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The ASA Physical Status Classification System as a Valuable Tool to Optimize Preoperative Blood Ordering for Orthopaedic Trauma.

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Disclosures

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The perioperative controversial decision to order blood typing and red cell antibody screening (T/S) or a type and crossmatch (T/C) before surgery

What if the case has a low or intermediate likelihood of transfusion?

To order or not to order?

- anticipated blood loss for a given procedure
- preoperative hemoglobin concentration
- the relative risk of transfusing emergency-release type-O blood during unexpected hemorrhage when preoperative T/S or T/C are unavailable

How do we best make the decision?

In 1976, Friedman B.A., et al proposed a recommended maximum surgical blood order schedule (MSBOS) for common surgical procedures.

The idea → Evidence-based projected number of units of blood transfused to patients during their hospitalization for 50 common primary surgical procedures in the United States during 1974 used to define maximum blood orders for each procedure

Eliminated excessive ordering and improved wastage.

How do we make the decision?

38 years later:

- New procedures introduced since then
- Evolving surgical techniques

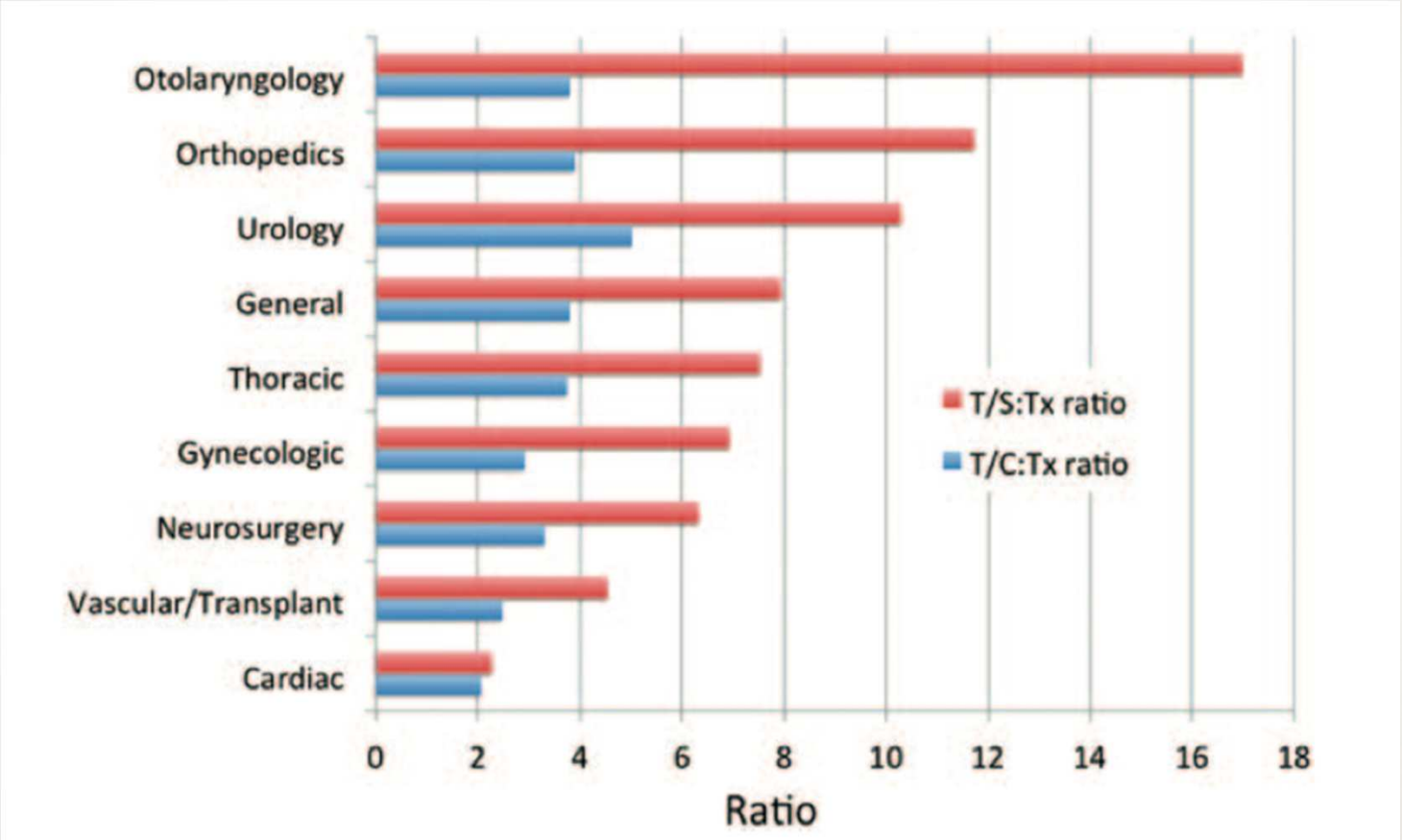
Blood loss is now less common than it was back then.

