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**Title:** Reduction of Intraparenchymal Pressure after Porcine Acute Spinal Cord Contusion Injury by Neuro-Spinal Scaffold Implantation

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**Introduction.** Spinal cord injury (SCI) causes acute hemorrhage, edema, and spinal cord swelling. Elevated intraparenchymal pressure (IPP) promotes ischemia by reducing the net perfusion pressure. InVivo Therapeutics is developing a novel neuro-spinal scaffold that is in an IDE clinical trial and is implanted via a myelotomy at the contusion epicenter. The neuro-spinal scaffold serves as a locus for appositional healing and decreased cyst formation and spared white matter in rodents. The objective of this study was to measure IPP at the contusion epicenter before, during, and after surgical implantation of the investigational neuro-spinal scaffold in a porcine model.

**Methods.** T10 severe contusion injuries were created in Gottingen pigs (n=2) with a weight drop apparatus. At 24 hrs, a 0.3 mm diameter intraparenchymal pressure catheter was placed at the injury epicenter. Pressures were monitored throughout the surgical procedure which included durotomy, piodomy, myelotomy, scaffold implantation, approximation of the pia, and expansion duraplasty.

**Results.** Intraparenchymal pressures in both animals were elevated (mean: 25.0 mmHg) at 24 hrs compared to normal values (11.5 mmHg). Surgical decompression via myelotomy, scaffold implantation, and expansion duraplasty resulted in decreased IPP in both animals (mean: 10.4 mmHg) to physiologically normal levels.

**Conclusions.** The surgical approach to the implantation of the neuro-spinal scaffold provides the benefit of reduction of IPP to physiological levels. Additional studies are underway to study the evolution of IPP increases in the porcine contusion model and to determine the association between reduced IPP and spinal cord blood flow. Raised IPP may be an important component of secondary injury in SCI.

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