Using Pre-Operative Data to manage Peri-Operative Anemia in Elective Joint Replacement Surgery Patients

CHALLENGE

Preoperative anemia prevalence of 25-30% in elective joint replacement surgery, average Hgb loss 4 grams/ procedure and 40% national transfusion average for patients with 2 units of red cells or more given per transfused patient.

Action

• Receive patient into new, patient-centric, peri-operative anemia management program at time surgery need identified, with 2 or more weeks to surgery date
• Standard data intake including labs, medical history, medications and type of and timeframe to surgery with algorithmic assessment for pre-surgical anemia and cause(s)
• Report includes treatment plans for pre-operative and peri-operative anemia and patient specific transfusion guidelines to provide safe transfusion avoidance or minimization
• Anemia corrected prior to surgery; hemoglobin and reticulocyte count of all treated patients documented on the day of surgery, change in hemoglobin in relation to time available for anemia correction measured (treatment effectiveness measurement)
• Number of red blood cell units transfused and percentage of patients transfused in new program, compared to historic controls
• Transfusion appropriateness measurement included for transfused patients
• Most efficient, effective, patient-centered and low cost way to treat anemia determined
• Validate pre-operative anemia correction for patients is not associated with worse clinical outcome, increased LOS or adverse events
• Learn barriers to adoption of new process
• Gain acceptance and ease of use of technology solution and algorithmic rules

Lessons Learned

New program works well for patients and physicians, 80% reduction in blood use and 0.67 fewer red cell units used/patient when patient transfused, without complications related to anemia treatment via medications and/or reducing red cell transfusions.

Barriers to adoption included resistance to new work (surgeon and support staff) and unfounded assumptions that surgery would be delayed, that surgeon would have to diagnose anemia and learn how to treat it.

Education and good communication regarding individual patients and program data (effectiveness of anemia treatment and blood use reduction without complications) are essential to attract new surgeon users.

RESULTS

Fairview Health System (6 hospitals) elective total joint replacement population is 3,350 patients annually; 1,000 patients estimated with pre-operative anemia in need of treatment prior to surgery. Estimated need for in-hospital blood use and post-operative anemia planning is 3,350 (all patients, pre-operative anemia is not the only risk factor for transfusion).

Results for new pre-operative anemia assessment/treatment as of April 2013:

148 Orthopedic patients: 32 anemic, 24 treated
Percentage of patients with anemia on the day of surgery: 36%;
Percentage of patients with anemia day of surgery intervention group: 100%
Transfused intervention group: 9 patients (6%);
Transfused patients in matched cohort group: 29 (19.3%)
Red cells units transfused: 12
(1.33 units/transfused patient);
Transfused red cell units in intervention group: 58 (2.0 units/transfused patient)
79.4% reduction in blood use
Of 12 red cell units transfused in intervention group, 4 not considered appropriate on internal review
Intervention group hemoglobin increase over time: < 14 days from first treatment to surgery 0.4 gm/dl, > 14 days from first treatment to surgery 1.46 gm/dl
No complications from anemia treatment and no anemia-related or other readmissions