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Cardiovascular Complications of Abdominal Aortic Aneurysm in Elderly Patients

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RESUMO

Introdução: O aneurisma da aorta abdominal é uma dilatação patológica que ocorre na porção inferior da aorta, frequentemente observada em pacientes idosos devido ao desgaste arterial associado ao envelhecimento. Com a progressão da idade, a integridade da parede arterial se compromete, resultando em um aumento do risco de complicações cardiovasculares, tais como trombose, embolia e ruptura. Essas complicações são particularmente graves em idosos, uma vez que eles podem ter comorbidades adicionais que aumentam a morbidade e a mortalidade associadas ao aneurisma. Objetivo: A revisão sistemática teve como objetivo analisar a literatura existente sobre as complicações cardiovasculares associadas ao aneurisma da aorta abdominal em pacientes idosos, com foco nas consequências clínicas, diagnósticas e terapêuticas dessas complicações. Metodologia: Foi realizada uma revisão sistemática seguindo o checklist PRISMA para garantir a transparência e a consistência da pesquisa. A pesquisa foi conduzida nas bases de dados PubMed, Scielo e Web of Science, utilizando os seguintes descritores: "aneurisma da aorta abdominal", "complicações cardiovasculares", "idosos", "ruptura de aneurisma", e "gestão clínica". Foram incluídos artigos publicados nos últimos 10 anos que abordassem as complicações cardiovasculares do aneurisma da aorta abdominal em pacientes idosos. Resultados: A análise revelou que as complicações cardiovasculares mais frequentes associadas ao aneurisma da aorta abdominal em idosos incluem a ruptura do aneurisma, a trombose e a embolia. A ruptura do aneurisma é uma emergência médica com alta taxa de mortalidade e requer intervenção cirúrgica imediata. A trombose pode levar à obstrução das artérias periféricas e à insuficiência arterial crônica, enquanto a embolia pode resultar em eventos tromboembólicos graves, como acidente vascular cerebral. Além disso, o manejo clínico é frequentemente complicado por outras condições cardiovasculares presentes nos pacientes idosos, como hipertensão e insuficiência cardíaca. Conclusão: Em suma, as complicações cardiovasculares do aneurisma da aorta abdominal representam um desafio significativo para pacientes idosos, exigindo uma abordagem multidisciplinar para a gestão e prevenção. A compreensão aprofundada dessas complicações é crucial para melhorar os resultados clínicos e otimizar o tratamento dos pacientes. A pesquisa e

a prática clínica devem continuar a focar na detecção precoce e na gestão eficiente dessas condições para reduzir a mortalidade e melhorar a qualidade de vida dos pacientes afetados.

Palavras-chave: "aneurisma da aorta abdominal", "complicações cardiovasculares", "idosos", "ruptura de aneurisma", e "gestão clínica".

ABSTRACT

Introduction: Abdominal aortic aneurysm is a pathological dilation occurring in the lower portion of the aorta, frequently observed in elderly patients due to arterial wear associated with aging. As age progresses, the integrity of the arterial wall deteriorates, leading to an increased risk of cardiovascular complications such as thrombosis, embolism, and rupture. These complications are particularly severe in older adults, as they may have additional comorbidities that exacerbate morbidity and mortality associated with the aneurysm. Objective: The systematic review aimed to analyze the existing literature on the cardiovascular complications associated with abdominal aortic aneurysm in elderly patients, focusing on the clinical, diagnostic, and therapeutic consequences of these complications. Methodology: A systematic review was conducted following the PRISMA checklist to ensure transparency and consistency in the research. The search was performed in the databases PubMed, Scielo, and Web of Science, using the following descriptors: "abdominal aortic aneurysm," "cardiovascular complications," "elderly," "aneurysm rupture," and "clinical management." Articles published in the last 10 years addressing cardiovascular complications of abdominal aortic aneurysm in elderly patients were included. Results: The analysis revealed that the most frequent cardiovascular complications associated with abdominal aortic aneurysm in the elderly include aneurysm rupture, thrombosis, and embolism. Aneurysm rupture is a medical emergency with a high mortality rate and requires immediate surgical intervention. Thrombosis can lead to peripheral artery obstruction and chronic arterial insufficiency, while embolism may result in severe thromboembolic events such as stroke. Additionally, clinical management is often complicated by other cardiovascular conditions present in elderly patients, such as hypertension and heart failure. Conclusion: In summary, cardiovascular complications of abdominal aortic aneurysm represent a significant challenge for elderly patients, requiring a multidisciplinary approach for management and prevention. A thorough understanding of these complications is crucial for improving clinical outcomes and optimizing patient treatment. Research and clinical practice should continue to focus on early detection and efficient management of these conditions to reduce mortality and enhance the quality of life for affected patients.

