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Comparison of chronic disease control strategies at different ages

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Abstract. As cardiovascular and cerebrovascular diseases (CVDs) in children are receiving increasing attention, the background is that CVDs at different age stages present different characteristics. Currently, some progress has been made in age-specific targeted therapeutic studies, but the refinement and optimisation of the overall treatment strategy still needs to be deepened. The research gap lies in the lack of a comprehensive and systematic comparison of treatment strategies for different age groups. This paper have analysed the differences and commonalities of CVD treatment strategies in different age groups, and obtained the relevant results of optimised strategies in each age group. Treatment for children must take into account the effects on growth and development, adolescents need to focus on prevention and correction, and the elderly require comprehensive management. This is of great significance in improving the treatment effect of CVD in children and provides a comprehensive reference for future studies, but the long-term effect assessment and individual difference response are still not fully resolved, and future studies can focus on further exploration in these directions.

Keywords: CVDs, age, treatment, comparison.

1. Introduction

These guidelines, written in the style of a submission, show the best layout for your paper using Microsoft Word. If you don't wish to use the Word template provided, please use the following page setup measurements. In China, cardiovascular disease (CVD) is the leading cause of death, much higher than tumors and other diseases that jeopardize the physical and mental health of human beings. The widespread prevalence of lifestyle risk factors has led to a dramatic increase in the number of CVD patients in China, with the number of patients reaching 330 million by 2022. Many studies have shown that hypertension and diabetes are the main risk factors for the development of CVDs. Therefore, the identification of high-risk groups and the adoption of effective preventive measures have become the main direction of CVD epidemiological research [1].

With the increasing emphasis on the treatment of CVD, there have been significant changes in therapeutic approaches. This is related to developments in gene sequencing, genomics and epigenetics. On the other hand, access to and analysis of big data on disease information has become easier due to new technologies in cloud computing and computational biology, the widespread use of electronic medical records and the burgeoning field of biomedical informatics. In addition, due to the rapid development of biotechnology and the advent of the era of precision medicine, researchers have continued to study the genetic factors of CVD, continuously explored the CVD susceptibility genes from

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the aspects of multi-omics, exposure genomics, and phenomics, and progressively explored the application of different therapeutic modalities in the intervention of CVD risk factors.

Although China has made great progress in research on cardiovascular and cerebrovascular diseases, there are still some shortcomings. For example, in basic research, the pathogenesis of the disease needs to be explored in greater depth; in clinical research, the scale and quality of multicenter clinical trials need to be improved; and in translational medicine research, how to better apply laboratory research results to clinical practice needs to be further strengthened. Since the twenty-first century, major noncommunicable diseases (mNCDs) - including hypertension, diabetes, obesity, stroke, coronary heart disease and diabetes mellitus, among others - and the negative energy they cause become a major challenge and burden to global public health [2]. These diseases have a serious impact on global economic and social development, as well as on people's quality of life and life expectancy.

Although the current medical system has paid more attention to the prevention and treatment of CVDs, there is still a lack of more targeted treatments for different age groups. Therefore, based on the existing treatments, a comparative analysis of treatment strategies for people of different age groups will be conducted, aiming to provide reference suggestions for existing CVD treatments and the development of new and more effective prevention methods.

2. Pathogenic factors

CVDs are characterised by a high prevalence of morbidity, disability and mortality. It is of the utmost importance to gain an understanding of the causative factors in order to effectively prevent and control such diseases. By analysing genetic factors, lifestyle, environmental factors, and underlying diseases, the roles they play in the occurrence and development of cardiovascular and CVDs are described. This is done with the aim of providing a theoretical basis for the prevention and treatment of cardiovascular and CVDs.

