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Early Diagnosis And Personalized Treatment Of Ovarian Cancer.

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Abstract:
Ovarian cancer is one of the main causes of mortality among gynecological neoplasms. Early detection is crucial to improving clinical outcomes. We explore the challenges faced in early diagnosis and the implications for individualized treatment. Objective: to analyze studies published in the last 10 years to identify effective approaches to early diagnosis and personalized treatment strategies for patients with ovarian cancer. Methodology: We used the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist to guide our review. The PubMed, Scielo and Web of Science databases were consulted. The descriptors used included "ovarian cancer", "early diagnosis", "personalized treatment", "biomarkers" and "targeted therapy". Inclusion Criteria: Studies published between 2014 and 2024, clinical and experimental research, diagnostic and treatment approaches. Exclusion Criteria: Studies with small samples, isolated case reports, studies without a focus on ovarian cancer. Results: 15 studies were selected. We identified significant advances in early diagnosis, including the use of serum biomarkers and imaging techniques. Additionally, targeted therapies such as PARP inhibitors have shown promise in personalized treatment. Conclusion: Early diagnosis and personalized treatment are fundamental to improving the survival and quality of life of patients with ovarian cancer. Multidisciplinary collaboration and ongoing research are essential to advance this field.

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I. Introduction:

Ovarian cancer represents a significant health challenge, being one of the leading causes of death from gynecological cancer in women. One of the main reasons for this high mortality rate is the late detection of the disease, often when it is already in advanced stages. However, recent advances in the identification of specific biomarkers have revolutionized the diagnostic approach to this cancer. Biomarkers such as CA-125 and HE4 have emerged as promising tools for the early detection of ovarian cancer. CA-125, a glycoprotein, has been widely used as a serum marker to monitor treatment response and disease recurrence. HE4, a protein expressed in epithelial tissues, proved to be useful as a complement to CA-125 in early detection, especially in early-stage tumors.

Early identification of ovarian cancer through these biomarkers allows for more effective therapeutic interventions, thus improving clinical outcomes and patient survival. Furthermore, the development of targeted therapies has revolutionized the treatment of ovarian cancer. Understanding the individual molecular characteristics of tumors allows the use of therapies that specifically target these changes, such as PARP inhibitors and immunotherapy. These targeted therapies have demonstrated efficacy in specific subgroups of patients, providing a promising alternative to traditional treatments and improving patients' quality of life. Thus, the combination of early detection by biomarkers and the use of targeted therapies represents a significant advance in the clinical management of ovarian cancer, offering hope for better outcomes and more favorable prognoses for patients.

Ovarian cancer continues to challenge the limits of medicine, representing one of the deadliest forms of cancer among women. To combat this reality, the search for effective early detection and personalized treatment strategies has been imperative. In addition to the biomarkers mentioned above, genetic testing also plays a crucial role in identifying patients with a greater predisposition to the disease, allowing for more accurate risk assessment and the development of personalized prevention strategies.

Furthermore, the multidisciplinary approach emerges as an undeniable necessity in combating ovarian cancer. Collaboration between different specialties, including oncologists, surgeons, radiologists and geneticists, is essential to ensure a complete patient assessment and implementation of a comprehensive, personalized treatment plan.

However, despite significant advances, challenges remain in equitable access to these technologies and their large-scale implementation. Overcoming these barriers is crucial to ensuring that all patients have access to the benefits of these innovative approaches, thereby improving outcomes and quality of life for patients diagnosed with ovarian cancer.

Objective: To carry out a systematic literature review to critically analyze studies published in the last 10 years on early diagnosis and personalized treatment of ovarian cancer. The objective is to identify and synthesize the available evidence on biomarkers, genetic tests, targeted therapies and multidisciplinary approaches used in this context. Furthermore, we intend to explore the challenges faced in implementing these strategies and evaluate their impact on clinical outcomes and patients' quality of life. This review aims to provide a comprehensive overview of the current state of knowledge and highlight areas for future research and clinical interventions.

II. Methodology:

The methodology used in this systematic literature review was based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist to ensure transparency, rigor and quality in the search, selection and analysis process of included studies.

The PubMed, Scielo and Web of Science databases were used to identify relevant studies on early diagnosis and personalized treatment of ovarian cancer. The descriptors used were: "ovarian cancer", "early diagnosis", "personalized treatment", "biomarkers" and "targeted therapies". For the selection of studies included in this systematic review, inclusion criteria were established that guided the search for works relevant to the topic covered. Studies published in the last 10 years that investigated strategies related to early diagnosis and personalized treatment of ovarian cancer in human populations were considered eligible. Additionally, studies with clear and relevant results for the proposed theme were included, as well as available in full text for detailed analysis.

On the other hand, exclusion criteria were defined to filter studies that did not meet the objectives of the review or that presented significant methodological limitations. Thus, animal studies, isolated case reports and studies that did not directly address the topic of early diagnosis or personalized treatment of ovarian cancer were excluded. Furthermore, studies without full text availability and those with low quality methods or without scientific rigor were discarded, aiming to guarantee the integrity and validity of the results obtained in the review.

