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Mini Review

Advanced Methods in Gynecological Oncology: Diagnosis, Prognosis, and Treatment

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Abstract

Gynecological oncology encompasses the comprehensive management of neoplasms affecting the female genital tract. This mini review discusses recent advancements in diagnostic methodologies, prognostic stratification, and innovative therapeutic strategies within this field. Diagnostic improvements include the use of radiomics and biomarker combinations to enhance the accuracy and specificity of detecting gynecological cancers. Prognostic tools, such as nomograms, help tailor treatment plans based on individual patient characteristics. Innovative therapeutic strategies, including the use of human amniotic membranes and advanced surgical techniques, aim to improve patient outcomes and quality of life. These advancements highlight the ongoing efforts to enhance the survival rates and well-being of women affected by gynecological cancers.

Keywords: Gynecological oncology; Diagnostic methods; Prognostic stratification; Therapeutic strategies

Introduction

Gynecological oncology deals with the 360-degree management of women suffering from neoplasms of the female genital tract. The research in this field aims to improve diagnostic, therapeutic, and prognostic techniques to enhance the survival and quality of life for women affected by gynecological cancers. Accurate staging and prognostic stratification are crucial for developing treatment strategies that are both sufficiently radical to ensure cancer safety and minimally invasive to preserve the quality of life for survivors.

This review aims to expand the understanding of methods used in scientific advancements within gynecological oncology, covering diagnostic improvements, prognostic stratification, and innovative therapeutic strategies.

Diagnostic Methodology in Gynecological Oncology

Recent advancements in diagnostic methodologies have significantly improved the accuracy and efficiency of detecting gynecological malignancies. For instance, Xu et al. proposed a radiomics nomogram to distinguish borderline ovarian cancer from malignant epithelial ovarian cancer (EOC). Their study demonstrated that the radiomics signature outperformed traditional clinical models, providing a non-invasive approach to capture inter-lesion heterogeneity and aiding in the accurate decision-making for cancer patients [1].

Another notable advancement is the combination of the HE4 marker with the ADNEX (Assessment of Different NEoplasias in the

adneXa) model by Timmerman, et al. Yang et al. concluded that this combination enhances the specificity and sensitivity of diagnosing ovarian tumors, particularly in differentiating borderline tumors from advanced-stage ovarian cancer [2].

Additionally, Wang et al. reported a case of superficial myofibroblastoma (SMF) in the lower female genital tract. The diagnostic pathway included gynecological examination, colposcopic evaluation, color Doppler flow imaging, magnetic resonance, and histopathological analysis. This case highlighted the first use of colposcopy for auxiliary diagnosis of SMF, demonstrating its potential in pre-surgical evaluations [3].

Prognostic Stratification in Gynecological Oncology

Prognostic stratification is essential for tailoring therapeutic and surveillance programs for gynecological cancer patients. Xu et al. used their radiomics nomogram to provide imaging-based prognostic stratification for ovarian malignancies, offering a valuable tool for clinical decision-making [4].

Jiang et al. developed a nomogram incorporating clinical and non-clinical features affecting the prognosis of cervical cancer patients. Their model included factors such as insurance status, grade, histology, chemotherapy, metastasis number, tumor size, regional node examination, lymphovascular space invasion (LVSI), and radiation, correlating with overall survival and cancer-specific survival [5].

In a study by Pang et al., data from 469 patients with gynecologic large cell neuroendocrine tumors (LCNET) were analyzed to identify prognostic factors. The study found that American Joint Committee on Cancer stage, lymph node metastasis, and chemotherapy were independent prognostic factors for overall survival and cancer-specific survival in patients with cervical LCNET [6].

Innovative Therapeutic Strategies in Gynecological Oncology

Advancements in therapeutic strategies are pivotal in improving outcomes for patients with gynecological cancers. Pang et al.'s retrospective analysis suggested that surgery alone may enhance survival rates in early-stage cervical LCNET, while comprehensive treatment involving surgery, chemotherapy, and radiotherapy is recommended for advanced-stage disease [7].

Restaino, et al. reported an innovative treatment using human amniotic membrane for myocutaneous dehiscence following radical surgery for vulvar cancer. This case marked the first use of amniotic membrane implantation to promote surgical wound healing in gynecological oncology, demonstrating its safety and psychological acceptability for patients [8].

In the realm of surgical interventions, Li et al. compared survival outcomes among stage IB3 cervical cancer patients undergoing different treatment modalities. Their findings indicated that abdominal radical hysterectomy combined with lymphadenectomy offered better overall and disease-free survival compared to radio chemotherapy [9].

Additionally, Wang, et al. highlighted the success of surgical resection in treating a patient with vaginal SMF, while Li et al. documented the successful surgical management of an ovarian small cell neuroendocrine tumor (SCNET), with the patient surviving two years post-surgery [10].

Conclusion

This review has provided insights into the diagnostic, prognostic, and therapeutic advancements in gynecological oncology. Continued research in these areas is essential for developing personalized and effective treatment strategies, improving patient counseling, postoperative management, and follow-up care. Future research should focus on minimally invasive surgery techniques, new radio and chemotherapy regimens, and fertility-sparing surgical pathways for young patients with gynecological cancers.

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Conflict of Interest

Author declare no conflict of interest.

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