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"Neurologic Outcomes of Vasopressor Use in Patients with Traumatic Spine Cord Injury"

The incidence of spinal cord injury is approximately 54 cases per million persons in the United States, with motor vehicle collisions and falls representing the primary etiologies. The National Spinal Cord Injury Statistical Center (NSCISC) defines traumatic spinal cord injury (TSCI) as a lesion within the spinal cord and cauda equina with any sensory or motor deficit following traumatic injury. Management of TSCI involves early spinal stabilization and immobilization, pharmacologic cord protection, and surgical cord decompression if needed. Adequate spinal cord perfusion is necessary for appropriate healing and repair of injury, as well as to prevent further ischemia. The current practice is to initially correct hypotension to a mean arterial pressure (MAP) greater than 90 mmHg following acute injury and to maintain MAPs greater than 85 mmHg for at least one week following acute injury, with or without the vasopressor support. These parameters were developed based on results from several case series. However, vasopressor use is not without associated risk factors, such as cardiac arrhythmias and ischemia. Thus, it is important to assess the role vasopressor use plays in neurological improvement in TSCI patients to better weigh the benefits and risks of this therapeutic approach.

A retrospective chart review of adult patients at an urban Level 1 Trauma Center with TSCI from July 2012 to August 2021 was performed. Electronic medical records were accessed to collect patient demographics. Daily MAP was collected from patient's chart over seven days post-admission. The type of vasopressors used during this period was also recorded. Patients were then stratified into groups based on vasopressor use. The primary outcome measured was neurological improvement quantified by the American Spinal Injury Association (ASIA) Impairment scale, from admission to post-MAP protocol (discharge and follow-up). Chi-Squared and Student's T-test were used to perform statistical analysis. A p value <0.05 was deemed significant. A total of 96 patients were included in this study. Majority of patients with SCI (77%) had an average MAP>85 mmHg. Vasopressors were used in 68% of the patients in the low average MAP (<85 mmHg) group compared to 33% in the high average MAP (>85 mmHg) group ($p=0.004$). When stratified by vasopressor use, there were no significant differences in age ($p=0.05$), BMI ($p=0.5$), gender ($p=0.2$) or comorbidities ($p>0.05$) between the two groups. Patients in the vasopressor group had significantly higher ventilator use ($p=0.01$) and ICU length of stay ($p=0.005$). ASIA score did not significantly improve in vasopressor group when compared to patient without vasopressor use at discharge ($p=0.3$) and initial follow-up encounter after discharge ($p=0.2$).

This study showed that TSCI patients managed with vasopressors had a longer ICU length of stay and a higher incidence of ventilator use. This study failed to recognize vasopressor use association with greater neurological improvement at the discharge or the follow-up when controlling for certain risk factors. In future we will investigate other factors, such as mode of spinal cord injury, that may play a role in post-MAP protocol neurological improvement in association with vasopressor use. Future directions for this research include the development of standardized treatment guidelines to help physicians determine the most appropriate utilization of vasopressor therapy for patients with TSCIs.