

Surgical Apgar Score (SAS) is Associated with Postoperative Complications in the Orthopaedic Trauma Patient Population

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Background/Purpose: Postoperative complications in orthopaedics can negatively impact patient outcomes, burden the health-care system with unplanned readmissions and increased hospital stays, and place further strain on our economy. The 10-point Surgical Apgar Score (SAS) is based on various intraoperative measures and has been shown to predict mortality and morbidity in several surgical subspecialties. However, the application of this novel and validated scoring system has not been examined in the orthopaedic trauma patient population. The aim of this study is to determine if the SAS is associated with postoperative complications in this patient population.

Methods: All patients who underwent operative treatment for orthopaedic injuries at a Level I trauma center over a 2-year period were retrospectively reviewed. A minimum 3-month postoperative follow-up was required for study inclusion. SASs were extracted from electronic records along with several other patient variables: patient demographics, primary insurance status, American Society of Anesthesiologists (ASA) physical status class, Charlson Comorbidity Index (CCI), Elixhauser Comorbidity Index, ISS, and a validated health literacy screening assessment. In addition, specifics regarding the hospitalization such as ICU and ventilator status, incidence of multiple operative procedures, emergency department Glasgow Coma Scale, presence of a work-related injury, and disposition were also collected. Electronic records were reviewed for any surgical site infections, hardware failures, or DVT/PE (deep vein thromboses/pulmonary emboli) occurring within 1 year following surgery. Multivariable logistic regression analyses were used to examine the association between the SAS and postoperative complications controlling for patient demographic and clinical characteristics. The level of significance was set at $\alpha = 0.05$.

Results: 2434 patients were eligible for the study and 1714 patients (70.4%) had at least a 3-month follow-up. 247 (247/1714 = 14.4%) patients suffered a postoperative complication within 1 year and over 50% of these complications were surgical site infections (149 cases). Increased SAS scores were associated with decreased postoperative complications (odds ratio [OR] = 0.88; $P = 0.03$). Patients with multiple operative procedures (OR = 1.8, $P = 0.001$) and ASA class 2 (OR = 3.0, $P = 0.04$), ASA 3 (OR = 3.0, $P = 0.04$), and ASA 4/5 (OR = 3.3, $P = 0.04$) were more likely to suffer a postoperative complication. Furthermore, increased education by years in school was associated with decreased complication rate (OR = 0.94; $P = 0.007$).

Conclusion: This study supports the use of the SAS to identify patients at-risk for postoperative complications in the orthopaedic trauma population. While many complications are multifactorial and sometimes unavoidable, steps taken to decrease preventable adverse events must begin with identifying those at increased risk. The use of risk factors such as the SAS can help identify these targets for intervention.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.