2026 NEW YORK REGIONAL SOCIETY OF PLASTIC SURGEONS ANNUAL RESIDENTS' NIGHT RESEARCH COMPETITION

MONDAY, APRIL 20, 2026
NEW YORK ACADEMY OF MEDICINE

ABSTRACT SUBMISSION TITLE: *A4 - A Comparative Analysis of Poly-4-hydroxybutyrate (P4HB) and AlloDerm Soft Tissue Support in Direct-to-Implant Breast Reconstruction*

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Abstract Text:

PURPOSE:

Implant-based breast reconstruction (IBBR) remains the predominant post-mastectomy reconstructive modality.[1] Soft-tissue support (STS) has facilitated the transition to pre-pectoral IBBR by improving pocket stability.[2,3] Traditionally, acellular dermal matrices (ADMs) comprised the predominant form of STS.[1] However, concerns regarding cost and complicated profiles have prompted investigations into other biologic and synthetic STS options.[4,5]

Poly-4-hydroxybutyrate (P4HB) is a fully absorbable synthetic mesh with favorable biomechanical properties and established use within aesthetic breast surgery.[6] P4HB may offer advantages in pre-pectoral direct-to-implant (DTI) IBBR by reducing dead space, stabilizing the implant pocket, and minimizing micro-shift. Subsequently, this study compares clinical outcomes of P4HB with ADMs in pre-pectoral DTI IBBR.

METHODS:

A retrospective review was conducted of consecutive patients undergoing mastectomy with immediate pre-pectoral DTI reconstruction from July 2017 to December 2024. Patients were grouped by STS type (P4HB vs. ADM) and analyzed at both the patient and breast level. Primary outcomes included overall, major, and minor complications. STS type was evaluated as a predictor using multivariable regression and propensity-score matching.

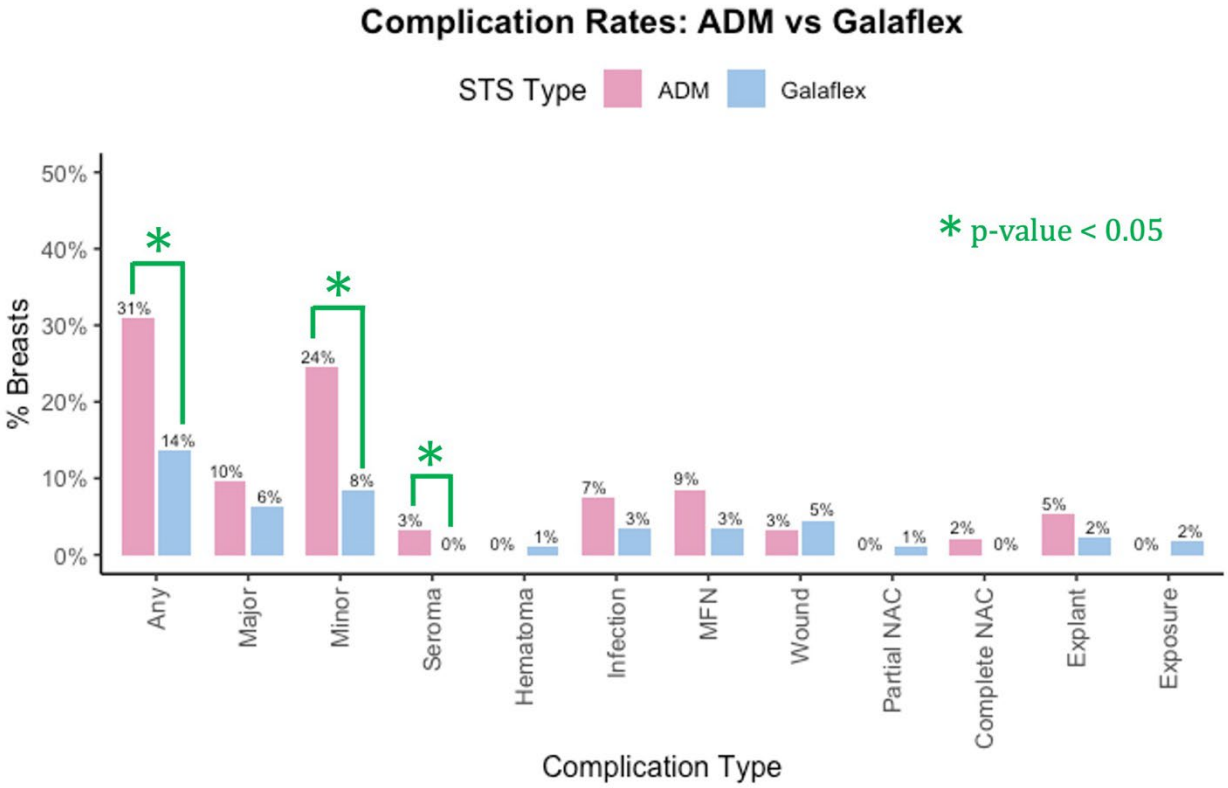
RESULTS:

A total of 153 patients (271 breasts) were included, with P4HB used in 102 (67%) breasts and ADM in 51 (33%). Mean follow-up was 13 months. Baseline characteristics were largely similar, though BMI was lower in the P4HB cohort (24 vs. 27 kg/m^2, $p<0.05$). P4HB was more commonly used in nipple-sparing mastectomy (71% vs. 29%, $p<0.05$) and in cases with lower mastectomy weights (444 vs. 653 g, $p<0.05$). Implant size was larger in the ADM cohort (425 vs. 369 cc, $p<0.05$).

Overall complications occurred in 19% of breasts, including 7% major and 14% minor complications. On unadjusted analysis, P4HB was associated with lower overall (14% vs. 31%) and minor (9% vs. 25%) complication rates ($p<0.05$). All seromas occurred in the ADM group (3% vs. 0%, $p<0.05$). However, after multivariable adjustment and propensity matching, STS type was not an independent predictor of complications. Increased BMI was associated with higher odds of overall (OR 1.1) and minor (OR 1.14) complications ($p<0.05$), while prior radiation predicted minor complications (adjusted OR 8.7, $p<0.05$).

CONCLUSIONS:

P4HB soft-tissue support was associated with fewer overall complications, fewer minor events, and no seromas on unadjusted analysis. Although these differences were not sustained after risk adjustment, P4HB performed equivalently to ADM despite being used in smaller-mastectomy-weight and nipple-sparing cases. These findings support P4HB as a safe, effective, and aesthetically favorable synthetic alternative to ADM in pre-pectoral DTI reconstruction. Further prospective studies are warranted to refine patient selection and evaluate long-term reconstructive and aesthetic outcomes with P4HB.



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