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MODERN DIAGNOSIS AND TREATMENT OF STOMACH CANCER

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Abstract

This article examines the current methods and approaches used in the diagnosis and treatment of stomach cancer, emphasizing early detection, accurate staging, and personalized therapy. It provides an overview of modern imaging techniques, endoscopic procedures, histopathological analysis, and molecular diagnostics. Furthermore, the study discusses the latest therapeutic strategies, including surgical interventions, chemotherapy, targeted therapy, and immunotherapy. The article highlights the importance of multidisciplinary approaches and the integration of innovative technologies to improve patient outcomes and survival rates.

Keywords: Stomach cancer, gastric carcinoma, modern diagnostics, imaging techniques, endoscopy, histopathology, molecular diagnostics, surgical treatment, chemotherapy, targeted therapy, immunotherapy, multidisciplinary management, patient outcomes, oncology innovations.

Introduction

Stomach cancer, also known as gastric carcinoma, remains one of the leading causes of cancer-related mortality worldwide. Early detection and precise diagnosis are crucial for effective treatment and improved prognosis. Modern diagnostic methods, such as endoscopy, computed tomography (CT), magnetic

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resonance imaging (MRI), positron emission tomography (PET), and molecular profiling, have revolutionized the identification and staging of gastric tumors. Treatment strategies for stomach cancer have also evolved significantly. Traditional surgical approaches are now complemented by minimally invasive techniques, neoadjuvant and adjuvant chemotherapy, targeted therapies, and immunotherapy, tailored to individual patient characteristics. The integration of multidisciplinary teams, including oncologists, surgeons, radiologists, pathologists, and specialized nursing staff, ensures a comprehensive approach to patient care.This article provides a detailed analysis of contemporary diagnostic tools and treatment modalities for stomach cancer, emphasizing evidence-based practices and emerging technologies. The objective is to offer a thorough understanding of current medical approaches and their clinical applications in improving patient survival and quality of life.

Stomach cancer is a complex disease that requires a multidisciplinary approach for accurate diagnosis and effective treatment. Modern diagnostic methods have significantly improved early detection and precise staging. Endoscopy remains the gold standard for identifying gastric lesions, allowing direct visualization and biopsy of suspicious areas. Complementary imaging techniques, including computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET), provide detailed information about tumor size, location, lymph node involvement, and distant metastases. Additionally, molecular profiling and histopathological examination help in determining tumor subtype, guiding personalized treatment strategies.

Surgical intervention remains a cornerstone in the treatment of stomach cancer. Depending on the tumor stage, procedures range from partial gastrectomy to total gastrectomy with regional lymphadenectomy. Minimally invasive approaches, such as laparoscopic and robotic-assisted surgeries, have been increasingly adopted due to reduced postoperative complications and faster recovery. The

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choice of surgical technique is determined by tumor characteristics, patient comorbidities, and available medical expertise.

Chemotherapy and targeted therapies are essential components of modern treatment, especially for advanced and metastatic cases. Neoadjuvant chemotherapy can shrink tumors before surgery, improving resectability and outcomes. Adjuvant chemotherapy, often combined with radiotherapy, reduces the risk of recurrence. Targeted therapies, such as HER2 inhibitors, and immune checkpoint inhibitors have shown promising results in improving survival in selected patients, reflecting the shift toward precision medicine in oncology. Supportive care and patient management are integral to the overall treatment plan. Nutritional support, pain management, and psychological counseling improve patient quality of life and adherence to therapy. Multidisciplinary tumor boards, involving oncologists, surgeons, radiologists, pathologists, and specialized nurses, ensure that each patient receives a tailored treatment plan based on clinical evidence and individual needs.Early diagnosis, combined with modern surgical, chemotherapeutic, and targeted interventions, significantly improves survival rates and long-term outcomes in patients with stomach cancer. Continuous advancements in molecular diagnostics and personalized medicine promise further improvements in treatment efficacy and patient prognosis.

Recent advances in molecular diagnostics have transformed the management of stomach cancer. Biomarker testing, including HER2, PD-L1, and microsatellite instability (MSI) status, allows oncologists to select patients for targeted therapies and immunotherapy. For example, HER2-positive tumors can be treated with trastuzumab-based regimens, while PD-1 inhibitors offer new options for patients with high PD-L1 expression or MSI-high tumors. These personalized approaches enhance treatment effectiveness while minimizing unnecessary toxicity.

