AB022. Circulating tumour DNA as a prognostic biomarker in predicting breast cancer outcomes: systematic review and meta-analysis

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Background: Fragmented deoxyribonucleic acid (DNA) is constantly released into the circulation by apoptosis and necrosis of both cancerous and non-cancerous cell. When it is released by cancer cells, it is specifically known as circulating tumour DNA (ctDNA). We performed a systematic review and meta-analysis to determine the clinical utility of ctDNA as a prognostic biomarker in predicting breast cancer outcomes.

Methods: A meta-analysis of nine relevant studies was performed. Primary outcome was the association of ctDNA with breast cancer disease free survival /relapse free survival. Secondary outcomes focused upon a subgroup analysis of the survival implications of ctDNA detection in early breast cancer and metastatic breast cancer. Statistical analysis was performed using Revman 5.

Results: Nine studies reported on 661 cases in total. ctDNA detection (both pre and post treatment) was significantly associated with worse disease free survival (DFS) (HR 3.53, CI: 1.47–8.49, P≤0.00001). ctDNA detection was significantly associated with a reduction in disease free survival in the early breast cancer subgroup (HR 8.32, CI: 3.01–22.99, P≤0.0001). ctDNA in the metastatic group was not associated with significance (HR 1.86, CI: 0.43–1.34, P=0.61). Pre and post-treatment plasma sample collection was analysed in both early and metastatic groups. Pre-treatment plasma detection of ctDNA was significantly associated with reduced DFS (HR 3.30, CI: 1.98–5.52, P≤0.00001). Post-treatment sampling of ctDNA failed to achieve statistical significance (HR 4.31, CI: 0.14–136.23, P=0.41).

Conclusions: Circulating tumour DNA is an important prognostic biomarker of reduced breast cancer disease free survival. Detection of elevated plasma ctDNA can predict patients at high risk of relapse and therefore may provide an excellent method to stratify risk and personalize patient follow-up.

Keywords: Breast cancer; circulating tumour DNA (ctDNA); disease free survival (DFS)

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