



A Review of the Effect Evaluation of Aspirin in the Prevention and Treatment of Cardiovascular Disease

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Abstract. The background of this research is reasonable treatment and prevention of cardiovascular and cerebrovascular diseases. Cardiovascular disease is a disease with a high incidence of human death. This article studies the prevention and treatment effects of aspirin on cardiovascular disease. Whether the use of aspirin in clinical practice has preventive and therapeutic effects on cardiovascular disease is the research purpose of this article. By reviewing the research methods such as the relevant literature in the past five years, the conclusion is drawn by summary. The final conclusion is that aspirin has a preventive and therapeutic effect on cardiovascular disease, but the dose should also be controlled to prevent the risk of bleeding.

Keywords: aspirin · cardiovascular disease · prevention · treatment · effect · adverse reactions

1 Introduction

Cardiovascular and cerebrovascular diseases are the general term of cardiovascular and cerebrovascular diseases. They generally refer to ischemic or hemorrhagic diseases of the heart, brain and systemic tissues caused by hyperlipidemia, blood viscosity, atherosclerosis and hypertension. Cardiovascular and cerebrovascular disease is a common disease that seriously threatens the health of human beings, especially the middle-aged and elderly people over 50 years old. It has the characteristics of high prevalence, high disability rate and high mortality. Even with the application of the most advanced and perfect treatment methods, more than 50% of the survivors of cerebrovascular accidents can not take care of themselves. The number of deaths from cardiovascular and cerebrovascular diseases in the world is as high as 15 million every year, ranking the first among various causes of death.

Nowadays, most cardiovascular diseases are treated with antiplatelet aggregation drugs, nitrates, lipid regulating drugs β Receptor blockers and other drugs. Aspirin is less used in cardiovascular diseases than the previous drugs, but aspirin can also prevent and treat cardiovascular diseases to a certain extent through its pharmacological effects, which is cheap and easy to obtain and has good patient compliance.

This paper evaluates the therapeutic effect of aspirin on cardiovascular disease from the aspects of pharmacological action, clinical manifestation, cost of drug use and patient compliance.

This proves that aspirin can play an important role in the prevention and treatment of cardiovascular disease, and the correct use of aspirin can save the lives of patients with cardiovascular disease. So that patients with cardiovascular diseases in China can get the most favorable treatment scheme, which is also the best drug economy, so as to improve the quality of life and life span of patients.

2 Main Body

Aspirin, also known as acetylsalicylic acid, is a traditional NASIDS drug. It was produced and listed by the German Bayer Company in 1898, and it has a history of more than 100 years. At first, aspirin was only used as an anti-inflammatory, people also found it can relieve pain from various sources. But with the development of pharmacology, organic chemistry and other disciplines, it has been found that its role is far more than that.

2.1 Pharmacological Effects and Clinical Use

2.1.1 Pharmacological Effects

As an inhibitor of platelet cyclooxygenase, aspirin has the function of preventing thrombosis. It mainly prevents the adhesion, aggregation and release of platelets, thereby repairing vascular endothelial damage and reducing the risk of having cardiovascular disease.

The specific mechanism of aspirin to prevent thrombosis is as follows. Firstly, Aspirin inhibits platelet aggregation. Prostacyclin 2 (PGI₂) is the product of arachidonic acid, an antithrombotic substance and an antagonist of thromboxane. PGI₂ can dilate blood vessels and inhibit platelet aggregation to prevent thrombosis; thromboxane A₂ (TXA₂) is a vasoconstrictor, which can activate platelets and make them aggregate; cyclooxygenase (COX) can catalyze the conversion of arachidonic acid into prostaglandins; Aspirin prevents the conversion of arachidonic acid into TXA₂ by inhibiting the activity of platelet COX, reduces the production of TXA₂, and increases the ratio of PGI₂ to TXA₂, thereby achieving the purpose of inhibiting platelet aggregation and preventing thrombosis. Secondly, the role of aspirin in inhibiting atherosclerosis is effective. Aspirin can enhance the expression of nitrogen synthase and nitrogen release in vascular endothelial cells, thereby making vasodilation, anti-platelet aggregation, anti-inflammatory and anti-smooth muscle proliferation; aspirin can promote serum C-reactive protein (CRP) and Inflammatory factors return to normal, reducing the risk of infarction in patients; aspirin can also reduce the formation of oxidative free radicals in patients and reduce pathogenic factors, thereby preventing and reducing the progression of atherosclerosis [1].

