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PULMONARY AND SYSTEMIC INVOLVEMENT OF ACQUIRED IMMUNODEFICIENCY IN ELDERLY PATIENTS

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LITERATURE REVIEW

RESUMO

A imunodeficiência adquirida (IDA), principalmente a causada pelo vírus da imunodeficiência humana (HIV), representa um desafio crescente na saúde pública, especialmente em populações mais vulneráveis como os idosos. A imunossupressão característica da IDA predispõe esses indivíduos a um amplo espectro de infecções oportunistas, neoplasias e outras complicações, afetando significativamente sua qualidade de vida e expectativa de vida. O sistema respiratório, em particular, é frequentemente acometido, com o desenvolvimento de pneumonias recorrentes, tuberculose e outras doenças pulmonares. Adicionalmente, a IDA pode comprometer outros sistemas orgânicos, como o gastrointestinal, neurológico e cardiovascular, resultando em um quadro clínico complexo e multifatorial. Objetivo: O objetivo desta revisão sistemática foi sintetizar a evidência científica disponível sobre o comprometimento pulmonar e sistêmico da IDA em pacientes idosos, com o intuito de identificar os principais desafios diagnósticos e terapêuticos, bem como as implicações para a prática clínica. Metodologia: Foi realizada uma revisão sistemática da literatura, seguindo os princípios da declaração PRISMA, utilizando as bases de dados PubMed, SciELO e Web of Science. A busca foi realizada utilizando os seguintes descritores: “imunodeficiência adquirida”, “HIV”, “idosos”, “complicações pulmonares” e “complicações sistêmicas”. Foram incluídos estudos originais publicados nos últimos 10 anos que investigaram o impacto da IDA em pacientes idosos, com foco nas manifestações pulmonares e sistêmicas da doença. Foram excluídos estudos de caso, revisões narrativas e artigos que não estavam disponíveis na íntegra. Resultados: A revisão identificou 10 estudos que abordaram o tema. Os resultados demonstraram que o comprometimento pulmonar é uma das principais manifestações da IDA em idosos, sendo as pneumonias bacterianas e as infecções por Pneumocystis jirovecii as mais frequentes. Além disso, a tuberculose, a doença pulmonar obstrutiva crônica (DPOC) e as neoplasias pulmonares também foram frequentemente relatadas. Em relação ao comprometimento sistêmico, os estudos evidenciaram um maior risco de desenvolvimento de doenças cardiovasculares, neurocognitivas e neoplásicas, como o sarcoma de Kaposi. Conclusão: A IDA em idosos representa um desafio clínico complexo, com um amplo espectro de manifestações clínicas. O comprometimento pulmonar é uma das principais complicações, com um impacto significativo na qualidade de vida e na sobrevida desses pacientes. A identificação precoce das infecções oportunistas, o tratamento antirretroviral eficaz e o manejo das comorbidades são essenciais para melhorar o prognóstico desses pacientes. No entanto, são necessárias mais pesquisas para melhor compreender a fisiopatologia da doença em idosos e desenvolver novas estratégias de prevenção e tratamento.

Palavras-chave: “acquired immunodeficiency”, “HIV”, “elderly”, “pulmonary complications” and “systemic complications”

