CELLULAR COMPOSITION OF MALIGNANT PLEURAL EFFUSIONS SHOW A SIMILAR LANDSCAPE TO THAT OF THEIR PRIMARY TUMOR SITES: A PILOT STUDY

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Background Malignant pleural effusion (MPE) is a frequent complication of advanced malignancy with significant associated morbidity and mortality. Metastases from lung cancer are the most common cause of MPE, followed by breast cancer. This pilot study aims to characterize the immune landscape of stage IV primary tumors (PT) and their MPE counterparts, to compare the cellular and immune landscape of these tumors.

Methods We studied the immune contexture of six breast carcinoma and five lung adenocarcinoma PT samples and their respective MPEs using three immune-oncology multiplex immunofluorescence panels (figure 1). The slides were scanned using Vectra Polaris and analyzed by InForm image analysis software. We characterized the cellular composition to compare PT and MPE samples (figure 1). In addition, we use the densities of cell phenotypes from PTs and the percentages from MPE to correlate with clinicopathologic characteristics (table 1).

Results Overall, the immune cell phenotypes were similar between PT and their respective MPE samples, as shown in figure 2. The predominant cell densities for CD3+ T-cells (45.5%) and CD3+CD8+ cytotoxic T-cells (4.7%) were observed in lung MPEs, while in the PTs the same phenotypes showed a median, 262 cells/mm² and 42 cells/mm², respectively. CD68+ macrophages were found mainly in breast MPE (61%) and in their PTs (median 82.5 cells/mm²). However, two breast carcinoma cases showed suppressive components related to regulatory T-cells CD3+Foxp3+CD8neg expression in their MPEs but not in their PTs; whereas in one case T cell antigen-experienced CD3+PD1+ was present in the breast PT but not in the corresponding MPE. One lung MPE showed T cell antigen-experienced CD3+PD1+ while this expression was absent in the PT. In contrast, one lung MPE case had no expression of CD3+PD-L1+, CD3+CD8+PD-L1+ or T regulatory CD3+Foxp3+CD8neg cells, but these cells were present in their respective lung PTs. No correlation was observed with clinicopathologic characteristics.

Conclusions While our results showed some differences in cellular compositions between MPE and their corresponding PT, the overall cellular compositions showed a similar landscape. Therefore, our results suggest that MPE may be used as a surrogate for PT to explore new target options or predict treatment responses. A more extensive study with a larger dataset would be necessary to confirm our results.