New Protocols → most are designed, however for a single type of surgical procedure.

There is room for improvement with new evidence-based protocols in order to optimize preoperative blood ordering.

1. Minimize unnecessary ordering through procedure based algorithms
2. Procedures or protocols designed to minimize wastage of units if ordered and not used.

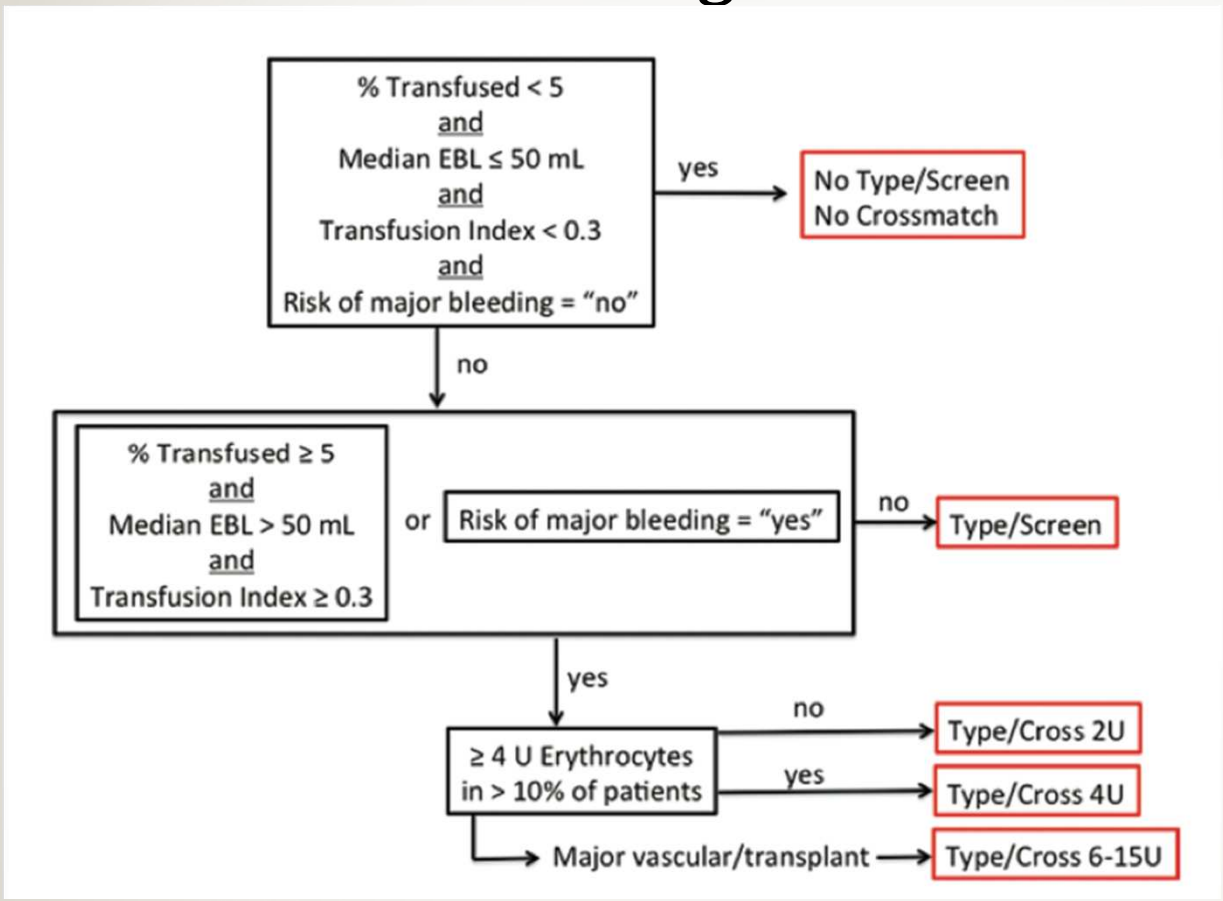
Type-and-crossmatch–to–transfusion (T/C:Tx) ratio and type-and-screen–to–transfusion (T/S:tx) ratio compared among surgical services.



