

STS/EACTS Latin America Cardiovascular Surgery Conference

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Conservative Pro-Erythropoietic Therapy in Ultra-Restrictive Patient Blood Management in Cardiac Surgery

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Patient Blood Management in Cardiac Surgery

- Overwhelmingly, the vast majority of publications show that a restrictive transfusion (PBM) protocol is effective in reducing morbidity, mortality and LOS, or at the very least is non-inferior with less resource utilization, especially in cardiac surgery.
- An aggressive multi-modality PBM program has been utilized for over 10 years at our institution resulting in a consistent transfusion rate in all-comers for cardiac surgery of less than 10%.
 - Intensive multi-modality, “no treatment too costly”, to achieve maximal reduction in transfusions.
 - Modalities included: pre-op screening and treatment when possible, pre and post-op Fe and Erythropoetin (E), ANH, RAP, Mini-circuits, PPP/PRP, MUF, Aminocaproic Acid/Tranexamic Acid (IV & top), hemostatic agents, lower trigger points, PBM coordinator, constant hospital-wide education.

STUDY DESIGN

- Objective: Decrease utilization of pro-erythrogenic drugs (E,Fe) while maintaining extremely low transfusion rates.
- Methods: Prospectively decreasing the use of E/Fe and comparing rate of transfusion to historical controls in 342 consecutive open-heart patients
 - Historical Controls: 244 consecutive patients; rec E/Fe (40K units/300mg pre-op & qod) for **HgB < 12mg/dl.**
 - Prospective Subjects: 98 consecutive patients; rec E/Fe (40K units/300mg pre-op & qod) for **HgB < 9mg/dl.**
 - **End Points: Units transfused, LOS, Mortality**

Pre-Operative Patient Characteristics

Column One	Pre-Change	Post-Change	P
N	244	98	
Age	71 (42-93)	72 (22-89)	0.753
Pre-Op HgB	14.0 (9-19)	13.4 (7-18)	0.003
Pre-op Ferritin	195 (122.4-1835)	219 (147.8-1802)	0.382
Female	31.6%	25.5%	0.303
Diabetes	29.5%	31.6%	0.700
Hypertension	75.0%	79.6%	0.384
CHF	22.1%	19.4%	0.585
CAD	73.0%	82.7%	0.075
PVD	6.6%	12.2%	0.066
CKD	10.2%	17.3%	0.088
Redo Surgery	7.8%	8.2%	0.829
Pre-Admit AC	2.5%	4.1%	0.384
Pre-op HgB< 9.0	0.0%	3.1%	0.005
Pre-op HgB<12.0	9.4%	18.4%	0.029

RESULTS

	Pre-Change	Post -Change	P
N	244	98	
HgB immediate intra/post-op	11.1 (5.2-15.3)	10.7 (6.0-15.0)	0.049
HgB at D/C	10.7 (7.1-16.0)	10.5 (7.4-14.0)	0.323
Epo Doses	2.2 (0-7)	1.0 (0-5)	<0.001
Fe Doses	1.8 (0-4)	0.8 (0-3)	<0.001
Units Transfused (avg pp through entire stay)	0.06 (0-6)	0.09 (0-3)	0.645
Total LOS	7.4 (4-24)	7.6 (3-25)	0.524
Epoetin (any post-op day)	85.2%	41.8%	<0.001
Fe (any post-op day)	86.1%	37.8%	<0.001
Units Transfused	3.9%	6.1%*	0.367
Expired	0.8%	1.0%	0.893

- All pre-change patients were performed by author (PT), one-third of post –change patients were performed by a second surgeon that was on staff at the time. Break down of “units-transfused” by post-change surgeons showed a total transfusion rate of 1.6% by author and 14.3% by second surgeon. Comparing pre vs. post change for author surgeon **only** shows no significance in transfusion rates.