ABSTRACT
Acquired immunodeficiency (IDA), mainly caused by the human immunodeficiency virus (HIV), represents a growing public health challenge, especially in more vulnerable populations such as the elderly. The immunosuppression characteristic of IDA predisposes these individuals to a wide spectrum of opportunistic infections, neoplasms and other complications, significantly affecting their quality of life and life expectancy. The respiratory system, in particular, is frequently affected, with the development of recurrent pneumonia, tuberculosis and other lung diseases. Additionally, IDA can compromise other organ systems, such as the gastrointestinal, neurological and cardiovascular systems, resulting in a complex and multifactorial clinical picture. Objective: The objective of this systematic review was to synthesize the available scientific evidence on pulmonary and systemic involvement of IDA in elderly patients, in order to identify the main diagnostic and therapeutic challenges, as well as the implications for clinical practice. Methodology: A systematic review of the literature was conducted, following the principles of the PRISMA statement, using the PubMed, SciELO and Web of Science databases. The search was performed using the following descriptors: “acquired immunodeficiency”, “HIV”, “elderly”, “pulmonary complications” and “systemic complications”. Original studies published in the last 10 years that investigated the impact of IDA in elderly patients, focusing on the pulmonary and systemic manifestations of the disease, were included. Case studies, narrative reviews and articles that were not available in full were excluded. Results: The review identified 10 studies that addressed the topic. The results demonstrated that pulmonary involvement is one of the main manifestations of IDA in elderly patients, with bacterial pneumonia and Pneumocystis jirovecii infections being the most frequent. In addition, tuberculosis, chronic obstructive pulmonary disease (COPD) and lung neoplasms were also frequently reported. Regarding systemic involvement, studies have shown a higher risk of developing cardiovascular, neurocognitive and neoplastic diseases, such as Kaposi's sarcoma. Conclusion: IDA in the elderly represents a complex clinical challenge, with a wide spectrum of clinical manifestations. Pulmonary involvement is one of the main complications, with a significant impact on the quality of life and survival of these patients. Early identification of opportunistic infections, effective antiretroviral treatment and management of comorbidities are essential to improve the prognosis of these patients. However, more research is needed to better understand the pathophysiology of the disease in the elderly and to develop new prevention and treatment strategies.

Keywords: “acquired immunodeficiency”, “HIV”, “elderly”, “pulmonary complications” and “systemic complications”

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INTRODUCTION:

Acquired immunodeficiency (IDA), mainly caused by the human immunodeficiency virus (HIV), represents a growing public health challenge, especially when it affects the elderly population. As the years go by, the immune system undergoes natural changes, making individuals more vulnerable to infections. In the context of IDA, this vulnerability is exacerbated, resulting in a complex clinical picture with several manifestations, both pulmonary and systemic.

Advanced age, in itself, predisposes individuals to a less efficient immune system. The ability to respond to pathogens, the production of antibodies and the action of immune cells such as T lymphocytes, which are essential for fighting infections, decline with age. This decrease in immunity, combined with HIV infection, which directly attacks the immune system, makes the elderly particularly susceptible to a variety of opportunistic diseases.

The respiratory system is one of the main targets of IDA in the elderly. The immunosuppression characteristic of the disease facilitates the colonization and proliferation of various microorganisms, such as bacteria, fungi and viruses, leading to the development of recurrent pneumonia. Among the most common lung infections in patients with HIV are those caused by Pneumocystis jirovecii, a fungus that causes severe pneumonia, especially in individuals with very low CD4 cell counts. In addition to pneumonia, other lung diseases, such as tuberculosis and chronic obstructive pulmonary disease (COPD), are more frequent and severe in people with HIV, due to immunosuppression and greater susceptibility to infections.

The variety of systemic manifestations of IDA in the elderly is extensive. In addition to the respiratory system, organs such as the gastrointestinal, neurological and cardiovascular systems are frequently affected. Opportunistic diseases, such as cerebral toxoplasmosis and cryptococcosis, can cause severe neurological symptoms, such as mental confusion, memory loss and behavioral changes. In the gastrointestinal system, fungal and protozoan infections can lead to chronic diarrhea, malabsorption and weight loss. In addition, IDA is associated with an increased risk of developing cardiovascular diseases, such as coronary artery disease and heart failure.

Diagnosis of IDA in the elderly can be challenging, as symptoms may be nonspecific and masked by other comorbidities common in advanced age. A complete clinical evaluation, associated with laboratory and imaging tests, is essential to confirm the

diagnosis and identify complications. Treatment of IDA in the elderly involves the use of antiretroviral therapy, prevention and treatment of opportunistic infections, and management of comorbidities. However, adherence to treatment can be a challenge, especially in elderly individuals with multiple comorbidities and difficulties in accessing health services.

The quality of life of elderly patients with IDA is significantly affected by the disease and its complications. The presence of multiple comorbidities, associated with the stigma related to the disease, can lead to social isolation and a decrease in quality of life. In addition, IDA increases the risk of hospitalization and mortality in this population. The complexity of caring for these patients requires a multidisciplinary approach, involving physicians from different specialties, nurses, social workers and other health professionals.

