AB066. 61. Evaluating the suitability and oncological safety of ADSCs isolated from breast cancer patients for use in breast regeneration

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Background: Breast reconstruction is the standard of care post-mastectomy. Limitations of current breast reconstruction approaches have driven research towards adipose tissue engineering in search of superior reconstruction techniques. Our aim was to investigate the regenerative potential of autologous adipose derived stem cells (ADSCs) from various adipose depots in breast cancer patients.

Methods: ADSCs were isolated from the breast of breast cancer patients in receipt and not in receipt of neoadjuvant chemotherapy, and abdomen of breast cancer and healthy controls. A stem cell population was identified by flow cytometry and osteogenic differentiation. Cell viability was assessed using AlamarBlue. Oil Red O tested adipogenic potential. Gene expression analysis was carried out for adipogenic- and cancer-related genes on undifferentiated and differentiated Adipose derived stem cells ADSCs. Cytokine analysis was performed on cell lysate and cell-conditioned media during adipogenesis.

Results: ADSCs from five patients in each group were isolated. A stem cell population was isolated from all four patient groups, identified by expression of CD105, CD90 and CD73, and no expression for CD45, CD34 and CD14, and by demonstrating osteogenic and adipogenic potential. There was no difference between groups in the expression of adipogenic genes in undifferentiated Adipose derived stem cells ADSCs. Abdominal Adipose derived stem cells ADSCs demonstrated superior adipogenic potential to breast ADSCs. Adipose derived stem cells ADSCs from breast adipose of patients treated with neoadjuvant chemotherapy, despite having lower cell proliferation and viability, had superior adipogenic potential to breast Adipose derived stem cells ADSCs not treated with chemotherapy.

Conclusions: Adipose tissue depot and receipt of neoadjuvant chemotherapy influences the suitability and oncological safety of ADSCs isolated from cancer patients for use in breast regeneration.

Keywords: Breast reconstruction; adipose tissue engineering; mastectomy.

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