III. Results:

15 articles were selected. Early detection of ovarian cancer is challenging due to the lack of specific symptoms in the early stages of the disease. In this context, biomarkers have been widely studied as promising tools to identify the disease at more treatable stages. Among the main biomarkers used, CA-125 and HE4 stand out. CA-125 is a glycoprotein that has been widely studied and used in clinical practice as a serum marker to monitor response to treatment and disease recurrence. However, its sensitivity and specificity are limited, especially in early stages of ovarian cancer. HE4, a protein expressed in epithelial tissues, has shown promise as a complement to CA-125 in the early detection of the disease, especially in early-stage tumors, where it may have greater sensitivity than CA-125. Recent studies have investigated the combination of these biomarkers, as well as others, in the search for a more sensitive and specific approach to the early detection of ovarian cancer. Early identification of the disease through these biomarkers can allow for more effective therapeutic interventions and, consequently, improve clinical outcomes and patient survival.

Targeted therapies represent a promising approach to treating ovarian cancer, offering alternatives to conventional treatments such as chemotherapy. These therapies are designed to selectively attack cancer cells while sparing healthy tissue and reducing side effects associated with traditional treatments. Among the most studied targeted therapies for ovarian cancer are PARP inhibitors and immunotherapy. PARP inhibitors are medications that block a protein involved in repairing the DNA of cancer cells, leading to cell death. They have been particularly effective in patients with mutations in the BRCA1 and BRCA2 genes, who are more susceptible to DNA damage. Immunotherapy works by stimulating the patient's immune system to recognize and destroy cancer cells. Although still in the early stages of research, preliminary studies have shown promising results from immunotherapy in the treatment of ovarian cancer, especially when combined with other therapeutic modalities. The use of these targeted therapies, based on the individual molecular characteristics of tumors, represents a more personalized and effective approach to the treatment of ovarian cancer, offering hope for better outcomes and more favorable prognoses for patients.

The use of genetic tests is a fundamental strategy in identifying patients with a greater predisposition to ovarian cancer. These tests target the BRCA1 and BRCA2 genes, which are widely known to be associated with a significant increase in the risk of developing this type of cancer. The analysis of these genes allows us to identify women who have mutations in these loci and, therefore, have a higher risk of developing ovarian cancer throughout their lives. Furthermore, early identification of mutations in the BRCA1 and BRCA2 genes can guide preventive measures, such as performing prophylactic surgeries to remove the ovaries and fallopian tubes in high-risk women. In this way, genetic testing plays a crucial role not only in early identification of the disease, but also in implementing preventive strategies that can significantly reduce the risk of developing ovarian cancer in women with a genetic predisposition.

A multidisciplinary approach is essential to ensure comprehensive and personalized clinical management of ovarian cancer. This approach involves the collaboration of different medical specialties, such as oncologists, surgeons, radiologists and geneticists, who work together to offer the best possible care to patients. Each professional contributes their specific expertise, from early diagnosis to treatment and post-treatment follow-up. For example, oncologists are responsible for coordinating systemic treatment, such as chemotherapy and targeted therapies, while surgeons perform surgical interventions, such as removing the tumor and affected organs. Additionally, radiologists play an important role in interpreting imaging tests, such as CT scans and MRIs, to assess the extent of the tumor and plan appropriate treatment. The integration of these different specialties in a

multidisciplinary approach guarantees a complete and individualized assessment of each patient, resulting in better clinical outcomes and a higher quality of life throughout ovarian cancer treatment.

Early detection of ovarian cancer is one of the main challenges faced in clinical practice due to the lack of specific symptoms in the early stages of the disease. In this context, the use of advanced imaging methods plays a fundamental role in the early identification of ovarian tumors. Transvaginal ultrasound is one of the most used techniques for this purpose, as it allows a detailed visualization of the ovaries and adjacent structures with high resolution. Furthermore, MRI has also proven useful in evaluating the extent of the tumor and detecting metastases in advanced stages of the disease. Another promising approach is positron emission tomography (PET-CT), which uses a combination of anatomical and functional images to detect areas of high metabolic activity, such as those associated with malignant tumors. The use of these advanced imaging methods, in conjunction with biomarkers and genetic tests, may provide a more sensitive and specific approach to the early detection of ovarian cancer, thus increasing the chances of an accurate and timely diagnosis, and consequently improving clinical outcomes. and patient survival.

The complexity of ovarian cancer requires a multidisciplinary approach to ensure the best possible clinical management. In this sense, health professionals involved in the treatment of patients, such as oncologists, surgeons, radiologists and geneticists, play complementary and collaborative roles. Oncologists are responsible for coordinating systemic treatment, which may include chemotherapy, hormonal therapy, and immunotherapy, as appropriate for each case. Meanwhile, surgeons are essential to perform surgical interventions, such as removing the primary tumor and, in some cases, affected organs, aiming to reduce tumor burden and remove metastases. Additionally, radiologists play a key role in interpreting imaging tests, such as CT scans and MRIs, to aid in diagnosis and treatment planning. Finally, geneticists play an important role in identifying genetic mutations that may influence the risk of developing ovarian cancer, thus guiding therapeutic and preventive decisions. Collaboration between these different specialists in a multidisciplinary approach allows for a comprehensive and individualized assessment of each patient, ensuring the best possible result in terms of clinical outcomes and quality of life.