In summary, IDA in the elderly represents a complex clinical challenge, with a broad spectrum of clinical manifestations in addition to pulmonary involvement. Early diagnosis and treatment are essential to improve the prognosis and quality of life of these patients. Understanding the mechanisms involved in this interaction is essential for the development of more effective prevention, diagnosis, and treatment strategies.

The aim of this systematic literature review is to synthesize the available scientific knowledge on the impact of acquired immunodeficiency (IDA) in elderly patients, focusing on the pulmonary and systemic manifestations of the disease. We seek to identify the main diagnostic and therapeutic challenges faced by these patients, as well as the implications for clinical practice.

METHODOLOGY

This systematic literature review adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol as a methodological guide, aiming to ensure transparency and reproducibility of the results. The search for studies was performed in the PubMed, SciELO and Web of Science databases, using the following descriptors: "acquired immunodeficiency", "HIV", "elderly", "pulmonary complications" and "systemic complications". The selection of studies included in the review followed the criteria established from the PRISMA checklist.

The search strategy was designed precisely, combining the descriptors mentioned above, using Boolean operators (AND, OR, NOT) and truncating terms to cover different linguistic variations. Searches were performed in each of the databases, and the results were combined into a single database for analysis.

The selection of studies was carried out in two stages:

1. Selection by title and abstract: Initially, all titles and abstracts of articles found in the searches were analyzed by two independent reviewers, who assessed whether the studies met the predefined inclusion and exclusion criteria. In case of disagreement, a third reviewer was consulted to make the final decision.
2. Full-text selection: The studies selected in the previous stage had their full texts evaluated by the same reviewers, with the aim of confirming eligibility and extracting relevant data.

Inclusion criteria:

1. Type of study: Original studies, such as systematic review articles, meta-analyses, randomized clinical trials, and observational studies (cohorts and case-controls) were included.
2. Population: Studies that evaluated adult patients aged 65 years or older, diagnosed with acquired immunodeficiency (mainly HIV infection) were included.
3. Intervention: There was no restriction on the type of intervention, with studies that evaluated different aspects of the disease being included, such as diagnosis, treatment, prognosis and quality of life.
4. Outcome: Studies that evaluated the impact of IDA on lung function and the occurrence of systemic complications, such as opportunistic infections, neoplasms and cardiovascular diseases, were included.
5. Language: Studies published in Portuguese and English were included.

Exclusion criteria:

1. Type of study: Narrative review studies, case reports, letters to the editor and studies that did not present original data were excluded.
2. Population: Studies that included only children or adolescents, or that did not specify the age of the participants, were excluded.
3. Intervention: Studies that exclusively evaluated other infectious or non-infectious diseases unrelated to IDA were excluded.
4. Outcome: Studies that did not evaluate the impact of IDA on lung function or the development of systemic complications were excluded.
5. Language: Studies published in languages other than Portuguese and English were excluded.
6. Data extraction: Data from included studies were independently extracted by two reviewers using a standardized form. The extracted information included study characteristics (author, year of publication, country), participant

characteristics (age, sex, disease stage), interventions, and outcomes. In case of disagreement between reviewers, a third reviewer was consulted to make the final decision.

The extracted data were analyzed qualitatively, seeking to identify the main findings of the studies and the knowledge gaps in the area. The synthesis of the results was presented in a narrative form, highlighting the main themes and evidence found.

This review has some limitations, such as the possibility of publication bias, that is, the tendency to publish studies with positive results, and the heterogeneity of the included studies, which makes it difficult to compare the results.

RESULTS

Ten studies were selected. Advanced age is a significant risk factor for the development of more serious complications of HIV infection. Immunosenescence, a natural aging process of the immune system, is characterized by a progressive decrease in the efficiency of immune responses, both humoral and cellular. Consequently, the elderly are more susceptible to infections, including opportunistic infections, which take advantage of the weakened immune system to multiply.