It is evident that genetic factors exert a considerable influence on the development of CVDs. Mutations or polymorphisms in specific genes are strongly associated with an increased susceptibility to CVD. For instance, different alleles of the apolipoprotein E (ApoE) gene have been linked to the risk of atherosclerosis. Individuals who carry specific alleles of the ApoE gene may be more susceptible to abnormalities in lipid metabolism, which in turn may increase the likelihood of developing diseases such as coronary heart disease.

Numerous studies have shown that people with a family history of early-onset CVD have a significantly higher risk of developing such disease in their offspring. For example, in some cases of familial hypercholesterolemia, mutations in specific genes lead to impaired cholesterol metabolism, making it possible for patients to develop severe atherosclerosis and CVD at a young age. In addition, genetic variants associated with blood pressure regulation, such as the angiotensin-converting enzyme (ACE) gene, may also lead to an increased susceptibility of individuals to hypertension [3].

2.1. Lifestyle

A healthy lifestyle is of great importance in the prevention of CVDs. An unhealthy lifestyle represents a significant risk factor for the development and progression of cardiovascular and CVDs.For instance, a prolonged consumption of an unhealthy diet, characterised by an excessive intake of foods high in salt, fat and sugar, can result in dyslipidaemia and elevated blood pressure, thereby increasing the risk of cardiovascular and CVDs. A number of epidemiological studies have demonstrated a correlation between the consumption of excessive salt and the prevalence of hypertension. Additionally, a diet high in fat and sugar has been linked to the development of dyslipidemia and the progression of atherosclerosis [4].

In addition, a lack of exercise is a significant contributing factor. A sedentary lifestyle with minimal physical activity impairs the body's metabolic processes and reduces cardiovascular function, increasing the likelihood of developing disease. Some studies have demonstrated that individuals who engage in regular physical activity exhibit a markedly reduced risk of CVD in comparison to those who are physically inactive [5].

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Smoking is an even more important adverse lifestyle factor. Harmful substances in tobacco can damage vascular endothelial cells, trigger inflammatory reactions, and accelerate the process of atherosclerosis. A large number of clinical observations and studies have confirmed that the incidence of cardiovascular and CVDs is significantly higher in smokers than in non-smokers [6].

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2.3. Underlying diseases

Diabetes mellitus represents a significant risk factor for the development of cardiovascular and CVDs. Prolonged hyperglycaemia can result in damage to vascular endothelial cells, the promotion of atherosclerosis formation, and an increased risk of cardiovascular and CVDs. Clinical studies have demonstrated that the likelihood of developing coronary heart disease, stroke, and other cardiovascular and cerebrovascular disorders is considerably higher in diabetic patients than in non-diabetic individuals [9].

Hypertension is also a key underlying condition that leads to CVD. Persistent hypertension puts greater pressure on the walls of blood vessels, causing them to thicken and harden, increasing the incidence of cardiovascular and cerebrovascular events. Numerous epidemiologic studies have shown that the prevalence of cardiovascular and CVDs is significantly higher in patients with hypertension, especially when blood pressure is poorly controlled [10].

The aetiology of cardiovascular and CVDs is complex and involves a multitude of interacting factors. The risk of cardiovascular and CVDs can be effectively reduced through comprehensive measures, including improving lifestyle, actively treating underlying diseases, paying attention to genetic factors and reducing adverse environmental influences. Further in-depth studies on the complex relationship between the factors are needed in order to develop more precise and effective prevention and treatment strategies.

3. Treatment of CVDs in different age groups

The physiology and pathology of CVDs differ significantly between age groups. Consequently, the most appropriate treatment for each age group must be distinct. This section examines the most common treatments for CVDs in four age groups: children, adolescents, middle-aged adults, and the elderly. It places particular emphasis on the importance of individualised treatment and comprehensive management.

