

A Liberal Transfusion Threshold Leads to Higher Infection Rates, Orthopaedic Trauma and Anemia: Conservative Versus Liberal Transfusion Strategy (ORACL), A Prospective Randomized Study 30-Day Inpatient Complications

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Purpose: There is ongoing debate what level of anemia should be used as a transfusion trigger for asymptomatic trauma patients no longer in a resuscitative phase. A previous retrospective case-control study by the lead investigator showed there was a higher risk of complications with a more liberal strategy, and this appeared to be dose-dependent. Multiple previous studies have shown allogeneic blood transfusion is immunosuppressive and may increase infection rates in surgical patients. This study was completed to determine if a more conservative strategy was safe and might decrease the risk of infection.

Methods: The ORACL study randomized 100 patients ages 18 to 50 years to a conservative transfusion threshold of 5.5 g/dL versus a liberal threshold of 7.0 g/dL in asymptomatic patients no longer being resuscitated for an associated musculoskeletal injury. Enrollment was performed at 3 Level I trauma centers from 2014 to 2021. 99 patients completed 30-day follow-up.

Results: There was a significant association between a liberal transfusion strategy and higher rate of deep infection (defined as unplanned return to operating room for debridement or admission for intravenous antibiotics, $P < 0.03$) but superficial infection (defined as oral antibiotics alone needed without admission or debridement) did not reach statistical significance (Table 1). Multiple secondary outcomes or complications (renal, cardiac, deep venous thrombosis, nonunion, transfusion-related acute lung injury, stroke, etc.) potentially associated with anemia or transfusion were not different between the 2 groups.

Conclusion: This study shows a conservative transfusion threshold of 5.5 g/dL in an asymptomatic young trauma patient with an associated musculoskeletal injury leads to a lower deep infection rate without an increase in adverse outcomes.

Table 1

	Overall (n=99)	Liberal transfusion group (n=49)	Conservative transfusion group (n=50)	p-value
Primary outcome (infection) within 30 days				
Yes	7 (7.1)	7 (14.3)	0 (0)	.0058*
No	92 (92.2)	42 (85.7)	50 (100)	
Deep or Superficial infection within 30 days				
Yes	7 (7.1)	7 (14.3)	0 (0)	.0058*
No	92 (92.2)	42 (85.7)	50 (100)	
Deep infection within 30 days				
Yes	5 (5.1)	5 (10.2)	0 (0)	.0267*
No	94 (95.0)	44 (89.8)	50 (100)	
Superficial infection within 30 days				
Yes	3 (3.0)	3 (6.1)	0 (0)	.1175
No	96 (97.0)	46 (93.9)	50 (100)	
Secondary outcome within 30 days				
Yes	8 (8.1)	5 (10.2)	3 (6.0)	.4870
No	91 (91.9)	44 (89.8)	47 (94.0)	

Values are frequencies (percentages) with p-values from Fisher's Exact test.

See the meeting website for complete listing of authors' disclosure information. Schedule and presenters subject to change.