The Effect of Fat Grafting on Random Pattern Skin Flap Viabilty

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Abstract Text:

Purpose: Flap necrosis is a common postoperative complication in random pattern skin flaps. Adipose-derived stem cells(ADSCs) and stromal vascular fraction(SVF) of adipose tissue have been found to stimulate angiogenic process and increase the viability of random pattern skin flaps. We studied to determine whether simple fat grafting increase the viability of random pattern skin flaps as well as ADSCs and SVF.

Methods: Twenty- four female Wistar rats were randomized into three equal groups (n = 24,n=8 for each), and a standardized dorsal random-pattern skin flap(2x8cm) was designed on each rat dorsum with based cranially. Fat grafts were harvested from the inguinal fat pads of rat. The fat grafts were processed until gelatenous form obtained. Before the elevation of cranially based random pattern skin flaps, fat grafts(0.5cc) were then injected into 4 cm distal to the pedicle (group A). 0.09 M sodium phosphate buffer saline was injected in group B and no treatment in group C. Ten days after the injections, the skin flaps were raised on each rat. Photograghic measurements were taken for viable flap assesment at postoperative day 7. Specimens were harvested for histologic analyses.

Results: Fat grafting led to a statistically significant decrease in flap necrosis in group A(Fig 1) compared with the negative control and the saline groups.($p \leq 0.05$) Histologic examination also demonstrated a statistically significant increase in capillary density in group A. ($p \leq 0.05$) (Fig 2)

Conclusions: The effect of ADSCs and SVF on neoangiogenesis has been relatively well studied and found to be stimulative and promising. But isolation of ADSCs and SVF can be problematic when proper labrotuary conditions are not optimal. These findings suggest that fat grafting may have a potential for decreasing random pattern skin flaps necrosis and for increasing vascularization of random pattern skin flaps.