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Triple-Negative Basal-Like Carcinoma: Insights into Biology and Treatment Options

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Commentary

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DESCRIPTION

Triple-Negative Basal-like Carcinoma (TNBC) is a subtype of breast cancer characterized by the absence of estrogen receptors, progesterone receptors and Human Epidermal Growth Factor Receptor 2 (HER2). This hostile form of breast cancer is often associated with younger patients and carries a poorer prognosis compared to other breast cancer subtypes. Understanding the unique features of TNBC, including its biological characteristics, clinical presentation, treatment options and ongoing research, is essential for improving patient outcomes.

Biological characteristics

Triple-negative basal-like carcinoma is recognized for its distinct biological behavior. It is primarily associated with basal-like subtype tumors, which typically exhibit a more aggressive phenotype. These tumors are often characterized by high rates of proliferation, genomic instability and the presence of specific molecular markers, such as cytokeratins 5 and 6. The basal-like profile is also linked to mutations in the *BRCA1* gene, contributing to the hereditary breast cancer syndrome.

The absence of hormone receptors in TNBC limits treatment options, as traditional hormone therapies that target estrogen or progesterone receptors are ineffective. This lack of targeted therapy, combined with the aggressive nature of TNBC, contributes to a higher risk of recurrence and metastasis.

Patients with triple-negative basal-like carcinoma may present with various symptoms, but many are diagnosed after noticing a palpable mass in the breast or an abnormal finding on a mammogram. Unlike other breast cancer types, TNBC may exhibit a more heterogeneous presentation, with varying degrees of tumor differentiation and growth patterns.

Due to its aggressive nature, TNBC is often diagnosed at a more advanced stage. It tends to have a higher likelihood of spreading to lymph nodes and distant sites compared to hormone receptor-positive breast cancers. Patients may experience symptoms related to metastatic disease, such as bone pain or respiratory issues if the cancer has spread. The diagnosis of triple-negative basal-like carcinoma typically involves imaging studies, such as mammography and ultrasound, followed by a biopsy for histopathological examination. The absence of estrogen and progesterone receptors, as well as HER2 negativity, is confirmed through immunohistochemical staining. Genetic testing may also be conducted to identify *BRCA1/2* mutations, particularly in younger patients with a family history of breast or ovarian cancer.

The treatment landscape for triple-negative basal-like carcinoma is complex due to the lack of targeted therapies. Surgical intervention remains the primary treatment modality, often involving a combination of lumpectomy or mastectomy with sentinel lymph node biopsy.

Adjuvant chemotherapy is a critical component of TNBC management, particularly for patients diagnosed with higher-stage tumors. Regimens typically include anthracyclines and taxanes, which have shown effectiveness in treating this aggressive cancer. The intensity and duration of chemotherapy may vary based on the individual patient's characteristics and tumor stage.

In recent years, there has been growing interest in exploring immunotherapy and targeted therapies for TNBC. The approval of immune checkpoint inhibitors, such as pembrolizumab and atezolizumab, in combination with chemotherapy has provided new avenues for treatment, especially for patients with PD-L1-positive tumors. These therapies aim to enhance the body's immune response against cancer cells, offering hope for improved outcomes.
The prognosis for patients with triple-negative basal-like carcinoma is generally less favorable than that for hormone receptor-positive subtypes. The risk of recurrence is highest within the first few years following diagnosis and many patients experience distant metastasis. Factors such as tumor size, grade and lymph node involvement significantly influence the prognosis.

However, it is important to note that not all TNBC patients have the same outcomes. Advances in research and treatment approaches are continually evolving and ongoing clinical trials aim to identify novel therapeutic strategies that can improve survival rates.

Triple-negative basal-like carcinoma is a challenging subtype of breast cancer with unique biological characteristics and a distinct clinical course. Its aggressive nature and lack of targeted treatment options necessitate a comprehensive approach to management, involving surgical intervention and chemotherapy. While the prognosis remains challenging, advances in immunotherapy and ongoing research hold promise for improving outcomes for patients diagnosed with this aggressive disease. Continued efforts to better understand the underlying biology of TNBC will be essential in developing innovative treatment strategies and ultimately enhancing patient care.