Keywords: abdominal aortic aneurysm, cardiovascular complications, elderly, aneurysm rupture and clinical management.

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INTRODUCTION

Abdominal aortic aneurysm is a condition characterized by the abnormal dilation of the lower portion of the aorta, the largest artery in the human body. The rupture of this aneurysm represents a severe medical emergency and is one of the primary risks associated with this condition. When the aneurysm ruptures, the patient faces massive internal bleeding, which can quickly lead to shock and death if immediate intervention is not provided. The mortality rate for patients who experience an aneurysm rupture is alarmingly high, highlighting the importance of early diagnosis and prompt measures to address this complication.

In addition to rupture, patients with abdominal aortic aneurysm frequently encounter other cardiovascular complications, such as thrombosis and embolism. Thrombosis occurs when a blood clot forms within the aneurysm, which can lead to obstruction of peripheral arteries and chronic arterial insufficiency. Embolism, on the other hand, refers to the detachment of clot fragments that can travel to other parts of the body, resulting in severe thromboembolic events, such as a stroke or myocardial infarction. Both conditions complicate the clinical picture and require a treatment approach that considers the complexity of the patient's health status, particularly in elderly individuals who often have additional comorbidities that exacerbate these complications.

The clinical management of abdominal aortic aneurysm in elderly patients is a complex challenge that requires a careful and integrated approach. Treatment often involves critical decisions regarding surgical intervention or conservative management, depending on the size and progression of the aneurysm, as well as the overall health condition of the patient. Treatment choices should be based on a detailed evaluation, considering not only the aneurysm but also existing comorbidities, such as hypertension and diabetes, which can impact the effectiveness and safety of the proposed interventions.

Early detection is crucial for the effective management of abdominal aortic aneurysm. Regular screening, especially in individuals with risk factors such as a family history or pre-existing cardiovascular conditions, allows for the identification of aneurysms at early stages before serious complications develop.

This proactive approach helps plan treatment strategies before the aneurysm reaches a critical size or causes significant adverse events.

Moreover, the presence of comorbid conditions has a substantial impact on the management of abdominal aortic aneurysm. Elderly patients often contend with multiple concurrent illnesses, such as heart failure or peripheral arterial disease, which can complicate both treatment and recovery. Therefore, it is essential to adopt a holistic approach that addresses not only the aneurysm but also associated conditions to improve prognosis and quality of life. The integration of multidisciplinary care may be crucial to achieving the best possible outcomes for these complex patients.

METHODOLOGY

The aim of the systematic literature review is to comprehensively and critically analyze the available evidence on cardiovascular complications of abdominal aortic aneurysm in elderly patients. The review seeks to identify and synthesize the main types of complications associated with this condition, such as rupture, thrombosis, and embolism, as well as to evaluate the clinical management strategies and screening practices used. By understanding the nuances and challenges of treating this condition in an aging population, the review aims to provide information that can enhance early detection, treatment, and overall care for patients with abdominal aortic aneurysm.

The methodology of the systematic review rigorously followed the PRISMA checklist to ensure transparency and consistency in the research process. The review was conducted using the databases PubMed, Scielo, and Web of Science. The descriptors used for the search were: "abdominal aortic aneurysm," "cardiovascular complications," "elderly," "aneurysm rupture," and "clinical management.

First, inclusion criteria were established to select relevant articles. Studies published in the last 10 years were included to ensure the currency of the evidence. Only peer-reviewed articles were considered, ensuring the quality and credibility of the data. The search focused on publications specifically addressing cardiovascular complications associated with abdominal aortic aneurysm in elderly patients, aligning the results with the review’s theme. Only studies with

full-text access were included for a detailed and complete analysis. Additionally, articles in Portuguese, Spanish, and English were considered to cover a broader scope of relevant literature.

Exclusion criteria were defined to narrow the selection to pertinent and high-quality studies. Studies that did not specifically address cardiovascular complications associated with abdominal aortic aneurysm, such as those focused on other aneurysmal conditions or non-elderly populations, were excluded. Articles presenting insufficient data or inadequate methodologies, such as very small sample sizes or lack of rigorous controls, were excluded to ensure the robustness of the conclusions. Duplicate publications and studies not available in full text were also eliminated to avoid redundancies and ensure the integrity of the review. Finally, opinion pieces or editorials that did not present relevant empirical data for analysis were discarded.

