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Biosynthetic Mesh Compares Favorably to ADM in Tissue Expander-Based Breast Reconstruction

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Purpose: Acellular dermal matrix (ADM) is commonly utilized during immediate expander-based breast reconstruction, with potential advantages of greater intraoperative expansion, decreased time to complete expansion, and decreased rates of capsular contracture. However, ADM is associated with increased infection rate, seroma, and subsequent reconstructive failure. Poly-4-hydroxybutyric acid (P4HB) mesh is a large pore, biosynthetic scaffold shown to fully resorb and incorporate host tissues within 18 months in pre-clinical data. We sought to compare outcomes between the use of P4HB and ADM in immediate expander-based reconstruction.

Methods: Here we review 110 cases (64 patients) of breast reconstruction by a single surgeon (DMO) using P4HB mesh from October 2014 to June 2016 compared to 198 cases (113 patients) of ADM between November 2011 and October 2014. In all patients, reconstruction was performed immediately following mastectomy for confirmed or high genetic risk cases of breast cancer. Data was analyzed by Fisher's exact test or unpaired T-tests. IRB approval was obtained for purposes of this study.

Results: Groups were similar in terms of patient characteristics and age (mean 50 yo P4HB vs 48 yo ADM; $p=0.17$). Overall infection rates were lower, but not significantly different between P4HB and ADM (8% vs 15%, $p=0.27$). In cases of infection, implants were removed in 6% with P4HB versus 8% with ADM ($n=7/110$ vs. $15/198$; $p=0.82$). Patients who underwent external beam radiation (XRT) were higher in the ADM group (37% vs 28%; $p=0.25$), though not statistically different. Similar numbers of patients received chemotherapy in each group (42% P4HB vs 46% ADM; $p=0.64$). Of patients who developed infections, no significant differences were seen with either XRT (50% vs 47%; $p=0.85$) or with chemotherapy (50% vs 40%, $p=0.73$). Of patients who did not receive XRT, fewer infections were seen with P4HB (13% vs 26%; $p=0.1$). Cost of P4HB mesh was approximately \$14/cm² compared to \$25/cm² for ADM (44% less expensive).

Conclusions: These data show biosynthetic P4HB mesh to be a safe alternative to ADM in expander-based breast reconstruction, with trends toward decreased rates of infection and need for device removal using P4HB mesh. There was also a trend toward decreased infection rates in P4HB patients that were not radiated. Although our results are limited to a small series of initial patients, P4HB porous mesh may be a promising novel technique to decrease complications inherent to use of ADM.

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