

论著

别嘌呤醇对未成熟大鼠脑白质损伤时自由基变化的影响

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摘要

目的 通过制作早产儿脑白质损伤动物模型,探讨自由基在早产儿脑白质损伤发病机制中的作用及别嘌呤醇的保护作用。方法 利用新生1日龄SD大鼠32只行双侧颈总动脉结扎(BCAO)制作脑白质损伤模型,随机分为假手术组(Sham, n=8)、BCAO组(BCAO, n=12)及别嘌呤醇干预组(ALLO, n=12)。BCAO后48h检测脑白质XO、iNOS、Na⁺K⁺-ATP酶、谷胱甘肽转移酶(GST)及 \cdot OH活力、UA及MDA含量。结果 MDA含量(nmol/mgprot):BCAO组(2.56±0.78)较Sham组(1.36±0.23)明显升高(P<0.01),而ALLO组(1.59±0.19)较BCAO组明显降低(P<0.01)。UA含量(mg/gprot):BCAO组(13.57±0.72)及ALLO组(12.34±0.21)均较Sham组(11.42±0.56)明显升高(P<0.01),而ALLO组较BCAO组明显降低(P<0.01); \cdot OH活力(U/mgprot):与Sham组(156.0±8.07)比较,BCAO组(206.6±21.27)明显升高(P<0.01),而ALLO组(191.7±13.04)较BCAO组显著降低(P<0.05)。;XO及iNOS活力:BCAO组较Sham组明显升高(P<0.01),而ALLO组较BCAO组明显降低(P<0.05);Na⁺-K⁺-ATP酶活力(μ molpi/mgprot/h):与Sham组(3.04±0.26)比较,BCAO组(2.30±0.37)及ALLO组(2.11±0.26)均明显降低(P<0.01),而ALLO组与BCAO组相比差异无显著性(P>0.05);GST活力(U/mgprot):与Sham组(56.75±4.22)比较,BCAO组(37.60±8.32)明显降低(P<0.01),而ALLO组(43.39±4.44)比BCAO组显著提高(P<0.05)。结论 自由基在早产儿脑白质损伤中可能发挥了核心作用。别嘌呤醇对缺血引起的早产大鼠脑白质损伤具有一定的保护作用。

关键词 新生; 早产; 脑缺氧; 脑缺血; 脑损伤; 脑白质; 黄嘌呤氧化酶; 一氧化氮合酶; 氧自由基; 羟自由基; 别嘌呤醇

分类号

The effects of allopurinol on changes of free radicals in damaged white matter in premature rats

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Abstract

Objective The study was designed to investigate the role of free radicals in pathogenesis of white matter damage in premature infants and the protective effects of allopurinol. Methods White matter damage animal model was established by bilateral carotid artery occlusion (BCAO). Thirty-two Sprague Dawley (SD) newborn rats (aging 1 day old) were used in this study and were divided randomly into three groups (Sham surgery, Sham; BCAO group, BCAO; allopurinol treated group, ALLO). XO, iNOS, Na⁺K⁺-ATPase and \cdot OH activity, UA and MDA content changes in white matter was determined 48h after BCAO. Results Compared with sham surgery group (1.36±0.23), the MDA level (nmol/mgprot) in BCAO group (2.56±0.78) increased significantly (P<0.01); Compared with BCAO group, MDA level in ALLO group (1.59±0.19) decreased significantly (P<0.05). The UA level (mg/gprot) in BCAO group (13.57±0.72) and that in ALLO group (12.34±0.21) were higher than that in sham group (11.42±0.56) (P<0.01); However, the UA level in ALLO group was lower than that in BCAO group (P<0.01). Compared with sham surgery group (156.0±8.07), the \cdot OH activity (U/mgprot) in BCAO group (206.6±21.27) increased significantly (P<0.01); Compared with BCAO group, \cdot OH activity in ALLO group (191.7±13.04) decreased significantly (P<0.05). The XO and iNOS activity in BCAO group were higher than that in sham group (P<0.01); However, the XO and iNOS activity in ALLO group was lower than that in BCAO group (P<0.05). Compared with sham surgery group (3.04±0.26), the Na⁺K⁺-ATPase activity (μ molpi/mgprot/h) in BCAO group (2.30±0.37) and that in ALLO group (2.11±0.26) decreased significantly (P<0.01); However the difference between

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ALLO group and BCAA group was not statistically significant($P>0.05$). Compared with sham surgery group(56.75 ± 4.22), the GST activity (U/mgprot) in BCAA group (37.60 ± 8.32) decreased significantly($P<0.01$); However, the GST activity in ALLO group (43.39 ± 4.44) was higher than that in BCAA group ($P<0.05$). Conclusions Free radicals may play a pivotal role in WMD. Allopurinol may have a potential protective effect on premature SD rat with ischemic WMD.

Key words [newborn](#) [premature infant](#) [cerebral anoxia](#) [cerebral ischemia](#) [brain damage](#) [white matter](#) [xanthine oxidase](#) [free radicals](#) [hydroxyl radicals](#) [allopurinol](#)

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