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ABSTRACT

Real-world evaluation of cellular, acellular, and matrix-like products for pressure ulcers in the post-acute setting

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Abstract

Objective: To evaluate the real-world effectiveness of cellular, acellular, and matrix-like products (CAMPs) compared with standard of care (SOC) in promoting pressure ulcer (PU) healing among patients treated in post-acute settings.

Method: This observational comparative effectiveness study analyzed de-identified data from the LiftOff Registry, a national database encompassing more than 18,000 patients and 23,000 pressure ulcers (PUs) treated in long-term acute care hospitals and skilled nursing facilities. Wounds receiving CAMPs + SOC were compared with those managed with SOC alone. Bayesian propensity score methods were applied to reduce confounding and achieve covariate balance across key demographic and clinical variables. All Bayesian models were implemented in Python 3.12 using PyMC, with the Bayesian Model-Building Interface (Bambi) for model specification and ArviZ for posterior diagnostics and visualization. Healing—defined as complete re-epithelialization or closure—was modeled using Bayesian logistic regression with study arm and baseline wound stage as predictors, summarized as posterior means and 95% credible intervals (CrI).

Results: Before matching, the SOC cohort included 9,356 patients (14,740 wounds), while the CAMPs cohort included 136 patients (190 wounds). After Bayesian matching, 375 wounds were retained (190 treatment; 185 SOC), with comparable distributions of age, diabetes prevalence, and baseline wound area (mean: 23.2cm² versus 24.4cm²). Most wounds were classified as Stage 3 or 4. The posterior mean average treatment effect (ATE) was 0.16 (95% CrI, 0.15 –0.18), representing a 16-percentage-point improvement in ATE with CAMPs versus SOC, or approximately a 50 point increase in percentage terms.

Conclusion: The use of CAMPs in post-acute settings was associated with a significant and credible improvement in PU healing compared with SOC. These real-world findings support the integration of CAMPs into post-acute wound management protocols to enhance outcomes for patients with complex or non-healing wounds.

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Author contributions: All authors confirm that they have made substantial contributions to the conception and design of the study, analysis and interpretation of the data, and drafting or critical revision of the manuscript for important intellectual content. Each author has reviewed and approved the final version of the manuscript and agrees to be accountable for all aspects of the work

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