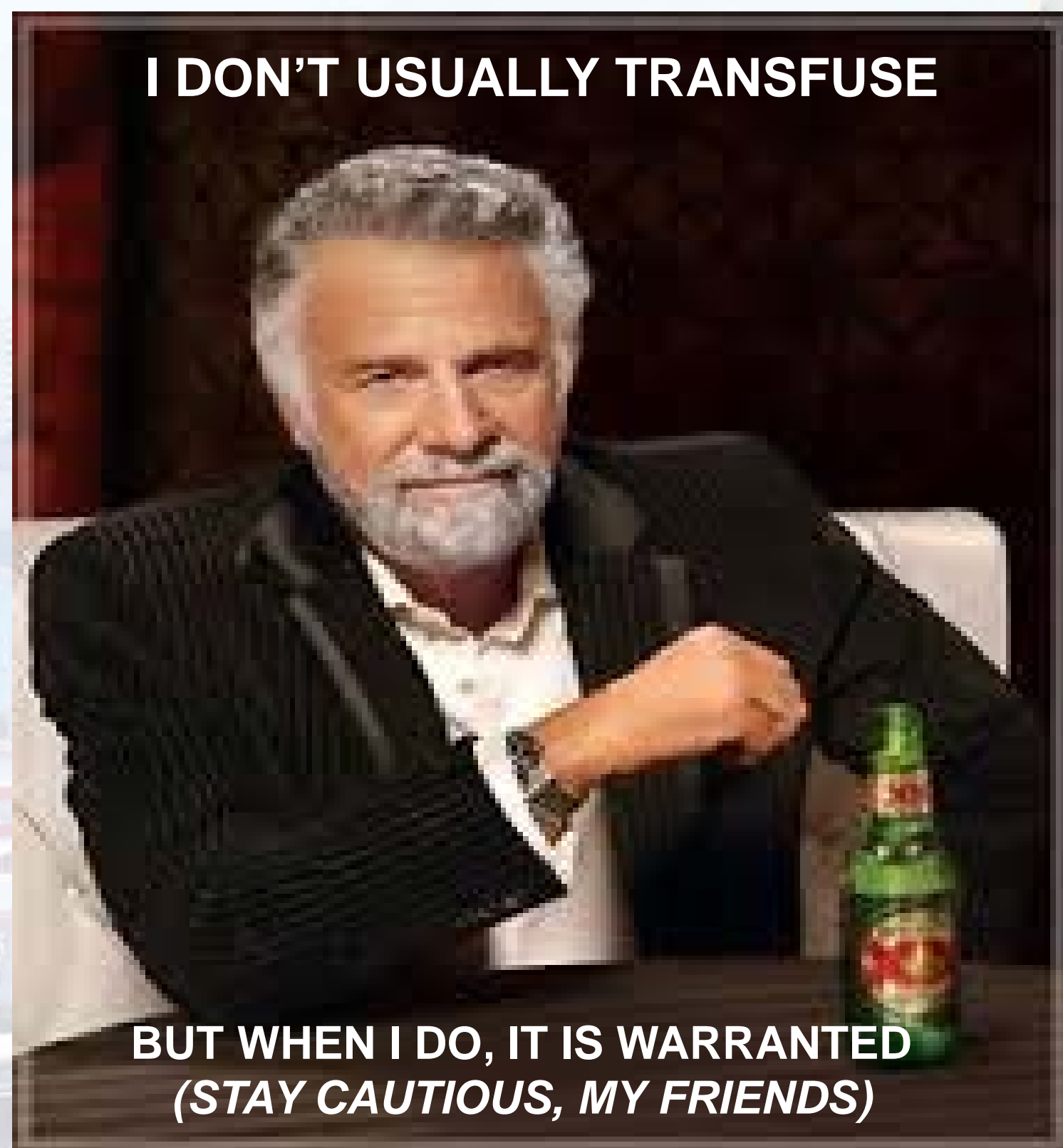
CONCLUSIONS

- PBM in cardiac surgery is beneficial for multiple reasons and some techniques in achieving PBM are expensive, especially pharmacological therapies.
- Efforts should be made to maximize effects while minimizing costs.
- Conservative use of Epo and Fe is possible while achieving excellent results with minimal transfusions.
- Further restriction of costly modalities should be investigated in order to find the most advantageous modalities for PBM without sacrificing outcomes.

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