellitus, and other comorbidities.

Results: Preventive techniques for cardiovascular disease have shown remarkable effectiveness in high-risk populations, with emerging evidence supporting their broader application. Key updates include advances in pharmacological therapies, lifestyle interventions, and public health policies targeting obesity and diabetes mellitus. Specific strategies tailored to ACS patients, such as intensified lipid-lowering therapy and enhanced adherence to guideline-directed therapies, have demonstrated improved outcomes.

Conclusions: While significant progress has been made in cardiovascular disease prevention, expanding these strategies to the general population is necessary to address the rising prevalence of risk factors. Continued innovation and adherence to evidence-based approaches are essential to effectively reducing the global burden of cardiovascular diseases.

Keywords: cardiovascular, healthcare cost, cardiac and heart recovery.

INTRODUCTION:

In industrialized nations, cardiovascular mortality has significantly decreased during the past 40–50 years thanks to advances in the understanding of cardiovascular risk factors and the implementation of primary and secondary preventive strategies. Cardiovascular illnesses, however, remain the primary cause of death in affluent nations and a significant contributor to disability and healthcare costs despite advancements in preventive efforts. Regarding acute

coronary syndrome (ACS), annual rates have not changed over the past ten years despite improvements in the disease's management (von Känel et al., 2021).

The impact of preventive measures is offset by the alarming rise in diabetes mellitus and obesity, population aging, and the emergence of other comorbidities, such as renal failure, which raise the risk of coronary heart disease and have the potential to reverse the recent trend of declining mortality, particularly in the younger population. Because of all of this, preventative education needs to be a top priority and a field that is always changing. We try to update the primary preventive strategies for patients who have had an ACS in the review paper that is being given, primarily focusing on the key advancements that have occurred in the past year (Paolisso et al., 2020).

METHODS OF PREVENTION FOR ACUTE CORONARY SYNDROME

Updates on risk factor control

Most recurrent cardiac events, according to observational studies, happen in survivors of acute coronary syndrome, especially in the first year following ACS. Significant progress has been achieved in patient care, reperfusion treatments, and medical treatment for the acute phase of ACS, which has resulted in a notable decrease in in-hospital mortality. We need to concentrate on improving secondary prevention medicines and patient adherence to treatments to achieve a higher decrease in mortality and recurrence of events following an ACS in these patients. Clinical practice recommendations for managing stable coronary disease, treating myocardial infarction with or without ST-segment elevation, and developing preventative or targeted risk factor management plans have all been modified recently (Damluji et al., 2023).

The significance of treating risk factors intensively is emphasized in all of these guidelines. During the hospital stay, both medicine prescriptions and patient education should begin since patients are typically more receptive to guidance and suggestions. It has also been demonstrated that there is a lower likelihood of optimizing therapies once the patient is released. The recommended secondary prevention treatment (beta-blockers, angiotensin-converting enzyme [ACE] inhibitors, angiotensin II receptor antagonists, and statins) was prescribed to most patients at discharge; however, only 1 out of 3 patients had their prescribed doses fall within the targets, and only 25% of cases had their dose increased after discharge (Steen et al., 2022).

This analysis was conducted on 6,740 patients who had suffered a myocardial infarction between 2003 and 2008. It is vital to attempt to optimize treatment dosages before releasing patients with ACS because the protective effect of these medications is dose-related. If target doses cannot be reached during hospitalization or elevated during patient follow-up, preventive measures may be limited (Yudi et al., 2021).

Lifestyle suggestions

Non-pharmacological secondary prevention methods are addressed superficially in European guidelines on the management of individuals with myocardial infarction with or without ST-segment elevation or with stable coronary artery disease. Their advice for lifestyle modification and cardiovascular disease prevention is based on guidelines for the treatment of dyslipidemia and heart disease prevention (von Känel et al., 2021).

Eat a diet:

Heart disease risk is decreased by eating a balanced diet. In this regard, the instructions from the various guidelines are consistent. The amount of energy consumed should not exceed what is required to maintain or reach a healthy weight. Sufficient body weight (BMI < 25). Eat 5 portions of fruit or vegetables per day and 3 portions of fish per week; reduce salt intake to <6 g/day; limit alcohol consumption and increase consumption of dried fruit and cereals. Saturated fat intake should be reduced (< 10% of total fat consumed) and replaced with omega-3 polyunsaturated fatty acids, primarily derived from fish oil. The largest study to date showed how effective these recommendations are: in patients at high risk of events but without a history of cardiovascular disease, a Mediterranean diet supplemented with extra virgin olive oil or walnuts decreased the incidence of serious cardiovascular events (Franklin et al., 2004).