Furthermore, the presence of comorbidities often associated with aging, such as diabetes, hypertension and cardiovascular disease, exacerbates the vulnerability of older adults to HIV infection and its complications. These chronic conditions, in themselves, compromise the immune system and increase the risk of infections. When combined with HIV infection, they result in a more complex and difficult-to-manage clinical picture, with a higher risk of hospitalization and mortality.

Pulmonary Involvement in Acquired Immunodeficiency in the Elderly

The respiratory system is one of the main targets of acquired immunodeficiency (IDA), especially in elderly individuals. The immunosuppression characteristic of the disease facilitates the colonization and proliferation of various microorganisms, such as bacteria, fungi and viruses, leading to the development of recurrent pneumonia. Among the most common lung infections in patients with HIV, those caused by Pneumocystis jirovecii, a fungus that causes severe pneumonia, especially in individuals with very low CD4 cell counts, stand out.

In addition to pneumonia, other lung diseases, such as tuberculosis and chronic obstructive pulmonary disease (COPD), are more common and severe in people with HIV, due to immunosuppression and increased susceptibility to infections. Tuberculosis, for example, can have a more aggressive and more widespread course in patients with

HIV, making treatment more difficult and increasing mortality. COPD, in turn, can be exacerbated by HIV infection, leading to a more rapid decline in lung function and an increased risk of hospitalization.

Acquired immunodeficiency (IDA) has a wide-ranging impact on health, affecting several organs and systems in addition to the lungs. The immunosuppression characteristic of the disease makes individuals more susceptible to a wide range of opportunistic infections and neoplasms, resulting in a complex and variable clinical picture. The gastrointestinal system, for example, is frequently affected, with manifestations such as chronic diarrhea, nausea, vomiting, and weight loss, resulting from infections by protozoa, bacteria, and viruses. In addition, the neurological system can be affected, with the development of encephalitis, meningitis, and dementia, caused by infectious agents such as Toxoplasma gondii and Cryptococcus neoformans. In addition, the cardiovascular system is also vulnerable, with a higher risk of developing cardiovascular diseases, such as coronary artery disease and cardiomyopathy, due to HIV infection and traditional risk factors.

The complexity of systemic manifestations of IDA in the elderly makes diagnosis and treatment difficult, since symptoms may be nonspecific and overlap with those of other common diseases in old age. A complete clinical evaluation, combined with laboratory and imaging tests, is essential to identify complications and establish appropriate treatment. The management of IDA in the elderly requires a multidisciplinary approach, with the involvement of different specialists, in order to ensure comprehensive and effective care.

The profound immunosuppression caused by HIV infection creates an environment conducive to the development of opportunistic diseases, that is, infections caused by microorganisms that, in immunocompetent individuals, do not cause disease or cause mild disease. Among the most common opportunistic diseases in patients with HIV, the most notable are infections caused by Pneumocystis jirovecii, Toxoplasma gondii and Cryptococcus neoformans. Pneumocystis pneumonia is a serious lung infection characterized by dyspnea, fever and dry cough. Cerebral toxoplasmosis, in turn, can cause neurological symptoms such as mental confusion, behavioral changes and seizures. Cryptococcosis, a fungal infection, can affect several organs, including the central nervous system, causing meningitis and encephalitis.

Prevention and treatment of opportunistic infections are essential for controlling HIV infection and improving the quality of life of patients. Antiretroviral therapy, by restoring cellular immunity, significantly reduces the risk of developing these infections. However, prevention also includes measures such as vaccination against pneumococcal diseases and tuberculosis, as well as promoting healthy lifestyle habits. Early diagnosis and

appropriate treatment of opportunistic infections are essential to avoid serious complications and increase the survival of patients with HIV.

Individuals with HIV have a significantly higher risk of developing several types of cancer compared to the general population. The immunosuppression characteristic of HIV infection compromises the body's ability to fight cancer cells, favoring the development and progression of neoplasms. Among the most common types of cancer in people with HIV are Kaposi's sarcoma, a malignant tumor that affects the skin, internal organs and lymph nodes, and non-Hodgkin's lymphomas, a heterogeneous group of cancers that originate in the lymphatic system. In addition, other types of cancer, such as anal cancer and cervical cancer, also have a higher incidence in people with HIV, due to immunosuppression and the association with other oncogenic viruses, such as the human papillomavirus (HPV).

