A Side by Side Trial of Pluripotent Cell Enrichment in Autologous Fat Grafting of the Breast

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Abstract

Background: Fat grafting of the breast is a widely utilized procedure still limited by inconsistent volume retention. A promising strategy to improve engraftment is replenishment of stromal vascular cells, depleted by the liposuction harvest process, through point of care cell isolation from excess lipoaspirate. Pluripotential cells residing in large numbers in the perivascular areas of adipose tissue demonstrate superior survival of the anoxic and physical insult of harvest and engraftment, reduce inflammation, stimulate neovascularization and support adipose tissue regeneration.
This is a prospective study of the clinical effect of cellular fat graft enrichment on volume retention after breast fat grafting in a side by side trial.

Methods: In this level 1, prospective study, one breast of each patient received fat graft enriched with SVF cells isolated at the point of care from between 100-200 cc's of excess lipoaspirate. The opposite breast, injected with the same volume of non enriched fat, served as control. End points are relative breast volume retention at 3-6 months by comparison of volumetric indices of each breast calculated from measurement of photographic registration landmarks and qualitative patient perception.

Results: A total of 12 women, age 22-51 were augmented with 250 to 360 grams of lipoaspirate per breast. Mean follow-up was 6.4 months. Post-operative breast volume showed a significant increase in both breasts. Volume retained in the experimental breast (Exp) augmented with cell enriched lipoaspirate showed a significantly greater volume index increase when compared to the control breast (C). The average preoperative ratio of breast indices (Exp /C) was 1.23 compared to a ratio of 1.90 at 5 months. This difference in volume retention through photographic analysis was confirmed by blinded observer evaluation and quantitative photographic analysis and the enrichment effect persisted through the end of the trial at 12 months. Complication rate was comparable in both breasts and consistent with previously reported rates for autologous fat breast augmentation.

Figure 1: 44 year old woman preop fat injection
Right breast: 300cc fat + approximately 9.3e6 ADSC's
Left breast: 300cc fat only

Figure 2: 3 months postop
Postop quantitative volume measurements show a 16% greater increase in right breast volume relative to left breast volume.
Right volume / left volume: Preop = 0.92, PostOp = 1.10

Conclusions: This study clearly demonstrates that graft volume retention in the breast can be improved by replenishing the population of pluripotential cells depleted in lipoaspirate fat graft. This finding is entirely consistent with a growing understanding of the role of stromal vascular cells in the regeneration process and the concept of utilizing this understanding to optimize the clinical engraftment process and volume retention.

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