Sir,

Elevation of a transverse rectus abdominis musculocutaneous (TRAM) flap results in diminution of the blood supply to the umbilicus. Those at higher risk of partial or total umbilical loss are smokers, having more than double the rate of umbilical necrosis (27.5%) than nonsmokers (11.8%). The delay phenomenon has been demonstrated to be effective in enhancing blood supply by dilating the choke vessels communicating with the adjacent angiosome.

A retrospective chart review was conducted for all patients undergoing pedicled TRAM flap breast reconstruction between 2000 and 2016. Patient demographics (smoking status, body mass index, history of chemotherapy, and medical comorbidities) were evaluated and donor site complications including abdominal hernia and bulge formation and rates of umbilical necrosis. Umbilical delay was performed under general anesthesia 14 days before reconstruction by making an incision around the umbilicus down to the level of the rectus fascia. Delay of the pedicled TRAM flap was performed in the same setting by making the superior and inferior flap incisions and ligating the superficial and deep inferior epigastric arteries (Fig. 1).

One hundred thirty-five patients underwent umbilical delay in a total of 183 flaps [87 unilateral (64.4%) and 48 bilateral reconstructions (35.6%)]. The delay procedure required an average of 46 minutes of operative time (range, 32–55 minutes), and there were no complications after this initial outpatient procedure. Multivariate analysis found that tobacco usage was the only significant risk factor for umbilical necrosis. The overall rate of umbilical necrosis was 3.7%, whereas the rates for smokers and those with a history of smoking were 11.1% and 7.7%, respectively. Meanwhile, the rate for nonsmokers was significantly lower 1.7% (P < 0.05). Obesity was a significant predictor of total flap loss (P = 0.04), and chronic immunosuppression had an increased risk of partial flap loss (P = 0.015). Immunosuppression (P = 0.0001) and cardiac disease (P = 0.01) were associated with increased risk of abdominal bulge or hernia formation. Neoadjuvant chemotherapy was a risk factor for mesh complications (P = 0.003) and delayed wound healing (P = 0.049).

Complications after pedicled TRAM breast reconstruction can be devastating. Umbilical necrosis, especially after bilateral pedicled TRAM flaps, can serve as a nidus for infection of underlying mesh which is often required for abdominal wall reinforcement. Delay of the TRAM flap has shown to increase flow and decrease resistance in the superior epigastric pedicle with dilation of choke vessels. Clinically, this results in decreased flap ischemia without increased complications. Similarly, delay of the umbilicus may decrease the incidence of umbilical necrosis with minimal risk.

These data demonstrate rates of umbilical necrosis >2× lower for smokers and 7× lower for nonsmokers than those reported by Kroll, who did not perform umbilical delay. Surgical delay of the umbilicus resulted in a lower rate of necrosis in all patients and may serve as a useful adjunct in optimizing results in pedicled TRAM flap breast reconstruction. High-risk patients such as active smokers and obese patients who have been shown to benefit from...
TRAM flap delay may also benefit from delay of the umbilicus.

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REFERENCES