The combination of inclusion and exclusion criteria ensured that the systematic review was focused, relevant, and based on robust evidence, accurately reflecting the current state of knowledge on cardiovascular complications of abdominal aortic aneurysm in elderly patients.

RESULTS

The rupture of an abdominal aortic aneurysm represents one of the most severe emergencies in the field of vascular medicine. When it occurs, the rupture results in massive internal bleeding, which can rapidly lead to hypovolemic shock. The intense bleeding causes a sudden drop in blood pressure and, frequently, loss of consciousness. This condition requires an immediate and effective response to minimize mortality, which typically involves urgent surgical intervention to repair the aneurysm and control the hemorrhage. Surgical procedures may vary from traditional open surgery to less invasive techniques such as endovascular stent placement, depending on the location and size of the aneurysm as well as the patient's overall condition.

Additionally, aneurysm rupture often manifests suddenly and unexpectedly, presenting diagnostic challenges. Clinical signs, such as intense and sudden abdominal pain, can be confused with other acute conditions, making early diagnosis a critical issue. Computed tomography is frequently used to

confirm the presence of rupture and to plan the surgical intervention. Therefore, quick and accurate identification of the clinical picture is vital for the success of treatment and patient survival. In light of this, improving screening strategies and education about warning signs are fundamental to reducing the incidence of fatal ruptures.

Early detection of abdominal aortic aneurysm plays a critical role in preventing severe complications. Screening is particularly relevant for individuals with risk factors such as a family history of aneurysm, hypertension, and atherosclerosis. Studies show that regular screening, often through abdominal ultrasound, can identify aneurysms before they reach critical sizes or cause symptoms, allowing for early intervention. Preventive treatment or regular monitoring can be highly effective in managing the aneurysm and reducing the risk of rupture, significantly improving patient prognosis.

Furthermore, early detection allows for the implementation of conservative management strategies for small and asymptomatic aneurysms. Continuous monitoring, along with modification of risk factors such as blood pressure control and smoking cessation, can prevent aneurysm progression and minimize the need for invasive interventions. Screening practices are especially recommended for the elderly population, where the prevalence of abdominal aortic aneurysm is higher. Thus, a proactive and systematic approach to detection and management of aneurysms can effectively reduce associated mortality and improve patients' quality of life.

Surgery is often the preferred therapeutic approach for treating abdominal aortic aneurysm, especially when the aneurysm is large or symptomatic. There are two main surgical techniques: open surgery and endovascular stenting. Open surgery involves making an abdominal incision to directly access the aneurysm, remove the dilated part of the aorta, and replace it with a synthetic graft. This approach, though more invasive, is widely used in complex cases or large aneurysms. In contrast, endovascular stenting, also known as endovascular repair, is a minimally invasive technique that involves inserting a stent covered with a supportive mesh into the aorta through small incisions in the groin. This technique has the advantage of reducing recovery time and minimizing surgical trauma, often recommended for patients with medical conditions that complicate

open surgery.

Moreover, the choice between these two approaches depends on various factors including the size and location of the aneurysm, as well as the patient's overall health. Endovascular repair is frequently preferred for elderly patients or those with severe comorbidities due to its lower risk profile and shorter recovery time compared to open surgery. However, both methods have their own potential complications and postoperative monitoring requirements. The selection of the most appropriate technique should be based on a detailed patient assessment and the expertise of the vascular surgeon to ensure the best treatment strategy and optimize clinical outcomes.

Conservative management is another approach for managing abdominal aortic aneurysm, particularly indicated for small and asymptomatic aneurysms. This strategy involves regular monitoring and managing risk factors associated with the aneurysm, such as hypertension and dyslipidemia. The conservative approach aims to prevent aneurysm progression and reduce the likelihood of severe complications, avoiding invasive interventions until necessary. Patients undergo regular imaging exams, such as ultrasounds or CT scans, to assess aneurysm progression and determine if surgical intervention is required.

