Application of the Berlin definition in PROMMTT patients: the impact of resuscitation on the incidence of hypoxemia.

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BACKGROUND: Acute lung injury following trauma resuscitation remains a concern despite recent advances. With the use of the PROMMTT study population, the risk of hypoxemia and potential modifiable risk factors are studied.

METHODS: Patients with survival for 24 hours or greater with at least one intensive care unit day were included in the analysis. Hypoxemia was categorized using the Berlin definition for adult respiratory distress syndrome: none (PaO\textsubscript{2}-to-FIO\textsubscript{2} ratio [P/F] > 300 mm Hg), mild (P/F, 201-300 mm Hg), moderate (P/F, 101-200 mm Hg) or severe (P/F ≤ 100 mm Hg). The cohort was dichotomized into those with none or mild hypoxemia and those with moderate or severe injury. Early resuscitation was defined as that occurring 0 hour to 6 hours from arrival; late resuscitation was defined as that occurring 7 hours to 24 hours. Multivariate logistic regression models were developed controlling for age, sex, mechanisms of injury, arrival physiology, individual Abbreviated Injury Scale (AIS) scores, blood transfusions, and crystalloid administration.

RESULTS: Of the patients 58.7% (731 of 1,245) met inclusion criteria. Hypoxemia occurred in 69% (mild, 24%; moderate, 28%; severe, 17%). Mortality was highest (24%) in the severe group. During early resuscitation (0-6 h), logistic regression revealed age (odd ratio [OR], 1.02; 95% confidence interval [CI], 1.00-1.04), chest AIS score (OR, 1.31; 95% CI, 1.10-1.57), and intravenously administered crystalloid fluids given in 500 mL increments (OR, 1.12; 95% CI, 1.01-1.25) as predictive of moderate or severe hypoxemia. During late resuscitation, age (OR, 1.02; 95% CI, 1.00-1.04), chest AIS score (OR, 1.33; 95% CI, 1.11-1.59), and crystalloids given during this period (OR, 1.05; 95% CI, 1.01-1.10) were also predictive of moderate-to-severe hypoxemia. Red blood cell, plasma, and platelet transfusions (whether received during early or late resuscitation) failed to demonstrate an increased risk of developing moderate/severe hypoxemia.

CONCLUSION: Severe chest injury, increasing age, and crystalloid-based resuscitation, but not blood transfusions, were associated with increased risk of developing moderate-to-severe hypoxemia following injury.