Steven M. Frank MD, director of the Interdisciplinary Blood Management Program at The Johns Hopkins School of Medicine.

Frank SM, Rothschild JA, Masear CG, Rivers RJ, Merritt WT, Savage WJ, Ness PM: Optimizing Preoperative Blood Ordering with Data Acquired from an Anesthesia Information Management System. Anesthe 2013; 118(6):1286-97

Evidence-based algorithm used to derive the maximum surgical blood order schedule.



Calculated potential reduction in Hospital charges →$211,448

Actual costs →$43,135 per year

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American Society of Anesthesiology's Physical Status Classification

- Proposed by Drs. Saklad, Taylor, and Rovenstein in 1941 as a method for categorizing surgical patients for study.
- Developed into its current form by Dr. Dripps and colleagues in 1961.
- Goal of the system is to assess the overall physical status of the patient prior to surgery and not to assess surgical risk per se because it neglects the impact of the surgery itself on the patient's outcomes.

The ASA Classification

Class	Description
ASA I	A normal healthy patient
ASA II	A patient with mild systemic disease
ASA III	A patient with severe systemic disease
ASA IV	A patient with severe systemic disease that is a constant threat to life
ASA V	A moribund patient who is not expected to survive without the operation
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes

Assessing ASA Physical Classification- Methods

- Retrospective analysis of Level I trauma cases for surgical treatment with fractures from January 1, 2005 to December 31, 2010 for further analysis.
- Records of patients having **isolated fractures in which only a single operative fracture was present** and no other organ system was significantly injured were selected this study
- Logistic regression controlling for age, gender, race, 21 individual medical comorbidities, and type of fracture was conducted to identify the predictive ability of ASA on the likelihood of blood transfusion.

Assessing ASA Physical Classification- Methods

Identified record of **1,817** patients meeting inclusion criteria.

- **216** had pelvis, acetabular, or hip fractures → **26.6%**
- **1,250** had lower extremity fractures → **68.9%**
- **351** had upper extremity fractures → **9.5%**

214 received blood transfusion during their surgical procedure.

ASA Distribution

- **159** patients with ASA I →**8.7%**
- **971** patients with ASA II → **53.4%**
- **543** patients with ASA III → **29.9%**
- **146** patients with ASA IV → **8.0%**
- **No patients ASA V or VI**