2.1.2 Clinical Use

When low-dose aspirin is used, its main pharmacological effect is to inhibit platelet aggregation and prevent the formation of cerebral thrombosis. When a medium dose of aspirin is used, it has an antipyretic and analgesic effect, and is mainly used to treat colds, fever, and chronic dull pain.

When high-dose aspirin is used, it has anti-inflammatory and anti-rheumatic effects and is the drug of choice for the treatment of acute rheumatic fever arthritis.

2.1.3 Side Effect

The side effects of aspirin have a certain relationship with the dose. Small doses have fewer side effects, but when the dose is relatively large, side effects are prone to occur, such as nausea, vomiting, and upper abdominal pain and discomfort. Others may have gastric bleeding and gastrointestinal ulcers. If the stool appears tarry during the medication, the possibility of gastrointestinal bleeding should be considered. In addition, bronchial asthma can be induced. This is mostly due to individual differences. There may also be rashes, urticaria, and liver and kidney damage.

2.2 Application of Aspirin in Cardiovascular Disease

2.2.1 Aspirin for the Prevention of Cardiovascular Disease Stipulates in the “Chinese Guidelines for the Prevention of Cardiovascular Diseases”

The key to reducing the mortality rate of cardiovascular patients lies in the rational use of antiplatelet drugs. Aspirin is a classic antiplatelet drug, which is recommended in the “Chinese Guidelines for the Prevention of Cardiovascular Diseases” as a primary preventive drug for high-risk groups of cardiovascular disease.

This guideline divides cardiovascular disease prevention measures into three levels:

Primary prevention aims to eliminate or reduce risk factors, reduce the chance of individual morbidity, and reduce the morbidity of the group.

Secondary prevention refers to the use of drugs or non-drug measures for patients or people with cardiovascular disease to prevent the recurrence and aggravation of the disease.

Tertiary prevention is to take strong clinical and rehabilitation measures for patients with cardiovascular disease who are in critical condition or a long course of disease and with poor prognosis, to prevent the deterioration of the condition, prevent serious complications, and prevent disability; rehabilitation for those who have lost the ability to work or are disabled treatment, carry out functional and psychological rehabilitation, and strive to improve the quality of life of patients and prolong life [2].

2.2.2 A Survey of Aspirin Use in Community Patients with Cardiovascular Disease

According to a questionnaire survey of cardiovascular disease patients in a community in China, the use rate of aspirin in cardiovascular patients was 5.88% for primary prevention and 94.12% for secondary prevention. Men who used aspirin to prevent cardiovascular disease accounted for 74.15% of the total number of users, and women accounted for

25.85% of the total number of users. From the existing data, the use of aspirin to prevent cardiovascular disease in this community in China is mainly for secondary prevention, and the users are mostly male. The use of aspirin for primary prevention is low, and doctors and patients do not pay enough attention to the use of aspirin for primary prevention [3].

2.2.3 A Survey of Aspirin Use in Hospital Patients with Cardiovascular Disease

Through the investigation of aspirin prevention use in a hospital in Beijing, the subjects were: (1) aged 35–80 years; (2) diagnosed with diabetes, hypertension, hypercholesterolemia, coronary heart disease or ischemic stroke; (3) Having at least 3 or more medical records in the outpatient clinic system; (4) Being able to understand the questions asked and cooperate with the need to complete the information collection.

The results showed that the overall application rate of aspirin in the secondary prevention of cardiovascular disease was 55.2%, and the overall application rate in the primary prevention was 40.1% [4].

Comparing the use of aspirin in the hospital and in the community, the author can clearly see that the preventive use of aspirin in the community is significantly lower than the use of aspirin in the hospital.

2.3 Evaluation of the Therapeutic Effect of Aspirin

In the above research, the author has learned the general situation of aspirin use in the community and hospital cardiovascular patients. Next, other literatures will be read to understand the clinical effect of aspirin on cardiovascular disease.

Aspirin is generally not used alone in the clinical treatment of cardiovascular disease, and most of the time it is combined with other drugs for a combined treatment plan. For example, statins are combined with aspirin in the treatment of cardiovascular disease, and adverse reactions such as nausea, dizziness, and drowsiness are prone to occur when statins are used in the treatment of cardiovascular diseases. The probability of adverse reactions in the aspirin group (control group) was 12%, and the probability of adverse reactions in the aspirin group (experimental group) was 4%. The results show that aspirin effectively reduces the probability of side effects caused by statins [5].