DOI: 10.54254/2753-8818/47/2024PJ0112

3.1. Treatment of CVDs in children

Drug therapy: Choose the appropriate drugs according to the specific type of disease, such as anti-arrhythmic drugs, antihypertensive drugs and so on. In children with congenital heart disease combined with arrhythmia, the rational use of anti-arrhythmic drugs can effectively control the symptoms.Some specific approaches appropriate for children include: In children with congenital heart disease, digitalis drugs may be used to increase myocardial contractility, such as digoxin. For some children with hypertension, angiotensin converting enzyme inhibitors (e.g. captopril) or angiotensin II receptor antagonists (e.g. losartan) may be used. Statins (e.g. atorvastatin) may be used to treat dyslipidaemia in children. Anti-arrhythmic drugs such as propafenone may be used in children with arrhythmias, depending on the type of arrhythmia [11].

Surgery: Surgical correction or repair is an important treatment for some structural heart diseases or vascular malformations. For example, congenital heart disease such as arterial ductus arteriosus can be surgically blocked to improve the prognosis of the child [12].

Lifestyle interventions: These include a healthy diet, moderate exercise and weight control. A favourable lifestyle can facilitate an improvement in the general health of children and a reduction in the risk of or mitigation of cardiovascular and CVDs [13].

3.2. Treatment of CVDs in adolescents and young people

Medication: Appropriate medications, such as lipid-lowering drugs and antihypertensive drugs, are used according to specific conditions. For adolescent patients with hyperlipidemia, the use of appropriate lipid-lowering drugs can effectively improve blood lipid levels and reduce cardiovascular risk.

Lifestyle modification: A key component of any successful weight loss programme. This encompasses a balanced diet, increased exercise, weight control, and the reduction of bad habits (e.g., smoking, excessive alcohol consumption, etc.). Lifestyle modification can significantly reduce the risk of cardiovascular and CVDs in adolescents, as well as slowing the progression of these diseases.

Psychological intervention: the provision of assistance to adolescents in order to enable them to cope with the psychological pressure that is often associated with the disease. A favourable psychological state will facilitate the recuperation and recuperative process of the disease [14].

3.3. Treatment of CVD in the elderly

A large number of clinical studies and practices have shown that ACEI/ARB and other drugs have a significant effect in regulating blood pressure in the elderly, and can effectively maintain the stability of blood pressure, and at the same time, they also play a positive role in the improvement of cardiac function, and through the inhibition of the renin-angiotensin-aldosterone system, to reduce the cardiac load, reduce the myocardial oxygen consumption, so as to reduce the risk of cardiovascular adverse events. According to the specific condition, the use of angiotensin-converting enzyme inhibitors (ACEI)/angiotensin II receptor antagonists (ARB), β-blockers, calcium channel blockers, statin lipid-lowering drugs, etc., is reasonable.

Rehabilitation therapy is of great significance to elderly patients with cardiovascular and cerebrovascular diseases. Exercise rehabilitation can enhance the cardiorespiratory function, muscle strength and endurance of elderly patients through planned and scientific exercise training, thus improving the overall function of the body. Physiotherapy can relieve pain and improve local blood circulation through various physical factors, such as heat therapy, electrotherapy and magnetic therapy. These factors can play an active role in promoting the recovery of the disease and significantly improve the prognosis of the patients [15].

Lifestyle regulation is crucial for CVD prevention and control. A healthy lifestyle is an essential foundation for the prevention and control of cardiovascular and cerebrovascular diseases. A low-salt and low-fat diet can help to regulate blood pressure and lipid levels, thereby reducing the risk of vascular damage. Moderate exercise can enhance the function of the cardiovascular system and improve the elasticity and compliance of blood vessels. Quitting smoking can prevent the harmful substances in tobacco from damaging the endothelium of the blood vessels and reduce the possibility of thrombosis.

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Controlling body weight plays an important role in reducing the burden on the heart and blood vessels, and improving the metabolic status [16].

3.4. Comparison of treatments by age

As children are at a critical stage of growth and development, treatment decisions need to take into account the potential impact of treatments on children's growth and development. The treatment plan should not only focus on the outcome of the disease, but also take into account the future physical development and healthy growth of the child. There may also be differences in children's tolerance and response to treatment compared to adults, which need to be more carefully assessed and adjusted.

