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The extent of preoperative BSCB damage correlates with 1-year neurological recovery after surgical decompression

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The pathophysiology of degenerative cervical myelopathy (DCM) involves chronic compression-induced damage to the spinal cord, resulting in secondary effects such as the disruption of the blood-spinal cord barrier (BSCB). Our data has already demonstrated that surgical decompression leads to short-term BSCB recovery three months postoperatively. This prospectively controlled cohort study investigates BSCB disruption in both pre- and postoperative DCM patients, aiming to correlate these findings with one-year postoperative outcomes. The study included 50 DCM patients (21 females; 29 males; mean age: 62.9 ± 11.1 years), with a 9-person loss to follow-up. All patients underwent a neurological examination and DCM-associated modified Japanese Orthopaedic Association Score (mJOA) was evaluated. To assess the preoperative BSCB status, blood and cerebrospinal fluid (CSF) samples were collected. Postoperatively, 15 DCM patients (4 females; 11 males; mean age: 64.9 ± 11.5 years) underwent additional BSCB status evaluation through lumbar puncture. Albumin, immunoglobulin (Ig) G, IgA and IgM levels were analyzed in CSF and blood serum. Quotients for CSF/serum were standardized and calculated following Reiber diagnostic criteria. Notably, all preoperative CSF/serum quotients correlated significantly with one-year postoperative mJOA (*all* $p < .03$), with IgAQ showing robust significance after Bonferroni correction ($p = .003$). Furthermore, a smaller preoperative CSF/serum quotient corresponded to a more substantial postoperative improvement in mJOA after one year: IgAQ ($p = .011$), AlbQ ($p = .018$) and IgGQ ($p = .008$). This study reinforces previous findings indicating the presence of BSCB disruption and recovery in DCM patients. Interestingly, the preoperative extent of BSCB damage seems to positively correlate with better postoperative neurological recovery. BSCB disruption could be a crucial pathomechanism in DCM patients, holding significance for treatment and clinical recovery.