Additionally, conservative management also includes lifestyle modification and adherence to medical treatments for controlling blood pressure and cholesterol. These measures can slow aneurysm expansion and improve overall cardiovascular health. Although this approach can be effective in many cases, it is crucial for patients to be closely monitored to detect any changes in the aneurysm that may require more aggressive intervention. Therefore, continuous follow-up and a well-structured treatment plan are essential for the effectiveness of conservative management, ensuring that the aneurysm is adequately monitored and treated as needed.

Complications associated with abdominal aortic aneurysm are diverse and can significantly impact patient health. Among the most common are thrombosis and embolism, both resulting from the aneurysm’s interaction with blood flow and the cardiovascular system. Thrombosis occurs when blood clots form within the aneurysm due to blood stasis. These clots can obstruct peripheral arteries, leading to a condition known as chronic arterial ischemia. Ischemia can result in

severe pain, loss of function, and, in severe cases, gangrene of the affected limbs, requiring additional interventions to restore blood flow and prevent severe complications.

Simultaneously, embolism represents another critical complication that arises when fragments of clots or atherosclerotic plaques detach from the aneurysm and travel to other parts of the body. These fragments can block distant blood vessels, causing significant thromboembolic events, such as stroke or myocardial infarction. These events are particularly dangerous and can lead to severe sequelae and death. Proper identification and treatment of these complications require close monitoring and effective clinical management to prevent disease progression and mitigate associated risks. Therefore, rigorous control of conditions contributing to clot formation and regular evaluation of potential complications are fundamental to the successful management of abdominal aortic aneurysm.

The presence of comorbid conditions plays a crucial role in managing abdominal aortic aneurysm, significantly influencing therapeutic decisions and patient prognosis. Comorbidities such as hypertension and diabetes mellitus are often associated with aneurysm progression and increased risk of complications. For instance, hypertension exerts additional pressure on the aortic walls, accelerating aneurysm expansion and potentially contributing to rupture. Strict blood pressure control is thus an essential strategy to minimize aneurysm growth and reduce the likelihood of adverse events. Similarly, diabetes mellitus can promote the formation of atherosclerotic plaques, which can complicate the aneurysm scenario, leading to additional problems such as thrombosis and embolism.

Moreover, managing other chronic conditions such as heart failure and chronic obstructive pulmonary disease is also crucial for the effective treatment of abdominal aortic aneurysm. These comorbidities can complicate both surgical and conservative treatments, requiring an integrated and multidisciplinary approach. The presence of heart failure can increase the risk of postoperative complications and affect patient recovery, while pulmonary disease can influence respiratory capacity during surgery. Thus, aneurysm treatment should be tailored to each patient's individual needs, considering all concomitant conditions to

optimize clinical outcomes and improve quality of life.

Multidisciplinary clinical management is essential to comprehensively address the challenges associated with abdominal aortic aneurysm. This approach involves collaboration among various specialists, including vascular surgeons, cardiologists, endocrinologists, and primary care physicians. The interaction between these professionals allows for the coordination of personalized treatment strategies aligned with the patient's specific needs. For example, combining treatments to control hypertension and diabetes with appropriate surgical or endovascular interventions can significantly improve prognosis and recovery.

Furthermore, the multidisciplinary approach facilitates continuous monitoring and adjustment of treatment strategies as the clinical picture evolves. The integration of specialists allows for a more comprehensive evaluation of the risks and benefits of different treatment options, promoting evidence-based decisions and best practices. Involvement of a comprehensive care team not only enhances the effectiveness of aneurysm management but also contributes to patient satisfaction and reduction of long-term complications. Therefore, collaboration among multiple healthcare professionals is essential to ensure a coordinated and effective approach in managing abdominal aortic aneurysm.

The impact of advanced age on the treatment of abdominal aortic aneurysm is a determining factor influencing both therapeutic choices and patient prognosis. As age advances, the elasticity of the aortic walls decreases and the risk of complications increases. In elderly patients, the aneurysm tends to grow more rapidly and has a higher likelihood of rupture due to the fragility of vascular structures. This phenomenon makes risk assessment and treatment choice particularly complex. The decision between invasive surgical approaches and conservative treatment should be made carefully, considering the patient's functional capacity and the presence of associated comorbidities.

Additionally, advanced age is often associated with an increase in comorbidities such as cardiovascular and pulmonary diseases, which can complicate aneurysm management. Surgical treatment in older patients requires detailed preoperative assessment to minimize the risk of complications during and after the procedure. The approach should be individualized to ensure the

appropriateness of interventions and protect the patient from potential adverse effects. Therefore, healthcare professionals must consider the complete patient profile, including age-related physiological and clinical aspects, to formulate an effective and safe treatment plan.