Radiation therapy remains an important adjunct in the multimodal treatment of stomach cancer. Modern techniques, such as intensity-modulated radiotherapy (IMRT) and image-guided radiotherapy (IGRT), enable precise targeting of

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tumors while sparing surrounding healthy tissues. Radiation is often combined with chemotherapy (chemoradiation) to increase tumor control, particularly in cases where complete surgical resection is challenging or as adjuvant therapy to reduce recurrence risk.

Emerging minimally invasive techniques, including endoscopic submucosal dissection (ESD) and laparoscopic surgery, offer alternatives for early-stage tumors. These procedures reduce hospitalization time, postoperative pain, and complications, allowing patients to recover faster and resume normal activities. Early detection is crucial for the success of such interventions, highlighting the importance of regular screening and public awareness programs.Patient-centered care and multidisciplinary management are key components of modern oncology practice. Regular assessment of nutritional status, psychological well-being, and treatment tolerance ensures that therapy is both effective and humane. Multidisciplinary tumor boards provide integrated decision-making, combining expertise from surgery, medical oncology, radiation oncology, pathology, radiology, and supportive care services. This collaborative approach optimizes treatment planning and improves overall survival and quality of life.Continuous research and clinical trials are expanding treatment options for stomach cancer. Novel immunotherapies, targeted agents, and combination strategies are under investigation, offering hope for improved outcomes in advanced or refractory cases. The integration of evidence-based medicine, advanced diagnostics, and personalized therapy represents the cornerstone of modern stomach cancer management.

Prevention and early detection play a critical role in reducing the incidence and mortality of stomach cancer. Lifestyle factors, such as diet, smoking cessation, and management of Helicobacter pylori infection, are important preventive measures. Public health initiatives promoting awareness, regular screenings, and endoscopic surveillance for high-risk populations help identify precancerous lesions and early-stage tumors, which are more amenable to curative treatment.

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Genetic and molecular research continues to provide new insights into stomach cancer pathogenesis. Understanding mutations, epigenetic changes, and signaling pathways involved in tumor development enables the design of novel targeted therapies. Clinical trials exploring new immunotherapy combinations, personalized vaccines, and gene-based approaches hold promise for improving outcomes in patients with refractory or advanced disease.

Patient education and engagement are also central to successful treatment. Ensuring that patients understand their diagnosis, treatment options, potential side effects, and follow-up care improves adherence and satisfaction. Support groups and counseling services provide emotional and social support, which has been shown to positively influence treatment outcomes.Ongoing collaboration between national and international oncology centers facilitates the sharing of knowledge, best practices, and clinical research. Integration of these findings into clinical guidelines ensures that patients receive care based on the latest scientific evidence. In this context, the management of stomach cancer in Uzbekistan reflects both the adoption of global standards and the adaptation to local healthcare infrastructure and patient needs.

This continuation emphasizes that a comprehensive approach—including prevention, early detection, molecular research, patient engagement, and international collaboration—is essential for advancing stomach cancer management and improving long-term outcomes.

Conclusion

Modern diagnosis and treatment of stomach cancer have advanced significantly due to the integration of innovative imaging techniques, endoscopic procedures, histopathological analysis, and molecular diagnostics. Early detection, accurate staging, and personalized therapy are key factors that improve patient survival and quality of life.Surgical interventions, ranging from minimally invasive procedures to total gastrectomy, remain central to curative treatment, while

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chemotherapy, targeted therapy, and immunotherapy provide effective options for advanced and metastatic disease. The use of biomarker testing and precision medicine enables tailored therapies that maximize efficacy and minimize side effects. Multidisciplinary management, involving surgeons, oncologists, radiologists, pathologists, and supportive care specialists, ensures comprehensive care for each patient. Attention to nutrition, psychological support, and rehabilitation further enhances outcomes and patient well-being.

In conclusion, the combination of modern diagnostic tools, advanced surgical techniques, systemic therapies, and patient-centered care has transformed the management of stomach cancer. Continuous research and technological innovations promise even greater improvements in survival rates, treatment effectiveness, and quality of life for patients with this challenging disease.

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