

Editorial

Stromal Vascular Fraction does not Ensure a Higher Survival in Autologous Fat Grafting for Breast Augmentation

Chiu CH*

Plastic and Aesthetic Department, Taiwan

***Corresponding author:** Chiu CH, Plastic and Aesthetic Department, Genesis Clinic, Taiwan**Received:** April 18, 2018; **Accepted:** April 20, 2018;**Published:** April 27, 2018**Keywords**

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Editorial

Autologous fat grafting has become a popular treatment for volume and contour defects in reconstructive and cosmetic surgeries [1]. Illouz described fat grafting to the breast using liposuctioned adipose tissue first and Bircoll published this approach in 1987 [2,3]. Since then, autologous fat grafting has gradually become popular as an option for cosmetic breast augmentation.

Several modifications and refinements regarding fat harvesting, processing, and injection have been made in many ways to increase graft survival and enhance the predictability of this approach. No big impact on outcome following fat grafting has been identified although these techniques have been extensively studied and standardized [4].

Zuk *et al.* Isolated mesenchymal stem cells from adipose tissue with the potential to differentiate into mesenchymal, including adipogenic lineages In 2001 [5]. Adipose-Derived Stem Cells (ADSC) also displays angiogenic properties through the release of mediators in a paracrine fashion. ADSC have become attractive in regenerative medicine and are capable of being used as a tool to enhance the survival of fat graft due to the ease of isolation and abundant supply [6].

The number of ADSC in adipose tissue is high *In vivo* [7]. Harvesting fat grafts by liposuction reduces the amount of ADSC [8]. This opens room for supplementation of the lipoaspirate with stromal cells and stem cells isolated from another portion of fat tissue during conventional liposuction. Supplementation aims to restore the amount of ADSC in the ready-for-grafting fat to approach the amount seen in native adipose tissue [9]. This method is called Cell-Assisted Lipotransfer (CAL) [9,10]. The isolation procedure of adipose tissue results in a Stromal Vascular Fraction (SVF) layer which is composed of a host of cells, including stem cells and others [11].

However, most of the published literatures related to CAL for breast augmentation are short of rigorous study in methodology. Apart from this, the absence of control group in most of the studies

makes it difficult to ascertain the efficacy and safety of CAL. The current level of evidence surrounding CAL makes it difficult to jump into the conclusions for its use in the clinical setting [12].

With respect to objective volume assessment in breast augmentation, Magnetic Resonance Imaging (MRI) and 3-Dimensional (3D) imaging both provide accuracy and reliability in breast volume measurement [13,14]. MRI is known for its precision in estimating breast volume and detecting internal consistency. However, for frequent follow-up, e.g., monthly volume analysis, repeated MRI exams would not be practical for the patients and not cost effective. 3D surface imaging, including 3D laser scanning is a better option in these cases. It is especially helpful in a private practice where fast data is required [15,16].

In a study conducted by the author, we retrospectively analyzed the change of breast volume in patients who underwent SVF-enriched fat grafting for breast augmentation and compared the clinical results with those who underwent conventional fat grafting without SVF by using 3D laser scanning. 206 patients were included in the study and were followed up for more than 18 months. The survival rate of the transplanted fat was 68.0% in those (n=105) underwent fat grafting without SVF enrichment comparing to 68.7% in the others (n=101) underwent SVF-enriched fat grafting. The difference was not significant.

Our study demonstrated that SVF-enriched fat grafting is not superior to conventional lipotransfer for breast augmentation in terms of fat survival and postoperative complications. SVF does not ensure a higher survival in autologous fat grafting for breast Augmentation. Although *ex vivo* expanded ADSC may be beneficial to improve graft survival by significantly increasing the ADSC concentration to more than 1,250 folds, we did not see any advantage in SVF-enriched fat grafting in terms of graft survival and postoperative complications [17].

Considering the potential drawbacks of ADSC and the extra cost of the consumables, in particular the need for harvesting larger amount of fat which could be reserved for additional fat grafting at a later time to achieve even better improvement, the results of this study do not support the use of SVF in autologous fat grafting for breast augmentation.

Conclusion

In conclusion, although the methods of fat harvesting, processing, and injection all have an impact on clinical outcomes, we believed that injection method is the most important factor in successful fat grafting [18]. Apart from the principle of structural fat grafting recommended by Coleman, the author adopted a "solid

injection method” to increase the amount of safe injection and reduce postoperative complications. This method was described in detail in the author’s previously published article and was verified again in this study [19]. Over the years, this method has proven the test of time to reduce fat-grafting-related complications and enhance graft retention in the long term [20,21].

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