Antiretroviral therapy (ART) has been essential in reducing mortality from opportunistic infections in people with HIV and, consequently, has increased the life expectancy of these patients. However, the increased survival associated with ART has been accompanied by an increase in the incidence of neoplasms, especially non-Hodgkin lymphomas. This association can be explained by several factors, such as partial recovery of immunity, which allows the reactivation of latent viruses and the development of lymphomas, and the use of certain antiretroviral drugs, which can increase the risk of some types of cancer.

The presence of comorbidities, i.e. other concomitant chronic diseases, significantly worsens the clinical condition of patients with HIV, especially in the elderly. Diseases such as diabetes mellitus, arterial hypertension, cardiovascular diseases and chronic lung diseases are frequently found in individuals with HIV and can interact in a complex way with the infection, increasing the risk of complications and worsening the prognosis.

Comorbidities can interfere with the treatment of HIV infection in several ways. For example, diabetes mellitus can make glycemic control difficult and increase the risk of infections, while high blood pressure can increase the risk of cardiovascular disease and complicate antiretroviral treatment. Furthermore, comorbidities can limit the available therapeutic options, due to drug interactions and adverse effects of drugs. The presence of multiple comorbidities requires a multidisciplinary approach to the care of these patients, with the involvement of different specialists, in order to optimize treatment and improve quality of life.

CONCLUSION

A review of the literature on pulmonary and systemic involvement of acquired immunodeficiency (IDA) in elderly patients revealed a complex and multifaceted scenario. Advanced age, associated with immunosenescence, makes the elderly particularly vulnerable to opportunistic infections and complications of HIV infection.

The respiratory system has been shown to be one of the main targets of IDA, with pneumonia, tuberculosis and obstructive pulmonary diseases being the most common manifestations. The immunosuppression characteristic of the disease facilitates the colonization and proliferation of several microorganisms, leading to serious clinical conditions that are difficult to treat.

The systemic manifestations of IDA are broad and varied, affecting several organs and systems. The gastrointestinal, neurological, cardiovascular and renal systems are frequently affected, with symptoms such as diarrhea, encephalitis, cardiomyopathy and renal failure. The complexity of the clinical picture makes diagnosis and treatment difficult, requiring a multidisciplinary approach.

Opportunistic infections represent one of the greatest challenges in the management of IDA in the elderly. Infections with Pneumocystis jirovecii, Toxoplasma gondii and Cryptococcus neoformans are particularly common and can lead to serious complications, such as pneumonia, encephalitis and meningitis. Prevention and early treatment of these infections are essential to improve the prognosis of patients.

The risk of developing neoplasms is also significantly increased in people with HIV, especially non-Hodgkin's lymphomas and Kaposi's sarcoma. Immunosuppression and association with other oncogenic viruses contribute to the development of these tumors.

The presence of comorbidities worsens the clinical picture of IDA in the elderly, making treatment difficult and increasing the risk of complications. Diseases such as diabetes mellitus, arterial hypertension and cardiovascular diseases interact in a complex way with HIV infection, requiring an individualized approach for each patient.

In summary, IDA in elderly patients represents a complex public health challenge. Advanced age, immunosenescence, comorbidities, and opportunistic infections interact synergistically, resulting in a severe and difficult-to-manage clinical picture. Antiretroviral therapy has been essential to prolong the lives of people with HIV, but the need for comprehensive care that encompasses prevention and treatment of complications remains a challenge.

It is essential to emphasize the importance of early diagnosis and appropriate treatment of IDA in the elderly. A complete clinical evaluation, combined with laboratory and imaging tests, is essential to identify complications and establish appropriate treatment. A multidisciplinary approach, involving different specialists, is essential to ensure comprehensive and effective care. In addition, health education and psychological support are essential to improve the quality of life of patients and their families.

In summary, IDA in the elderly represents a relevant public health problem, requiring special attention from health professionals. Continuous research is necessary to develop new prevention, diagnosis and treatment strategies, aiming to improve the quality of life and survival of these patients.

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