中国药理学与毒理学杂志 2001 15 (1): 68-71 ISSN: 1000-3002 CN: 11-1115/R

论著

脑室给甲氨蝶呤治疗脑肿瘤患者脑脊液中的药代动力学

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收稿日期 1999-12-15 修回日期 网络版发布日期 2009-2-24 接受日期 2000-9-19

摘要 对脑肿瘤病人脑室内注射5 mg甲氨蝶呤(MTX)3次后，脑脊液(CSF)中MTX呈二室开放动力学特点. 主要动力学参数：$t_{1/2\alpha}$=3 h; $t_{1/2\beta}$=48.2 h; V_c=15.6 mL; AUC=6365 mg·h·L^{-1}; Cl=0.324 mL·h^{-1}. 给药后48 h血药浓度很低，峰值(4 h)时仅有0.7 mg·L^{-1}. 对MTX经脑室给药CSF药物浓度高，维持时间久，而血药浓度一直在极低水平的原因及应用前景进行了分析.

关键词 甲氨蝶呤 脑肿瘤 化学疗法 燐光分析法 药代动力学

分类号 R969.1

Pharmacokinetics of methotrexate in cerebrospinal fluid after intracerebroventricular chemotherapy to a patient with recurrent intracranial germioma

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Abstract

Blood brain barrier and blood-cerebrospinal fluid(CSF) barrier are almost totally impermeable to non-lipid-soluble drugs including methotrexate(MTX). Therefore, MTX would have no effect at all on the brain when it is introduced into the blood. However, it could have excellent effects on the brain by injecting into the CSF. In this article, the pharmacokinetics of MTX in CSF was analyzed after injecting 5 mg MTX to the right cerebral ventricle of a patient with recurrent intracranial germioma, which disseminated along ependyma to ventricular system. Concentration of MTX in CSF was dramatically high, from 990 mg·L^{-1} (0.5 h) to 80 mg·L^{-1} (48 h). It was determined by phosphorimetric method. The mathematic expression of MTX concentration in CSF is:

$c_{mg\cdot L^{-1}}$=245.3 $e^{-0.2304\ t}$+76.22 $e^{-0.01438\ t}$

Some main pharmacokinetic parameters were calculated as: $t_{1/2\alpha}$=3 h; $t_{1/2\beta}$=48.2 h; V_c=15.55 mL; AUC=6365 mg·h·L^{-1}; Cl=0.324 mL·h^{-1}. At the same time, blood drug concentration of MTX was very low, and nearly in the same level(below 1 mg·L^{-1}). This article also discussed the theory and prospect of chemotherapy by intraventricular injection.

Key words methotrexate brain neoplasms chemotherapy phosphorimetric analysis pharmacokinetics

DOI:

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