Different circulating endothelial microvesicle subtype signature in subacute and chronic spinal cord injury.

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**PREVALENT**

Cardiovascular disease (CVD) is 3x more prevalent in adults with SCI than the general population-which leads to higher morbidity & mortality from vascular events (i.e., myocardial infarctions & strokes).

**ACCELERATED**

Despite initial clinical assumptions higher prevalence of vascular events in adults with SCI is not explained by traditional risk factors, which results in silent atherosclerotic disease.

**SCI DRIVEN**

Vascular events after SCI appears to be driven by injury characteristics. Investigating the mechanisms that drive this vascular risk gap is critical to providing effective prevention & treatment strategies.

Endothelial Cell Derived Microvesicles (EMVs)

Elevations in the number of EMVs is both predictive of & a prognostic biomarker of vascular dysfunction. We have reported elevated EMV numbers and pathological miRNA cargo in adults with chronic SCI. *What is not clear* are the conditions that induce increased EMV release from endothelial cells after SCI. EMVs provide a window into the condition of endothelial cells that released them, either activation or apoptosis.

**The aim of this study is to determine whether adults with subacute and chronic SCI differentially express apoptotic- & activated-EMVs.**

**Methods**

- **Non-Injured Controls (n=16)**
- **Subacute Tetraplegia AIS A/B (1-3mo TSI; n=16)**
- **Chronic Tetraplegia AIS A/B (>12mo TSI; n=18)**

**Results**

Apopotic endothelial cells (CD31+/42b−) were significantly higher in adults with subacute SCI (77±17 EMVs/µL) than adults with chronic SCI (53±19 EMVs/µL) and non-injured adults (46±19 EMVs/µL). EMVs originating from activated endothelial cells (CD62e+) were significantly higher in adults with chronic SCI (140±59 EMVs/µL) compared to adults with subacute SCI (99±27 EMVs/µL) and non-injured adults (104±36 EMVs/µL).

**Conclusions**

This is the first study to assess circulating EMVs' subtypes in adults with subacute and chronic SCI. Differential expression of circulating EMVs in adults with SCI during the subacute or chronic phase of injury may represent a biomarker of the vascular environment associated with each condition. Indeed, our findings suggest that the subacute phase of SCI is associated with heightened endothelial cell damage and death; whereas, in the chronic phase of SCI the vasculature likely adapts and shifts to a more activated state. Understanding these vascular adaptations as individuals' age with SCI is critically important in therapeutic approaches to promote good vascular health and prevent major vascular events.