Preventive effects of intrathecal methylprednisolone administration on spinal cord ischemia in rats: The role of excitatory amino acid metabolizing systems

施純明

Wu GJ;Chen WF;Sung CS;Jean YH;Shih CM;Shyu CY;Wen ZH

摘要.

Abstract

Spinal cord ischemic injury usually results in paraplegia, which is a major cause of morbidity after thoracic aorta operations. Ample evidence indicates that massive release of excitatory amino acids (EAAs; glutamate) plays an important role in the development of neuronal ischemic injuries. However, there is a lack of direct evidence to indicate the involvement of EAAs in the glutamate metabolizing system (including the glutamate transporter isoforms, i.e. the Glu-Asp transporter (GLAST), Glu transporter-1 (GLT-1), and excitatory amino acid carrier one (EAAC1); glutamine synthetase (GS); and glutamate dehydrogenase (GDH)) in spinal cord ischemia. In the present results, we found that methylprednisolone (MP; intrathecal (i.t.) injection, 200 mug twice daily administered for 3 days before ischemia), a synthetic glucocorticoid, is the therapeutic agent for the treatment of spinal injuries in humans, can significantly reduce the ischemia-induced motor function defect and down-regulate the glutamate metabolizing system (including GLAST, GLT-1, GS, and GDH) in male Wistar rats. The spinal cord ischemia-induced down-regulation of EAAC1 protein expression in the ventral portion of the lumbar spinal cord was partly inhibited by pretreatment with i.t. MP. However, MP did not affect the down-regulation of EAAC1 in the dorsal portion of the lumbar spinal cord after spinal cord ischemia. The i.t. injection of MP alone did not change the neurological functions and the expression of proteins of the glutamate metabolizing system in the spinal cord. Our results indicate that spinal cord ischemia-induced neurological deficits accompany the decrease in the expression of proteins of the glutamate metabolizing system in the lumbar portion of the spinal cord. The i.t. MP pretreatment significantly prevented these symptoms. These results support the observation that MP delivery through an i.t. injection, is beneficial for

the treatment of spinal cord ischemic injuries