24 PROTEOMIC ANALYSIS OF BREAST CANCER BASED ON IMMUNE SUBTYPES

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Background Immunotherapy was recently conducted on breast cancer to defeat the limitations of survival gain of other treatment modalities like surgery, chemotherapy and targeted therapy. With immunotherapy, a tumour can be classified into immune inflamed, immune excluded and immune desert based on the distribution of immune cells. We assessed the clinicopathological features, each subtype's prognostic value, and differentially expressed proteins between the immune subtypes.

Methods A total of 56 cases of breast cancer with neoadjuvant chemotherapy, including all intrinsic subtypes, between 2014 and 2018 were retrieved from Asan Medical Center. The immune subtype was established based on the tumour-infiltrating lymphocytes' level and Klintrup criteria. Correlation between clinicopathological factors and immune subtypes and each subtype's prognostic value were investigated. Mass spectrometry was used to identify differentially expressed proteins in formalin-fixed paraffin-embedded biopsy tissues.

Results Thirty-one cases (55%) were immune inflamed, 21 cases (38%) were immune excluded, and 2 cases (4%) were immune desert. Only age demonstrated a statistical difference between immune inflamed and excluded/desert, among clinicopathological factors. The old age (age$\geq$50) ratio was higher in immune inflamed than in immune excluded/desert (p=.039). In the Kaplan-Meier survival analysis, there was no difference in the overall survival rate and relapse-free survival (RFS) rates between immune subtypes. Welch's t-test revealed two differentially expressed proteins between immune inflamed and immune excluded/desert. *CORO1A* and *SERPINA1* were up-regulated in immune inflamed (adjusted p=.008) and immune excluded/desert (adjusted p=.008), respectively. *TNN* was up-regulated in pCR than non-pCR among immune inflamed subtypes (adjusted p=.036).

Conclusions Through proteomic analysis using formalin fixed paraffin embedded breast cancer samples, CORO1A showed up-regulation in immune inflamed and SERPINA1 showed up-regulation in immune excluded/desert. TNN was up-regulated in pCR than non-pCR in immune inflamed and probably related to favorable prognosis. Further studies in large representative cohorts needs to be performed to validate these findings.

Ethics Approval Informed consent was obtained from all patients. This study was approved by the Institutional Review Board of Asan Medical Center (2019–1480).

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