Metaplatic carcinoma of breast: biology, challenges, and strategic direction

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Metaplastic breast carcinoma (MpBC) is a rare cancer that accounts for less than 1% of primary breast malignancies. The term of “metaplastic carcinoma” was first published by Huvos and colleagues in 1973. In general, MpBC is biphasic and comprises both carcinomatous and other components such as s spindle sarcomatous, matrix-producing, and squamous carcinomatous components. Prior genetic studies have shown evidence for a monoclonal origin of carcinomatous and sarcomatous components. MpBC has distinct genetic alterations such as higher frequency of PI3K/ AKT/mTOR and Wnt pathway related gene mutation. The gene expression profiles and proteomics studies identified potential MpBC specific biomarkers.

MpBC is typically a triple-negative breast cancer (TNBC), but it has a worse prognosis and decreased survival compared to other histology of TNBC. MpBC has poor treatment response to conventional chemotherapy. For example, a recent neoadjuvant study from MSKCC showed only one (2%) of 44 patients with stage I-III MpBC had a pathologic complete response (pCR). 27% showed progression while on NAC. So far, current clinical practice guidelines do not have specific treatment recommendations for MpBC. So far, there is no data about neoadjuvant chemo-immunotherapy for early stage MpBC. For metastatic MpBC, only a few clinical trials of mTOR inhibitors and immune checkpoint inhibitors were designed specifically for MpBC, and showed potential clinical utility.