

In search of the optimal timing of breast reconstruction in the context of irradiation: a consecutive 370 pedicled TRAM/DIEP flaps performed in a single center

He Shanshan (Breast Reconstruction Department, Tianjin Medical University Cancer Institute and Hospital, China), Yin J ((Breast Reconstruction Department, Tianjin Medical University Cancer Institute and Hospital, China), Zhang XH (Breast Reconstruction Department, Tianjin Medical University Cancer Institute and Hospital, China), Sun JY (Breast Reconstruction Department, Tianjin Medical University Cancer Institute and Hospital, China), Li HX (Epidemiology Department, Tianjin Medical University Cancer Institute and Hospital, China) , Liu J (Breast Reconstruction Department, Tianjin Medical University Cancer Institute and Hospital, China), Han CY (Breast Reconstruction Department, Tianjin Medical University Cancer Institute and Hospital, China)

Purpose: Radiation can have adverse effects on the reconstructed breast. There's a debate on the optimal sequence of radiation and breast reconstruction. The purpose of this article was to a) assess the impact of radiation on autologous breast reconstruction, and b) analyze the best timing for autologous breast reconstruction in the setting of radiation in Chinese population.

Methods: A retrospective review of patients undergoing breast reconstruction with autologous lower abdominal flaps between 2001 and 2014 in Tianjin Oncology Hospital was performed. Patients were grouped by their irradiation status, and further stratified by the timing of irradiation. The primary outcomes were early and late breast complications, secondary and revision surgery to the reconstructed breast, the secondary outcome was aesthetic and psychological evaluations by the patients. Logistic regression was used to assess the potential association between irradiation, patient and treatment variables, and surgical outcomes.

Results: 360 patients with 370 reconstructed breasts were included in the study, 92 of which received radiation, and 278 of which did not. There was a significant increase in secondary surgery due to fat necrosis ($P \leq 0.001$), and in late complication ($P = 0.011$) in the irradiated group. A significant increase in flap contracture ($P = 0.043$), and an increasing trend in the severity of fat necrosis were observed when radiation was performed after breast reconstruction. Radiation and its timing did not have adverse impact on patients' aesthetic and psychological evaluations.

Conclusions: Radiation increased the rate of late complication and secondary surgery. Radiation on the reconstructed breast increased flap contracture and severity of fat necrosis. Breast reconstruction followed by radiation can be successful, but for patients who already develop fat necrosis, surgical interventions to address fat necrosis are suggested before radiation starts.