

Pregnancy Should Not Obscure Trauma Urgency: Shock Index and Social Determinants Predict Life-Saving Interventions and Recovery Trajectory



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Background: Trauma is a leading cause of maternal mortality in the U.S., with hemorrhage being the most fatal consequence in pregnant trauma patients. Prior studies have found that pregnant women have double the risk of dying following trauma compared to their non-pregnant counterparts. Physiologic injury indicators such as Shock Index (SI) and Injury Severity Score (ISS) are increasingly used to guide intervention decisions in trauma care, but evidence specific to pregnant trauma populations remains limited. We identified physiologic and clinical predictors of

life-saving interventions and acute care outcomes among pregnant trauma patients.

Methods: A retrospective cohort study was conducted using a national trauma care quality improvement database (2020-2023), including pregnant adults who sustained traumatic injuries with some reasonable chance of survival (ISS <75) and in hemorrhagic shock (SI \geq 0.9). Associations were examined between clinical indicators (SI, ISS), select treatments (massive transfusion protocol [MTP], low molecular weight heparin [LMWH]), hemorrhage control interventions such as cesarean section and uterine artery procedures, and disposition to the intensive care unit (ICU), Operating room or other post-acute care discharge. Outcomes were compared across three shock index ratios.

Results: From the 1,685 cases, 8% underwent (lifesaving) cesarean section and 2% received a uterine artery intervention. Pregnant trauma patients with elevated SI 1.4-1.69 had significantly higher odds for a uterine artery intervention (OR 5.15, CI 1.45-18.29, $p = 0.01$) and cesarean section (OR 2.84, CI 1.18-6.82, $p = 0.02$) as compared to patients with lower SI. MTP activation was strongly associated with cesarean delivery and uterine artery interventions (OR 2.43-7.88). Higher ISS was associated with significantly greater likelihood of disposition to the ICU (OR 1.09, CI 1.07-1.11, $p < 0.001$), operating room (OR 1.07, CI 1.04-1.11, $p < 0.001$), and rehabilitation center (OR 1.05, CI 1.03-1.07, $p < 0.001$). Patients who received LMWH also had significantly higher odds of disposition to the ICU (OR 1.87 CI 1.22-2.88, $p = 0.004$), operating room (OR 4.19, CI 2.00-8.79, $p < 0.001$) and rehabilitation center (OR 2.32, CI 1.60-3.38, $p < 0.001$). Patients with a substance use disorder had significantly longer ICU stays (+1.78 days) and ventilator days (+2.66 days).

Conclusions: Study findings support the prognostic value of SI and ISS in anticipating life-saving interventions in pregnant trauma patients. Integrating such physiological indicators, as well as better recognition of social risk factors such as substance abuse, may further optimize timely trauma care outcomes. Future guidelines should consider formalizing these thresholds for earlier and more equitable intervention in obstetric trauma care.