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Impact of fat grafting combined with expander-to-implant exchange in a one-stage procedure after irradiation

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Introduction: Reconstructive failure rates for patients undergoing radiation therapy following tissue expander placement exceeded 30%, with grade 3 or 4 capsular contracture occurring in over 50% of cases during a 6-year follow-up. Previous studies indicated that two sessions of lipofilling prior to expander-to-implant exchange significantly reduced complication rates. **Objective:** This study aimed to evaluate the safety and effectiveness of a single session of immediate fat grafting combined with expander-to-implant exchange in irradiated patients. **Methods:** This retrospective cohort study assessed patients diagnosed with invasive breast carcinoma who underwent post-mastectomy radiation therapy and two-stage implant-based breast reconstruction, from 2015 to 2024. A single session of immediate fat grafting was performed concurrently with expander-to-implant exchange. The outcomes assessed included reconstructive failure, aesthetic results, capsular contracture, and infection rates. **Results:** A total of 36 patients (mean age 50.3 years, range 24–67) with stage II or III breast cancer were included. The median volume of fat grafting was 90 mL (range 40–285). At a median follow-up of 48 months (range 16–205), there were seven cases of reconstruction failure (19.4%): four due to infection, one due to severe capsular contracture, one due to trauma, and one due to pyoderma gangrenosum. Four patients (11.1%) developed grade 3 or 4 capsular contracture. **Conclusion:** Immediate fat grafting during expander-to-implant exchange after radiotherapy reduced the rates of capsular contracture and reconstructive failure compared to historical controls, although the results were less pronounced than those observed with two prior sessions of lipofilling. Further studies with larger cohorts are needed to refine the optimal fat grafting protocol for irradiated breast reconstructions.

Keywords: breast neoplasms; radiotherapy; adipocytes; implant capsular contracture.