Tobacco:

In addition to promoting atherosclerosis and increasing the instability of atheromatic plaques, smoking also modifies endothelial function, promotes cell adhesion, and is a proinflammatory, prothrombotic, and prooxidative agent. Smoking also has an arrhythmogenic effect. Smoking patients with ACS have a recurrence of ischemic episodes twice as frequently as nonsmokers, suggesting that tobacco use has a significant prothrombotic effect. It is imperative to put a lot of effort into smoking cessation because it is the potentially most effective secondary

preventive strategy. Observational studies have shown that patients who quit smoking have lower mortality in later life compared to those who continue to smoke. Counseling, group therapy, or combinations of treatments such as varenicline, bupropion, or nicotine replacement therapy should be made available to patients (Han et al., 2022).

The PARADOX study's findings in 2013 revealed an intriguing finding about tobacco use and cardiovascular disease. This study discovered that the effectiveness of clopidogrel monotherapy varied based on the patient's smoking status for atherothrombotic illness. Patients receiving clopidogrel or prasugrel were split into two groups for the study: smokers and nonsmokers (never smokers or former smokers). The platelet reactivity of these patients was compared. Greater platelet reactivity was reported in nonsmokers using clopidogrel because its metabolite was shown to be less active. Patients on prasugrel did not experience this since their platelet reactivity was reduced whether or not they smoked (Tong et al., 2020).

Following the release of this study, additional cohorts were examined, including the CAPRIE trial, which showed that the effect of clopidogrel varied according to smoking status. Clopidogrel medication has been linked to a decrease in ischemic events in smokers even though smokers are more likely to experience events than nonsmokers or former smokers. However, this advantage was not seen when comparing clopidogrel to acetylsalicylic acid (ASA) in nonsmokers or ex-smokers. These findings suggest that clopidogrel may provide better protection against ischemic events and is superior to ASA in smoking patients with cardiovascular disease receiving antiplatelet monotherapy treatment. Additionally, since some patients are unable to quit smoking despite advice, a greater one could be defined as an effective secondary prevention for patients who do not quit. After the dual anti-aggregation treatment period is over, ASA could be chosen as monotherapy for patients who do not smoke and clopidogrel for smokers (You et al., 2020).

High blood pressure

The 2013 modifications to the European guidelines and the US Eighth Joint National Committee guidelines represent the fundamental advancements in the therapy of arterial hypertension. Both guidelines maintain the same blood pressure goals while simplifying the treatment objectives. < 140/90 mmHg in the majority of cases, with a few exclusions, including diabetes mellitus and old age. The five primary pharmacological groups ACE inhibitors,

angiotensin II receptor antagonists, beta-blockers, calcium channel blockers, and diuretics can be taken singly or in combination to start or continue treatment (Kim et al., 2020).

Except for the recommendation to utilize beta-blockers in this situation, these guidelines also apply to hypertensive patients who have experienced an ACS. Current recommendations for hypertension The American study goes a step further and suggests that the target blood pressure for people over 60 should be < 150/90 mmHg, while minor patients under 60 years old should only have a goal of 140/90 mmHg (Sánchez-de-la-Torre et al., 2020).

Elevated Cholesterol

The objectives of treatment have evolved with the release of the new American guidelines on hypercholesterolemia and, more recently, the Joint British Societies guidelines on cardiovascular prevention. Target values for treatment have been removed from the American guidelines. This advice stems from the lack of data supporting statin dose titration to reach a particular target for low-density lipoprotein cholesterol (LDL-C) or non-high-density lipoprotein cholesterol (non-HDL). C) (obtained by deducting HDL-C from total cholesterol), given that the statin doses used in the clinical trials that form the foundation of the evidence are fixed and range from moderate to high potency (Vaidya et al., 2021).