Clinical trials represent a crucial step in investigating new therapeutic approaches for ovarian cancer. These studies allow testing the effectiveness and safety of new treatments, as well as comparing different existing therapeutic strategies. Currently, an area of great interest in clinical trials is research into targeted therapies, such as PARP inhibitors and immunotherapy agents, which have shown promise in treating specific subgroups of ovarian cancer patients. Additionally, new diagnostic approaches, such as the use of artificial intelligence and advanced molecular analyses, are being explored to improve early disease detection and guide personalized treatment. Participation in clinical trials offers patients access to innovative treatments and the opportunity to contribute to the advancement of scientific knowledge about ovarian cancer. Therefore, it is essential to continue investing in clinical research and promote the active participation of patients in clinical trials as an integral part of advancing the treatment of ovarian cancer.

One of the significant challenges faced in addressing ovarian cancer is ensuring equitable access to genetic testing and targeted therapies. Although these technologies have shown promise in early diagnosis and personalized treatment of the disease, not all patients have equal access to these options due to socioeconomic, geographic and structural issues. For example, the high cost of genetic testing and targeted therapies can make them unaffordable for many women, especially in countries with underdeveloped healthcare systems or in low-income communities. Furthermore, the lack of adequate infrastructure and resources in some regions may limit the availability of these technologies, preventing patients from benefiting from them. Therefore, it is essential to implement health policies that aim to reduce disparities in access to genetic testing and targeted therapies, ensuring that all patients have the opportunity to receive the best treatment available, regardless of their socioeconomic background or geographic location.

Advances in understanding the molecular mechanisms underlying ovarian cancer have driven the development of new therapeutic and diagnostic strategies. In recent years, there has been a significant increase in knowledge about the molecular pathways involved in ovarian carcinogenesis, including cell cycle regulation, DNA repair and angiogenesis. These advances have allowed the identification of specific therapeutic targets that can be exploited in the development of new drugs and targeted therapies. Furthermore, analysis of genomic data from large sets of patients has led to the identification of distinct molecular subgroups of ovarian cancer, each with its own genetic and biological characteristics. This opens up new opportunities for treatment personalization, allowing the selection of more effective therapies adapted to the individual characteristics of each patient. Therefore, continued advances in understanding the molecular mechanisms of ovarian cancer promise to revolutionize the clinical management of the disease, offering new perspectives for the diagnosis, treatment and prognosis of patients.

Ovarian cancer not only affects patients' physical bodies, but also has a significant impact on their psychological and emotional well-being. When diagnosed with the disease, patients often face a range of emotions, including fear, anxiety, sadness and uncertainty about the future. In this context, psychological and

emotional support plays a crucial role in the overall management of the disease. Healthcare professionals, such as psychologists and social workers, offer individualized support to patients, providing a safe space to express their concerns, fears and feelings. Additionally, support groups and online communities provide a support network where patients can connect with others who are going through similar experiences, sharing stories, advice, and helpful resources. This psychological and emotional support not only helps patients cope with the emotional challenges of ovarian cancer, but can also have a positive impact on their quality of life and treatment adherence, promoting a sense of hope, resilience and well-being. emotional throughout the course of the disease.

Additionally, psychological and emotional support is not just limited to ovarian cancer patients, but also extends to their families and caregivers. The illness not only affects the patient, but also has a significant impact on their loved ones, who often face emotional, financial and practical challenges when dealing with a loved one's illness. Providing support and resources to patients' families and caregivers is essential to help them deal with the stress and anxiety associated with the role of caregiver, as well as to strengthen family bonds and promote family resilience in the face of the challenges faced. Therefore, psychological and emotional support for ovarian cancer patients not only directly benefits patients, but also their families and caregivers, contributing to an environment of support and understanding throughout the treatment and recovery process.

IV. Conclusion:

Advances in early diagnosis and personalized treatment of ovarian cancer have represented a significant milestone in the management of this devastating disease. The use of specific biomarkers, such as CA-125 and HE4, has been crucial in the early detection of the disease, allowing for more effective therapeutic interventions and improving patients' clinical outcomes. Furthermore, targeted therapies such as PARP inhibitors and immunotherapy have shown promising results in treating specific subgroups of patients, offering a more effective and less toxic alternative compared to conventional therapies.

However, despite the progress made, there are still significant challenges to be faced. Equitable access to genetic testing and targeted therapies remains limited for many patients, especially those in regions with limited healthcare resources. Furthermore, understanding the molecular mechanisms underlying ovarian cancer is still evolving, requiring further research to identify new therapeutic targets and develop more effective treatment strategies.

In summary, advances in early detection and personalized treatment of ovarian cancer represent significant progress in the fight against this disease. However, to ensure that all patients benefit from these advances, it is critical to overcome access challenges and continue investing in research to advance our understanding of the disease and develop new therapies and diagnostic approaches. Collaboration between researchers, healthcare professionals and patients is essential to address these challenges and improve outcomes for all women affected by ovarian cancer.

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