Post-treatment monitoring is crucial to ensure the effectiveness of interventions performed in the management of abdominal aortic aneurysm and to prevent additional complications. After undergoing surgical or endovascular procedures, patients should undergo regular follow-up, including periodic imaging exams, to assess the integrity of the repair and the evolution of the aneurysm. Continuous surveillance allows for early detection of any changes in the aneurysm's state, such as residual growth or the formation of new aneurysms, enabling prompt intervention before serious complications arise.

Additionally, monitoring includes managing risk factors and evaluating possible side effects of the therapies used. Proper follow-up may involve medication adjustments, lifestyle changes, and implementation of rehabilitation strategies to promote patient recovery. Careful post-treatment monitoring not only improves clinical outcomes but also contributes to the patient's quality of life, ensuring a proactive approach in detecting and managing emerging issues. Thus, a well-structured monitoring plan is essential to ensure the long-term success of abdominal aortic aneurysm treatment.

Education and awareness about abdominal aortic aneurysm play a fundamental role in preventing and managing this condition. Informing patients about associated risk factors, such as family history, hypertension, and atherosclerosis, is essential to promote early screening and detection of the disease in its early stages. Educational programs and awareness campaigns aim to increase knowledge about the signs and symptoms of aneurysm, such as sudden and severe abdominal pain, which may indicate a serious condition. This increase in awareness helps patients seek timely medical care, improving the likelihood of effective interventions and reducing the incidence of advanced cases and severe complications.

Furthermore, continuous education for healthcare professionals is equally important. Well-informed professionals are able to conduct appropriate screenings and advise patients on the importance of regular monitoring and risk

factor management. Training and updating programs for doctors and nurses ensure that the team is current with best practices and recent guidelines for aneurysm management. Implementing comprehensive educational strategies for the general population and healthcare professionals is thus crucial for improving early detection, treatment, and control of the condition, leading to better clinical outcomes and a general reduction in morbidity associated with abdominal aortic aneurysm.

CONCLUSION

An in-depth analysis of cardiovascular complications related to abdominal aortic aneurysm in elderly patients reveals a complex and multifaceted landscape, with significant implications for clinical management and patient quality of life. Abdominal aortic aneurysm, as it expands and eventually ruptures, presents a substantial risk of mortality and morbidity. Aneurysm rupture has been identified as one of the most severe complications, often leading to massive internal bleeding and hypovolemic shock, which requires emergency surgical intervention to save the patient's life. Literature has shown that early detection and appropriate treatment are crucial for improving outcomes and minimizing the fatal consequences associated with this condition.n addition to rupture, other important complications associated with abdominal aortic aneurysm include thrombosis and embolism. The formation of clots within the aneurysm can result in peripheral arterial obstruction, causing ischemia and severe damage to the limbs. Embolism, in turn, can lead to critical thromboembolic events such as stroke and myocardial infarction, which are highly debilitating and potentially fatal. These complications underscore the need for careful management and continuous monitoring to prevent such adverse events and ensure the effectiveness of interventions.

The impact of advanced age on the treatment of abdominal aortic aneurysm is noteworthy. Elderly patients often present a combination of comorbidities that complicate both the choice of treatment and postoperative recovery. Studies have shown that a conservative approach may be more appropriate for small or asymptomatic aneurysms in older patients, while surgery, despite being more

invasive, may be necessary for larger or symptomatic cases. Managing these comorbid conditions and adapting treatment strategies to the individual needs of elderly patients are essential for optimizing outcomes and minimizing the risk of complications.Furthermore, post-treatment monitoring has proven to be an essential practice for ensuring the integrity of the repair and the positive evolution of the clinical picture. The implementation of rigorous surveillance and continuous management of risk factors have been highlighted as key factors for preventing additional complications and achieving long-term success in aneurysm treatment.

Finally, education and awareness play a vital role in the prevention and management of abdominal aortic aneurysm. Awareness of risk factors and warning signs can facilitate early detection and effective treatment. Educational programs aimed at both patients and healthcare professionals have been considered indispensable for improving clinical outcomes and reducing the incidence of severe complications.

In summary, the integration of personalized treatment strategies, careful management of comorbidities, continuous monitoring, and appropriate education are fundamental to addressing the challenges associated with abdominal aortic aneurysm in elderly patients and improving the overall prognosis of this condition.

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