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“Single vs. Double Unit Red Blood Cell Transfusion in Stable, Non-Bleeding Anemic Trauma Patients”

BACKGROUND: Red blood cell (RBC) transfusion remains a fundamental component of trauma management, yet optimal dosing strategies for stable, non-bleeding patients remain undefined. While restrictive transfusion thresholds have been widely adopted across critical care and surgical settings, uncertainty persists regarding the safety and efficacy of single-unit versus double-unit transfusion practices in trauma populations. This gap carries significant implications for patient outcomes and resource utilization, particularly within patient blood management (PBM) frameworks that advocate minimizing unnecessary transfusion exposure.

METHODS: A comprehensive literature review was conducted, integrating data from randomized controlled trials, systematic reviews, clinical guidelines, and observational trauma studies. Primary outcomes included hematologic response to transfusion, defined by post-transfusion hemoglobin and hematocrit levels, and clinical endpoints such as additional transfusion requirements, infections, length of stay, and mortality. Data from a retrospective trauma cohort (N=344) were analyzed to compare one-unit versus two-unit transfusion strategies, alongside predictors of repeat transfusion.

RESULTS: Across multiple studies, restrictive transfusion thresholds (hemoglobin 7–8 g/dL) were associated with non-inferior or improved outcomes compared to liberal strategies. Single-unit transfusion protocols consistently demonstrated significant reductions in RBC utilization (13.9–44%) without compromising safety or length of stay. In the trauma cohort, both one-unit and two-unit transfusions resulted in significant hematologic improvement; however, the absolute increase in hemoglobin was modestly greater with two units (mean increase 1.6 vs. 1.2 g/dL). Despite this, the need for additional transfusions did not differ between groups (42% vs. 39%, $p=0.6$). Logistic regression revealed that post-transfusion surgical intervention (OR=2.82, 95% CI: 1.47–5.36) and total number of operations were independent predictors of further transfusion, whereas initial transfusion dose was not.

CONCLUSIONS: Restrictive, single-unit transfusion strategies appear safe and effective in stable, non-bleeding trauma patients, achieving adequate hematologic response without increasing the likelihood of subsequent transfusions. These findings support PBM principles and highlight the need for individualized, context-driven decisions, particularly in operative settings. Further prospective studies are needed to refine transfusion protocols in this population.