When aspirin and clopidogrel are used in the treatment of patients with occult coronary heart disease, some studies have shown that the efficacy of clopidogrel and aspirin alone is not satisfactory. Aggregation rates and platelet counts were significantly lower than before treatment and with clopidogrel and aspirin alone. It is suggested that clopidogrel combined with aspirin in the maintenance treatment of patients with occult coronary heart disease can significantly enhance the antiplatelet effect and improve the therapeutic effect [6].

As for the Metoprolol combined with aspirin in the treatment of acute myocardial infarction, some studies have observed and compared the clinical efficacy, vascular recanalization rate, vascular reocclusion incidence, LVEF, LV-EDVI, BNP levels and coagulation function after administration. Lol combined with aspirin has a significant clinical effect in the treatment of acute myocardial infarction, the incidence of vascular reocclusion is reduced, LVEF, PT and APTT are increased, and the levels of LV-EDVI

and BNP are decreased, which can effectively improve the quality of life of patients and reduce the incidence of cardiovascular events [7].

2.4 Adverse Reactions of Aspirin

For the treatment of coronary heart disease in the elderly, the treatment regimen of clopidogrel combined with aspirin is very common, and some studies have investigated the clinical adverse reactions of this therapy [8]. Aspirin is an anti-platelet drug that inhibits cox enzymes, thereby inhibiting the synthesis of thromboxane and prostacyclin, thereby inhibiting platelet aggregation. Elderly patients with coronary heart disease have a long course of disease and require long-term medication. During drug treatment, patients are prone to adverse reactions such as liver function damage, vomiting, rash, and nausea, which affect the treatment effect of patients. According to the existing data, studies have shown that patients with coronary heart disease who use aspirin enteric-coated tablets (Bayer Health Care Co., Ltd.) alone have adverse reactions, rash, nausea, gastric mucosal bleeding, and vomiting. The probability of patients is 20.51%. In Aspirin combined with chlorine, the incidence of adverse reactions of pidogrel was 2.56%, and it can be judged that the probability of adverse reactions of aspirin alone is much greater than that of the two drugs in combination.

For the treatment of acute cerebral infarction, use aspirin combined with atorvastatin. According to the relevant literature survey [9], when aspirin is used alone, patients are prone to bleeding symptoms in various parts of the body, such as: gastrointestinal bleeding, gingival bleeding, subcutaneous tissue bleeding, etc. These are the common adverse reactions of aspirin in clinical practice.

3 Conclusion

This article mainly discusses the pharmacological effect of aspirin on cardiovascular diseases through various relevant literature materials; the characteristics of clinical use and the types of adverse reactions, that is, the frequency of occurrence. Judging from the existing data, in the community, the proportion of patients at risk of cardiovascular disease using aspirin to prevent cardiovascular disease is relatively low. People do not know enough about the principles of cardiovascular disease prevention and treatment. As a classic antiplatelet drug used in combination with other drugs to treat various cardiovascular diseases, such as: occult coronary heart disease, acute myocardial infarction, etc., the effect of this combination therapy is often better than the use of various drugs alone. When atorvastatin, clopidogrel and other drugs are combined with aspirin to treat diseases, their side effects will be reduced or reduced to a certain extent.

When using aspirin clinically, attention should be paid to the occurrence of adverse reactions. The use of this drug for a long course of treatment and excessive dosage may cause side effects such as bleeding, nausea, vomiting, rash, etc. Therefore, in clinical treatment, it must be strictly used which requires to check the patient's health.

To sum up, the application of aspirin in the treatment of cardiovascular disease is indispensable and very important. Aspirin can not only play an antiplatelet effect alone, but also can be used in combination with various other drugs to enhance the efficacy of

the treatment plan and reduce the adverse reactions of the treatment plan at the same time. In the future clinical treatment and disease prevention programs, aspirin will continue to play its own important and unique role.

The author believes that the use of aspirin will be more standardized and reasonable in the future clinical treatment process, and both doctors and patients will benefit from it. Perhaps in the future the precise use of aspirin can be linked to AI to make treatment plans more intelligent. There is already a lot of research on combining drugs with artificial intelligence at this stage, and hopefully this can be seen one day in the near future.

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