CLINICAL RESEARCH TO CLINICAL PRACTICE
“A PERFUSIONISTS PERSPECTIVE”

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Translational Science
Knowledge translation is a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system.
Knowledge To Action Process

Knowledge Creation

Basic Research

Synthesis

Products and Tools
- PRE-APPRAISED SYNTHESIZED EVIDENCE
- COCHRANE LIBRARY SYSTEMATIC REVIEWS
- INTER/INTRA DISCIPLINARY PRACTICE GUIDELINES
- REGISTRIES
Knowledge To Action Process

Knowledge Creation

Basic Research

Synthesis

Products and Tools

Identify Problem

Adapt Knowledge to Local Context

Assess Barriers to Knowledge Use

Select, Tailor Implement Interventions

Monitor Knowledge Use

Evaluate Impact on Outcomes

Communicate Success

Sustain Knowledge Use
“Given the extremely rapid growth of randomized trials and other rigorous investigations, the issue is no longer how little medical practice has a firm basis on such evidence; the issue today is how much of what is firmly based is actually applied in the front lines of patient care.”

DL Sackett
Evidenced Based Medicine
“Adult Perfusion – any agreement??”

1. CPB Equipment / Supplies
   - Roller / centrifugal?
   - Art. Line Filter 22μ, 40μ, none, other?
   - Leukofiltration?
   - Roller-pump occlusion?
   - Point-of-Care monitors vs. lab?
   - Hard / soft tubing?
   - Biocompatible circuits?
   - Low-prime?
   - Gravity / vacuum / kinetic drainage?
   - Open / closed venous reservoir?
   - Hemofiltration?
   - Std. cardiotomy reservoir use?
   - Routine shed blood salvage?
   - Embolex?

2. CPB Prime
   - Low / standard prime Volume?
   - Hct / Hb?
   - Composition (COP, drugs, lytes)?
   - Going-on Temperature?

3. CPB Blood flow rate
   - BSA-index?
   - Wt-index?
   - SvO2?
   - MAP / SVR?

   - Micro-volume vs. std.?
   - Blood vs. crystalloid?
   - Biocompatible?
   - Water vs. ice?
   - Particulate filter?
   - Leukofiltration?
   - Myo-temperature?
   - Ante & retro?

5. CP Prime
   - Volume / ratio?
   - Hct / Hb?
   - Composition (COP, drugs, lytes)?
   - Temperature?
   - CP flow rate
   - Qb empirical?
   - Pressure?
   - Time?
   - Myo-lactate?
   - Myo-temperature distribution?

6. Evidence-based protocols
   - Yes / no?

7. Anticoagulation
   - ACT target / range?
   - POC test / lab?
   - Bolus vs. continuous?

8. Perfusion Technique re:
   - sample/infusion manifold technique?
   - Max. degree bld:water gradient?
   - Maximum arterial blood temperature?
   - Patient Temp. site (r, eo, bl, v, a, tymp, …)?
   - Circuit Temp. site?
   - Active / passive cooling?
   - Microfilter donor blood?
   - Wash donor blood?
   - Microfilter / leukodeplete salvaged blood?
   - Optimal transfusion crystalloids?
   - PRP / Plt. Gel?
   - Target paO2?
   - Target paCO2?
   - Target SvO2?
   - Target pt. / bld temperature?
   - stat – pH-stat?
   - Allowed time for wet/dry setups?
WHAT MAKES THIS CAR GO SO FAST?
THE HOSPITAL IS THE MOST COMPLEX HUMAN ORGANIZATION EVER DEVISED.

THE US HEALTH CARE SYSTEM IS THE MOST COMPLEX INDUSTRY WE HAVE EVER ATTEMPTED TO UNDERSTAND.
The specific hospital significantly affects red cell and component transfusion practice in coronary artery bypass graft surgery: a study of five hospitals


BACKGROUND: Interhospital differences in blood transfusion practice during coronary artery bypass graft (CABG) surgery have been noted, but the underlying issues have not been identified.

STUDY DESIGN AND METHODS: Records of 267 consecutive CABG cases in five university teaching hospitals in 1995 and 1996 were stratified by hospital, type of revascularization conduit, patient’s sex, and other factors. Statistical methods were used to compare patient characteristics, transfusion outcomes, and hospital outcomes.