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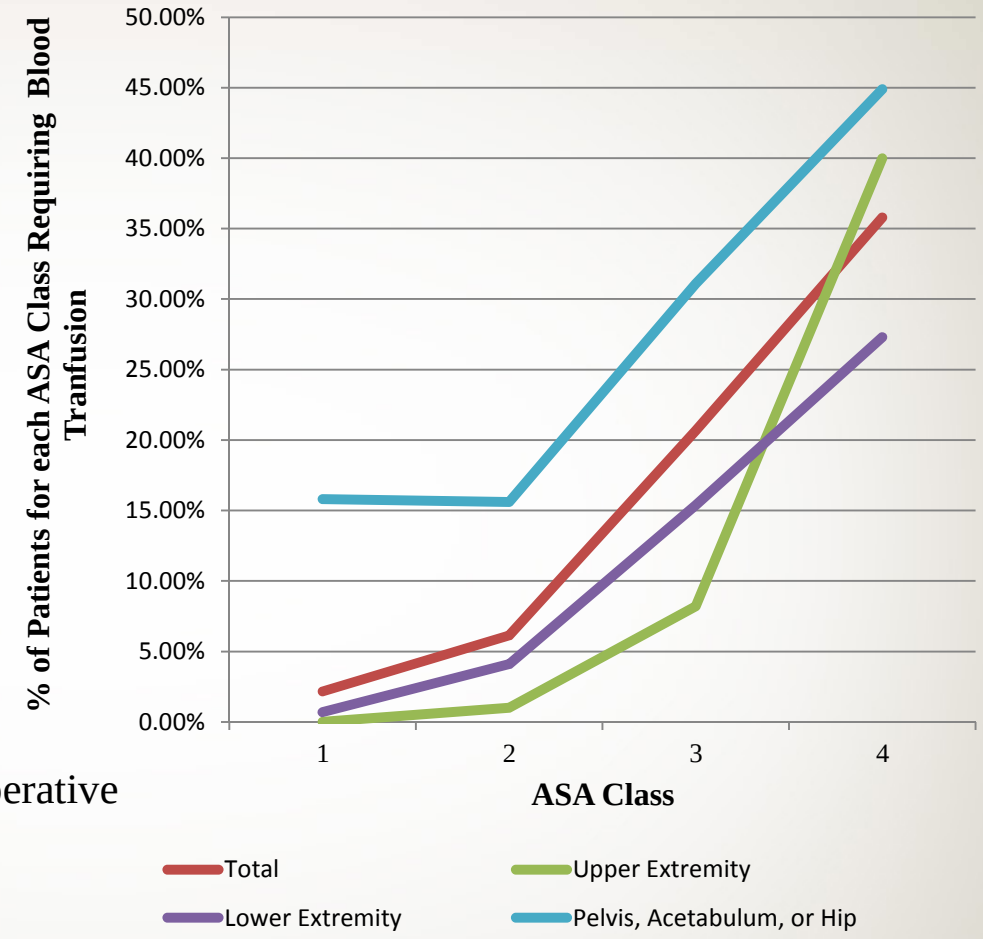
Results

Table 1 Percentage of intraoperative blood transfusion in patients by fracture location and ASA class.

Type of Fracture	ASA Class I	II	III	IV	Relative Risk (95% CI)
Upper Extremity (n=172)	0.00%	1.04%	8.16%	40.00%	22.4 (95% CI, 3.4-146.6)
Lower Extremity (n=1162)	0.70%	4.05%	15.38%	27.27%	3.5 (95% CI, 2.5-4.8)
Pelvis, Acetabulum, or Hip (n=485)	15.79%	15.61%	31.13%	44.90%	1.6 (95% CI, 1.1-2.3)
Total Patients with Isolated Fracture (n=1819)	2.17%	6.25%	20.97%	36.69%	

p-value <0.001



Compared to patients with an ASA class of I:

- ASA II → **2.45 more likely** to receive intraoperative blood transfusion.
- ASA III → **6.00 times more likely** to receive intraoperative blood transfusion.
- ASA IV → **14.71 times more likely** to receive intraoperative blood transfusion.

Conclusion and Limitations

- Patients' ASA class is significantly associated with the need for intraoperative blood transfusion in patients undergoing orthopaedic surgery for isolated fractures.
- Although there are variations on different procedures this association was observed in all of them when grouped by body region. ASA PS Classification System may be used as one element in the criteria for blood ordering when creating institution specific algorithms designed to minimize wastage.

- Is ASA classification useful in risk stratification?
  - Literature is conflicting. Some Anesthesiologists hold that ASA was never meant to be a risk stratification scale. Risk of bleeding in surgery are procedure specific which is not accounted for in the ASA PS classification system.
  - Increasing ASA class was associated with higher prevalence and a stepwise increase in the odds ratio of serious adverse events for EGD.
- The simplicity of classification system is both a strength and weakness. It is easily applied and communicated, so practical to use. However, ASA PS lacks specificity, which leads to inconsistent ratings between anesthesiologists and imprecise clinical interpretation.