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“Surgical Delay of the Thoracodorsal Artery Perforator Flap for Autologous Breast Reconstruction”

Background: When women are poor candidates for abdomen-based free flap reconstruction, the muscle-sparing thoracodorsal artery perforator (TDAP) flap may be considered for total autologous breast reconstruction due to its reliable perforator anatomy and function as a pedicled flap, requiring no vascular anastomosis. However, the TDAP flap is not as popular as other autologous breast reconstruction methods since it is often limited by flap size and distal tip necrosis.

Objective: We aim to demonstrate a novel use of the delay phenomenon in TDAP flaps for total autologous breast reconstruction.

Methods: This prospective IRB-approved study recruited patients between April 2021 and August 2022 for autologous breast reconstruction using surgically delayed TDAP flap reconstruction when abdomen-based flap reconstruction was contraindicated. This involved two operations: 1) dissection of the TDAP flap except for a distal skin bridge, then 2) reconstruction of the breast. Doppler ultrasound was used to locate flap perforators and assess pre- and post-surgical delay caliber (mm) and flow (cm/s). Data collected included flap dimensions (cm x cm), operative time (min), delay between dissection and reconstruction (days), hospital length of stay (days), complications/revisions, and follow-up (days).

Results: Five (5) patients and seven (7) flaps were included in this study to date. Median age and BMI of patients was 59.8 years old and 30.7 kg/m², respectively (n=6 operations). Average flap skin paddle dimension was 33.3 x 11.0 cm (n=3 flaps). Median time between surgical delay and inset was 6 days, ranging 2-7 days (n=7 flaps). The surgically delayed TDAP arterial caliber increased from 1.3 ± 0.385 mm pre-delay to 1.9 ± 0.350 mm post-delay (n=3 flaps, 95% CI, *p<0.01 paired t test). Peak systolic flow showed a pre-delay mean of 10.5 ± 2.4 cm/s and post-delay mean of 35.2 ± 15.9 cm/s (n=3 flaps, 95% CI, p=0.1). Complications included one donor site seroma, but no instances of dehiscence, infection, hematoma, flap necrosis, or flap revisions. Median follow-up was 73 days (n=7 flaps).

Patients	Flaps	Age (yr)	BMI (kg/m ²)	Skin Paddle (cm)	Skin Paddle (cm ²)	Delay (days)	Complications/Revisions	Follow-up (days)
		*n=5	*n=5	n=3	n=3	n=7	n=7	n=7
5	7	59.8	30.7	33.3 x 11.0	370	5.5	Donor site seroma (1) None (6)	73

Conclusions: We demonstrate surgically delayed TDAP flaps as a viable alternative for total autologous breast reconstruction with promising surgical outcomes. Although more data is needed, preliminary results reveal increased perforator caliber, enlarged volume capabilities, and no incidences of flap necrosis which demonstrates reliable and well-perfused flaps.