Adolescents emphasise prevention and correction, and adolescence is a critical period for preventing the onset and development of cardiovascular and cerebrovascular disease. The emphasis is on making adolescents aware of the dangers of poor lifestyle choices and correcting bad habits in time through health education and other means. At the same time, a good doctor-patient communication mechanism is to be established so that adolescents can actively participate in the treatment and management of the disease and improve the adherence and effectiveness of treatment.

Elderly patients require comprehensive management due to the decline in their physical functions and the high number of complications. In addition to medication and rehabilitation, attention should be paid to the nutritional status, mental health, and social support of elderly patients. A multidisciplinary and collaborative approach is essential for the provision of comprehensive and personalised treatment services to elderly patients, with the objective of improving their therapeutic outcomes and quality of life.

3.5. Suggestions

Strengthening individualised treatment planning for children, taking full account of each child's specific situation, including age, physical condition, severity of disease and other factors, and formulating more individualised treatment plans. Advanced medical technology and testing methods, such as genetic testing and imaging, are being used to provide a more accurate basis for the formulation of treatment plans. Long-term health monitoring is carried out to monitor the long-term health of children with cardiovascular and cerebrovascular diseases, and regular reviews and assessments are carried out to detect changes in the disease and potential problems in time, and to adjust the treatment plan. At the same time, health monitoring allows us to understand the long-term effects of treatment and the impact on children's growth and development, providing reference for further optimisation of treatment.

In the case of young people, health education should be strengthened, and health education activities should be carried out through multiple channels, such as schools, families and society so that young people can fully understand the prevention of cardiovascular and cerebrovascular diseases and the importance of a healthy lifestyle. The content of education should include such aspects as reasonable diet, moderate exercise, cessation of smoking and limitation of alcohol consumption, and mental health, so as to raise the health awareness and self-care ability of young people.

It is recommended that elderly patients optimise their drug treatment plans and fine-tune them. It is of paramount importance to consider the potential interactions between drugs, as well as the side effects and the liver and kidney functions of elderly patients, when selecting appropriate drug types and dosages. Concurrently, the monitoring and management of drugs should be reinforced in order to guarantee the security and efficacy of drug therapy. Secondly, it is necessary to increase the input of rehabilitation resources, including human, material and financial resources, for the treatment of cardiovascular and cerebrovascular diseases in the elderly. It is recommended that more professional rehabilitation therapists be trained, that rehabilitation treatment facilities and equipment be improved, and that the quality and level of rehabilitation treatment be raised.

4. Conclusion

CVD represents a significant risk to human health, with treatment strategies varying according to age. This paper outlines the causative factors of CVD, the treatments for different age groups, and a

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comparison of treatments. A summary of these elements reveals that treatment in children must consider the impact on growth and development, adolescents focus on prevention and correction, and the elderly require comprehensive management. The treatment of CVD must be tailored to the individual patient, taking into account their age and condition. Concurrently, lifestyle intervention represents a pivotal instrument in the treatment of CVD.

The findings of this study are of considerable importance for the treatment of CVDs. By undertaking a comparative analysis of treatment strategies in different age groups, clinicians can be provided with more scientific and reasonable treatment plans. In addition, the recommendations for improving treatment strategies presented in this paper can also provide more effective guidance for patients' treatment. Nevertheless, it should be noted that this paper is not without limitations. For instance, the research presented in this paper primarily concerns the treatment of CVDs, with a paucity of in-depth discussion on the prevention of CVDs. Furthermore, the study presented in this paper is primarily based on a literature review, and lacks the support of empirical studies. Further studies could investigate the preventive measures of CVDs and the long-term effects of different treatment strategies. Concurrently, future research could also adopt the methodology of empirical studies to validate and optimise the treatment strategies proposed in this paper.

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