

eP059

ePoster Viewing

Post-surgical and implant infections: from head to knee

**HEALTHCARE-ASSOCIATED INFECTION AFTER RED BLOOD CELL TRANSFUSION: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED TRIALS**

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**Objectives:** Red blood cell (RBC) transfusion is a common procedure in hospitals, with approximately 14 million units transfused annually in the United States. Since transfusion-related immunomodulation has been associated with increased rates of infection, we evaluated the current evidence from randomized trials regarding restrictive versus liberal transfusion thresholds and the effect on healthcare-associated infection.

**Methods:** We conducted a systematic review and meta-analysis of the randomized trials which incorporated two comparator arms – restrictive versus liberal RBC transfusion strategies – to evaluate their impact on the incidence of healthcare-associated infection. PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guidelines were followed. MEDLINE, Embase, Web of Science, Cochrane Register of Controlled Trials, ClinicalTrials.gov, International Clinical Trials Registry Platform, and the ISRCTN registry were searched through 23/08/2013. Random effects models were used to pool risk ratios and risk differences. Absolute risks of infection were pooled using the profile likelihood method with variance stabilized using the enhanced Freeman-Tukey arcsine transformation. Heterogeneity was assessed using Cochran's Q test, between-study variance, and the inconsistency index. Cost savings associated with a restrictive strategy in orthopedic patients were calculated using 2012 US dollars.

**Results:** A total of 18 trials with 8037 patients met criteria, of which 17 trials (n=7486 patients) contained sufficient information for meta-analyses. Restrictive RBC transfusion strategies decreased the risk of infection by 18% (95% CI: 5% to 28%) with little heterogeneity ( $I^2 = 0.0\%$ ;  $\tau^2 < 0.0001$ ). Pooled risk of infection was 11.8% (95% CI, 7.0% to 16.7%) in the restrictive group and 16.9% (95% CI, 8.9% to 25.4%) in the liberal group. The number needed to treat with restrictive strategies to prevent infection was 34 (95% CI, 21 to 110) and the number of avoided infections per 1000 patients was 29.6 (95% CI, 9.1 to 47.5). Leukoreduction of RBC units did not mitigate the effect of a liberal transfusion strategy on infection. With stratification by patient type, there was a 30% decreased risk of infection with restrictive RBC use (95% CI, 9% to 46%) in orthopedic patients which yielded \$1.6 to \$2.0 billion estimated cost savings to U.S. hospitals annually. Patients with sepsis exhibited a 49% decreased risk of nosocomial infection with lower RBC thresholds (95% CI, 5% to 72%). There were no significant differences in the incidence of infection by RBC threshold for patients with cardiac disease or acute upper gastrointestinal bleeding, the critically ill, or for low birth-weight infants. Sensitivity analyses relevant to study quality (concealed randomization, blinding, withdrawals, protocol violations) did not appreciably change the results.

**Conclusion:** Restrictive RBC transfusion strategies are particularly beneficial in patients undergoing hip or knee arthroplasty and in patients with sepsis. Implementing restrictive strategies would likely decrease the incidence of healthcare-associated infection and reduce healthcare costs.