In addition, the British guidelines advise all patients, regardless of baseline cholesterol levels or contraindications, to begin secondary preventive treatment with high dosages of statins. The non-HDL-C parameter is preferred to be used as a treatment target because evidence suggests that it has a stronger correlation with risk and response to treatment than LDL-C, particularly in patients with type 2 diabetes mellitus, where the increase in atherogenic particles is not reflected in the LDL-C concentration. Nevertheless, this guidance maintains the ideal levels of LDL-C and non-HDL-C that should be achieved with treatment. In conclusion, regardless of non-HDL-C readings, all patients with established cardiovascular disease should get high dosages of statin treatment while they are in the hospital. Atorvastatin 80 mg is the preferred statin (Watanabe et al., 2022).

The goals are LDL-C < 70 mg/dL or non-HDL-C < 100 mg/dL with the advent of a new family of medications that dramatically lower cholesterol concentrations. A new area in the treatment of hypercholesterolemia is currently emerging. These monoclonal antibodies target the subtilisin-kexin-type proprotein convertase, a protease that attaches to the hepatic LDL receptor

and aids in its breakdown. By blocking its activity, the liver receptors for LDL are left intact, enhancing the absorption and excretion of the lipid. There are several benefits associated with it. It is applied subcutaneously every two to four weeks. As its action does not entail the manufacture of cholesterol, it does not cause the hepatic and muscle side effects associated with statins (Roule et al., 2020).

Three molecules, evolocumab (Amgen), alirocumab (Regeneron Pharmaceuticals), and bococizumab (Pfizer) have recently started clinical trials. Three evolocumab clinical trial findings were recently published, and they showed very positive outcomes. Evolocumab 420 mg every 4 weeks was compared with placebo in the DESCARTES research, which involved individuals recently diagnosed with hypercholesterolemia (added to background statin medication). Evolocumab treatment effectively decreased cholesterol (62% of patients receiving low doses of statins and 49% of individuals receiving high doses) (Sherazi et al., 2021).

Similar decreases were seen in two more studies using this chemical in patients with statin intolerance (GAUSS-2) and mixed hyperlipidemia (LAPLACE-2 study). In the second, ezetimibe reduced LDL by about 37–39% in participants who were intolerant to statins, while evolocumab reduced LDL by 55–56%. The FOURIER (Further Cardiovascular Outcomes Research With PCSK Inhibition in Subs With Elevated Risk) study, which compares evolocumab versus placebo when added to statin treatment in 22,500 patients, will have to be completed before we can act on these encouraging results. The study's goal is to lower the combined primary endpoint of cardiovascular death, myocardial infarction, hospitalization for unstable angina, stroke, or coronary revascularization. 2018 is anticipated to yield results (Sherazi et al., 2020).

Recent advancements in the management of antiplatelets following acute coronary syndrome

Following an ACS, low-dose ASA (75–100 mg) is the preferred antiplatelet therapy and is advised forever; patients who truly have an ASA intolerance should use clopidogrel (75 mg). The most recent American and European guidelines are firmly in favor of the new P2Y12 receptor inhibitors as a dual treatment with ASA, and clopidogrel is only recommended for patients who are unable to take ticagrelor or prasugrel (IA recommendation). The thorough presentation of the TRITON TIMI-3821 and PLATO study results, which demonstrate the superiority of ticagrelor and prasugrel over clopidogrel and prasugrel, respectively, justifies this conclusion (Turgeon et al., 2020).

The ideal course of dual antiplatelet medication has been examined in several trials. Extending dual antiplatelet therapy beyond 12 months significantly increased the risk of major bleeding without achieving a reduction in mortality, myocardial failure, heart attack, or stroke, compared to control (3 to 12 months of dual antiplatelet therapy), according to a meta-analysis of four clinical trials involving 8,231 patients undergoing angioplasty with drug-eluting stents (61% after ACS). The DAPT (Dual Antiplatelet Therapy) trial, which comprised 26,000 patients treated with metallic or pharmacoactive metallic stents and dual antiplatelet therapy, will provide more conclusive information on the ideal length of dual antiplatelet therapy following ACS. Patients who had no events at 12 months were randomly assigned to receive a placebo or to continue taking thienopyridine for an extra 18 months. It is anticipated that May 2014 will mark the study's conclusion (Gorog et al., 2021).

