

Isolation and Differentiation Potential of Human Mesenchymal Stem Cells From Adipose Tissue Harvested by Water Jet-Assisted Liposuction.

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Abstract

BACKGROUND:

In recent years the therapeutic application of extracted adipose tissue for autologous fat grafting and the application of adipose tissue-derived mesenchymal stem cells (adMSC) isolated thereof has progressed. Water-jet assisted liposuction (WAL) is 1 procedure for harvesting adipose tissue and provides a favorable aesthetic outcome combined with high tissue protection. Tissue aspirated by WAL has been successfully applied in grafting procedures.

OBJECTIVES:

The aims of this study were to confirm the tissue viability and to understand the abundance and mesenchymal differentiation capacity of stem cells within the tissue.

METHODS:

We analyzed tissue integrity of WAL tissue particles via fluorescence microscopy. The adMSC content was determined by isolating the cells from the tissue. The mesenchymal differentiation capacity was confirmed with cytochemical staining methods.

RESULTS:

The stromal vascular fraction of WAL tissue showed high viability and contained an average of 2.6×10^5 CD34-positive cells per milliliter of tissue. Thus WAL tissue contains a high number of stem cells. Furthermore adMSC isolated from WAL tissue showed typical mesenchymal differentiation potential.

CONCLUSIONS:

WAL of adipose tissue is well suited for autologous fat grafting because it retains tissue viability. Furthermore it is a valid source for the subsequent isolation of adMSC with multipotent differentiation potential.

LEVEL OF EVIDENCE:

3 Therapeutic.

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