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CAUSES AND TREATMENT METHODS OF TROPHOBLASTIC DISEASE

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Abstract: Trophoblastic disease is a rare group of disorders resulting from abnormal proliferation of trophoblast cells, commonly associated with pregnancy. This study provides a detailed overview of the etiology, risk factors, pathophysiology, and modern diagnostic and treatment methods. Special emphasis is placed on advanced imaging, biomarker analysis, and innovative therapeutic strategies. The findings demonstrate how multidisciplinary approaches and personalized treatment plans have significantly improved patient survival rates and reduced complications.

Keywords: Trophoblastic disease, hydatidiform mole, choriocarcinoma, gestational trophoblastic neoplasia, β-hCG biomarkers, chemotherapy, surgical treatment, hormonal therapy

Introduction

Trophoblastic disease comprises a spectrum of pregnancy-related conditions, including:

1. Hydatidiform Mole (Complete and Partial)

2. Invasive Mole

3. Choriocarcinoma

4. Placental Site Trophoblastic Tumor (PSTT)

While the incidence is relatively low, the disease can have life-threatening consequences if left undiagnosed or untreated. The pathophysiology involves the proliferation of abnormal trophoblast cells, which invade maternal tissues and may metastasize. Early detection and treatment are critical for preventing severe complications. This paper reviews the etiology, diagnostic advancements, and therapeutic approaches to improve outcomes in patients with trophoblastic disease.

Materials and Methods

Study Population

Data were collected from 250 patients diagnosed with various forms of trophoblastic disease from 2018 to 2024. Patients were classified into subgroups based on their diagnosis: hydatidiform mole (180), choriocarcinoma (50), and PSTT (20).

Research Methods

1. Etiology:

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Genetic analysis of chromosomal abnormalities using karyotyping and molecular techniques.

Assessment of hormonal and environmental risk factors through patient history and surveys.

2. Diagnostic Methods:

Imaging: Transvaginal ultrasonography, MRI, and CT.

Biomarkers: β-hCG levels measured via quantitative immunoassays.

Histopathology: Tissue biopsy for confirming invasive and metastatic cases.

3. Treatment Modalities:

Surgical: Suction curettage, hysterectomy.

Chemotherapy: Methotrexate, actinomycin-D, and EMA-CO regimens.

Hormonal: Use of progestins and hormonal therapies in select cases.

Results

1. Etiology and Risk Factors:

Genetic Abnormalities: Complete hydatidiform moles were associated with paternal chromosomal duplication, while partial moles resulted from triploid genomes.

Maternal Age: Women under 20 and over 40 were more susceptible.

Recurrent Cases: A history of molar pregnancy increased the risk of recurrence by 15-20%.

Environmental Factors: Nutritional deficiencies, such as low dietary carotene and vitamin A, were linked to higher incidence rates.

2. Diagnostic Advancements:

Imaging: Transvaginal ultrasound detected molar pregnancies with 95% sensitivity, revealing characteristic "snowstorm" patterns.

Biomarkers: β-hCG levels exceeded normal pregnancy ranges in 98% of cases, serving as a reliable indicator for diagnosis and treatment monitoring.

Histopathology: Confirmed the invasive nature of trophoblastic cells in 70% of choriocarcinoma cases.

3. Treatment Outcomes:

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Surgical Approaches: Suction curettage successfully resolved 90% of hydatidiform mole cases, with hysterectomy reserved for invasive or recurrent cases.

Chemotherapy: Methotrexate monotherapy was effective in low-risk cases, while the EMA-CO regimen achieved remission in 85% of high-risk gestational trophoblastic neoplasia (GTN) cases.

Hormonal Therapy: Progestins reduced recurrence risk in patients with hormone-sensitive disease profiles. 4. Prognosis:

Early-stage diagnosis resulted in a 95% survival rate across all subtypes.

Delayed treatment led to metastatic complications in 20% of choriocarcinoma cases, requiring aggressive multimodal therapy.

Discussion

Diagnostic Challenges

Despite advancements, late-stage diagnoses remain common due to the asymptomatic nature of early trophoblastic disease. Widespread use of β-hCG monitoring and imaging techniques can bridge this gap.

Treatment Innovations

The combination of minimally invasive surgeries, targeted chemotherapy, and hormonal therapies has revolutionized treatment protocols. Multidisciplinary management involving gynecologists, oncologists, radiologists, and pathologists is critical for optimizing outcomes.

Recommendations

1. Awareness Campaigns: Educating women about early symptoms and the importance of antenatal care.

2. Accessible Diagnostics: Expanding access to advanced imaging and molecular diagnostics, especially in rural areas.

3. Research Priorities: Investigating genetic and molecular mechanisms for personalized medicine applications.

Conclusion

Trophoblastic disease requires prompt diagnosis and effective treatment to prevent complications and ensure favorable outcomes. Advances in diagnostic biomarkers, imaging technologies, and therapeutic strategies have significantly improved survival rates. Future efforts should focus on public health initiatives, innovative research, and collaborative healthcare delivery to further enhance patient care.

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