Regardless of whether coronary stents have been inserted, dual antiplatelet medication is still advised for a full year in European ACS guidelines for patients with ACS, both with and without ST-segment elevation. The latest Joint British Societies guideline, however, stipulates a minimum period of 1 month for patients treated with a conventional metal stent and 6 months for those treated with an eluting stent. Of medication, even though it also recommends 12 months of treatment following an ACS. Novel antiplatelet techniques have been attempted using medications like Vorapaxar, which block the platelet thrombin receptor. Despite this, the medicine has not demonstrated a clear advantage, as it increases bleeding rates and does not decrease ischemic events (Paolisso et al., 2020).

Anticoagulant therapy

Treatment with modest dosages of rivaroxaban, in addition to dual antiplatelet therapy, was examined in the ATLAS ACS 2-TIMI 51 trial.

Table: List of the primary medications used in secondary prevention

Treatment	Recommendation

Statins	Regardless of LDL-C (or non-HDL-C) levels, early treatment with a high-dose statin (atorvastatin, 80 mg, or rosuvastatin, 20 mg)
Colchicine	At dosages of 0.5 mg/day, there may be value in secondary prevention, with indications of a decrease in coronary events.
beta-blockers	Significant advantages were seen in the first year after an ST-segment elevation myocardial infarction. Heart failure patients with a Class I indication
The Rivaroxaban	It lowers the chance of incidents at low dosages (2.5 mg/12 h), but it raises the risk of major bleeding.
ACEI/ARB-II	Minimal impact, but with definite advantages in secondary prevention. Heart failure patients with a Class I indication
AAS	Forever, at modest dosages (75–100 mg/day). Use of clopidogrel (75 mg/day) is advised in the event of a genuine allergy to ASA.
Antialdosterones	Benefits seen in myocardial infarction patients with insufficient cardiac

Patients with an ST-segment elevation myocardial infarction were treated with ASA and clopidogrel. Rivaroxaban had a benefit-versus-risk dose of 2.5 mg/12 hours, which resulted in a decrease in cardiovascular mortality (2.5 versus 4.2%) but an increase in serious bleeding, such as cerebral hemorrhage (0.6 vs. 0.1%) (Gray et al., 2021).

Additional medications for secondary prevention

- Blockers of beta. For a maximum of one year following an ST-segment elevation myocardial infarction, there is evidence to support the use of beta-blockers as secondary prevention; however,

there is no evidence available for longer periods or for other patient groups. They would be prescribed in conjunction with antialdosterones, ACE inhibitors/angiotensin II receptor blockers, and individuals with ventricular dysfunction or heart failure.

- Antagonists of the ACEI/ANgiotensin II receptors. The importance of
It is debatable whether these medications should be used as a secondary preventive strategy to lower cardiovascular events in individuals without heart failure. The combined risk of cardiovascular death, myocardial infarction, and stroke is decreased by treatment with ACEIs or angiotensin II receptor antagonists. Still, ACE inhibitors are the preferred agents, according to a recent meta-analysis31 that examined 26 randomized trials involving 108,212 patients without heart failure.
- Colchicine. Patients with stable coronary artery disease have shown this medication to be beneficial in preventing cardiovascular events. Colchicine 0.5 mg/day treatment reduced the combined occurrences of ACS, out-of-hospital cardiac arrest, and ischemic stroke (5.3 versus 16%) when paired with antiplatelet medication, statins, and other secondary preventive strategies.

Programs for cardiac rehabilitation

For individuals with several risk factors or those at moderate-to-high risk, the guidance suggests prevention and rehabilitation programs. Although the effectiveness of these programs has been amply proven, many countries often lack cardiovascular rehabilitation facilities. Despite showing 41% reductions in mortality and 32% reductions in rehospitalizations, cardiac rehabilitation had the lowest adherence rate of all secondary prevention measures following ACS (Steen et al., 2022).

CONCLUSION:

Since they have significantly decreased mortality in the acute phase, effective treatments for SCA patients are already accessible. Nevertheless, we frequently neglect to maximize secondary preventative therapies, for which risk reduction has been shown (table). To attain a higher level of risk reduction, we will need to push for the creation of cardiac rehabilitation programs above all other preventative treatments, which are now the least employed while having significant benefits that have been shown.

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