RESULTS: Forward two-step logistic regression using patient likelihood of red cell transfusion factors in the first step, and the specific hospital in the second step revealed a significant effect of hospital on the 3-octa va-
ties for red cell transfusion. This finding was confirmed by analyses of a highly stratified subset of cases, males in diagnosis-related group 107 (primary cases of coronary bypass without coronary catheterization) who underwent revascularization with venous and internal mammary artery grafts, revealing variations among hospitals from 109 to 457 units of red cells transfused per hundred cases. Corresponding variations in transfusions of all blood components were from 324 to 1019 units per hundred cases by hospital. Variation in red cell transfusion practice among surgeons in the same hospital was not responsible for these interhospital differences.

CONCLUSION: The effect of the specific hospital on transfusion practice is attributed to institutional differences that, through habits of training or hierarchy, become ingrained in hospitals.

ABBREVIATIONS: CABG = coronary artery bypass graft surgery, CHTS = Collaborative Hospital Transfusion Study (Chicago), ICD-9-CM = International Classification of Diseases, Ninth Revision, IMA only = internal mammary graft only (saphenous vein, left IMA), NCM = necrotomia conduct, SMG = saphenous vein, SMG = saphenous vein and IMA graft, IM = IMA and SMG.

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Surgeon D.M. et al
The specific hospital significantly affects red cell and component transfusion practice in coronary artery bypass graft surgery: a study of five hospitals

Transfusion 1998;38:122-134
**Background:** Although blood utilization has been under considerable scrutiny for the past two decades, particularly for surgery, subtle differences in perioperative transfusion practices between countries are rare, and the evolution of international standards remains unknown. Therefore, the objective of this evaluation was to compare the perioperative transfusion of blood components in cardiac surgery in multiple centers in different countries.

**Study Design and Methods:** Transfusion practice was investigated prospectively in 70 centers among 16 countries. A total of 5465 randomly selected cardiac surgery patients of the Multicenter Study of Perioperative Ischemia (PBACTICA) were evaluated. Utilization of red blood cells (RBCs), fresh-frozen plasma (FFP), and platelets (PLTs) was assessed daily, before, during, and after surgery until hospital discharge.

**Results:** Intraoperative RBC transfusion varied from 9 to 100 percent among the 16 countries, and 25 to 87 percent postoperatively (percentage of transfused patients). Similarly, frequency of transfusion of FFP varied from 0 to 38 percent intraoperatively and 3 to 35 percent postoperatively, and PLT transfusion from 0 to 51 and 0 to 30 percent, respectively. Moreover, there were not only marked differences in transfusion rates between centers in different countries but also in institutional composition of multiple centers within countries.

**Conclusion:** In cardiac surgical patients, marked variability in transfusion practice exists between centers in various countries and suggests differences in perioperative practice patterns as well as possible inappropriate use. International standardization of perioperative practice patterns as well as transfusion regimes appears necessary.

**Abbreviations:** CABG = coronary artery bypass graft; ICAM = intensive care unit; PBACTICA = Multicenter Study of Perioperative Ischemia Epidemiology II.

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See Appendix I for a complete list of the investigators and centers.

Stephanie A. Snyder-Ramos and Patrick Möhrle contributed equally to the manuscript and share first authorship.

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**Transfusion practice varied from 9-100% and 25-87% postoperatively in 16 countries**

Intraoperative RBC transfusion varied from 0-98% and 3-95% postoperatively

Platelet transfusion from 0-51% and 0-39% respectively

Snyder-Ramos S. et al
The ongoing variability in blood transfusion practices in cardiac surgery.
Transfusion 2008;Volume 48:1284-1299
BLOOD CONSERVATION AT SMGH AT A GLANCE

- EDUCATION
- PREOP ANEMIA MANAGEMENT
- MARKETING
- BENCHMARKING AND REPORTING
- CONSULTATION AND COMMUNICATION
- BIOCOMPATIBLE SURFACE COATINGS
- LIMIT HEMODILUTION
- POINT OF CARE TESTING
- ANTI-COAGULATION MANAGEMENT
- SEQUESTRATION OF PUMP BLOOD
- BLEEDING IS SURGICAL UNTIL PROVEN OTHERWISE
Report of Coronary Artery Bypass Surgery in Ontario
Fiscal Years 2005/06-2006/07
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RATHER THAN LOOKING AT INSTITUTIONAL COMPLIANCE ON A SINGLE MEASURE OR INDICE IT IS IMPORTANT TO LOOK AT CONSISTENT DELIVERY OF A BUNDLE OF CARE
GUIDED BY THE AVAILABLE EVIDENCE AND DRIVEN BY THE TWIN PRINCIPLES

“MANAGEMENT BY OBJECTIVE AND MANAGEMENT BY MEASUREMENT”
“PRACTICE IS SCIENCE TOUCHED WITH EMOTION”

STEPHEN PAGET, 1909
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