TEG-Directed Transfusion in Complex Cardiac Surgery: Impact on Blood Product Usage

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Purpose

✴ Complex Cardiac Surgical Procedures Often Require Blood or Blood Products to Treat Bleeding or Coagulopathy

✴ Thromboelastography (TEG) was Introduced at Toledo Hospital in 2010 to Direct Transfusion Therapy in Cardiac Surgery

✴ The Goal of the Study was to Quantify the Impact of TEG on both Perioperative and Postoperative Transfusion Rates
TEG Directed Transfusions

What is TEG?

- Point of Care Coagulation Analyzer
- Provides an Overall Snapshot of Coagulation Status
- Specifically Identifies and Quantifies Blood Products Needed
TEG Directed Transfusions

Study Cohort

✴ All Patients Who Underwent Complex Cardiac Surgery Procedures at Toledo Hospital:
  ✴ Multiple Valve Procedures, Valve-CABG Procedures, Aortic Root/Aortic Arch Replacement

✴ Retrospective Analysis: Total 681 Patients Identified

✴ Pre-TEG Era 2008-2009 → 370 Patients
✴ Full Implementation of TEG 2011-2012 → 311 Patients
✴ Minimally Invasive Cases Excluded
TEG Directed Transfusion Methods

- 214 Data Points Collected per Patient
- Blood Usage was Analyzed for Perioperative (OR+24 hrs), 24-48 hrs, >48 hrs and the Entire Hospitalization Time Periods
- 3 Surgeons Performed All Surgeries within Study Group
- Cardiopulmonary Bypass Circuit and Oxygenators Uniformly Consistent throughout Study Period
Patient characteristics and blood use were compared with t-test and chi-square analysis.

A multivariate model including patient characteristics, preoperative and postoperative lab values (hemoglobin, hematocrit, and platelet count), procedure, pump time, and autotransfusion volume was used to determine the impact of TEG on intra-operative, postoperative, and total blood use.
TEG Directed Transfusion

Perioperative Blood Use (mean units)

- RBC: Before TEG: 20.5%, After TEG: 2.5%, p<0.001
- FFP: Before TEG: 67.5%
- Cryo: Before TEG: 81.3%
- Platelets: Before TEG: 2.5%
TEG Directed Transfusion
Total Blood Product Use
(mean units)

- RBC: 28.7% decrease
- FFP: 67.3% decrease
- Cryo: 79.6% decrease
- Platelets: 4.8% decrease

*p<0.001
TEG Directed Transfusion

Reduction in Blood Usage by Time Period (mean units)

Before TEG | After TEG
---|---
OR+24 hrs | 7.33 | 4.44 *
24-48 hrs | 0.46 | 0.39
>48 hrs | 1.45 * | 0.63
Entire Hospital Stay | 9.66 | 5.79 *

p<0.001
**TEG Directed Transfusion Results - Impact of TEG**

- Mean Units of RBC’s, FFP and Cryoprecipitate all Significantly Reduced with TEG (p<0.0001)

- Platelet Use was Reduced Although Not Significantly

- Mean Overall Blood Product Usage was Significantly Reduced (40%) in Both the Perioperative Period and for the Entire Hospitalization (p<0.001)

- Total Proportion of Patients Exposed to Allogenic Transfusions was Significantly Reduced (p<0.01)
TEG Directed Transfusion

**TEG Directed Clinical Interventions**

- Additional Protamine Doses Given (50-100mg)
- Desmopressin (DDAVP-Dose 0.3 mcg/kg)
- Platelet Transfusion
- FFP Transfusion
- Cryoprecipitate Transfusion
**TEG Directed Transfusion Conclusions**

- **TEG Directed Management of Blood Product Administration in Complex Cardiac Surgical Procedures Significantly Reduced Perioperative and Overall Hospitalization Transfusion Rates**
- **In Total, Fewer Patients were Exposed to Allogenic Blood Transfusions**
- **The Use of TEG in Complex Cardiac Surgical Procedures to Guide Blood Product Administration Significantly Impacted Transfusion Therapy**
- **The Potential Impact on Hospital Costs Requires Further Analysis**
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