



## Chiari畸形伴脊柱侧凸患者椎旁肌的失神经支配：后颅窝减压术后可获得改善吗？

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Influence of posterior fossa decompression on denervation of the paraspinal muscles in patients with scoliosis secondary to Chiari malformation and syringomyelia

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- 摘要
- 图/表
- 参考文献
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**摘要** 目的 通过研究椎旁肌细胞凋亡因子Bax、Bcl-2于后颅窝减压术（posterior fossa decompression, PFD）前后表达的差异，探讨PFD术对Chiari畸形/脊髓空洞伴脊柱侧凸患者椎旁肌失神经支配的改善效果。方法 前瞻性选取2011年7月至2012年7月，接受PFD及二期脊柱侧凸矫形手术的14例Chiari畸形伴脊髓空洞患者，于PFD及矫形术中分别切取颈胸段脊柱两侧椎旁肌中的部分竖脊肌组织。通过蛋白免疫印迹检测椎旁肌细胞Bax与Bcl-2的表达，测定灰度值并对其PFD前后表达差异进行定量分析。结果 14例患者接受PFD时年龄为（16.0±3.3）岁，主弯Cobb角为63.8°±18.3°，PFD与侧凸矫形术间隔（7.6±2.6）个月。Bax净灰度、阳性灰度积和阳性比于PFD术前分别为106.2±30.9、12.6×10<sup>4</sup>±9.4×10<sup>4</sup>和0.75±0.13，术后改善为73.9±38.5（P=0.021）、5.6×10<sup>4</sup>±6.1×10<sup>4</sup>（P=0.013）和0.28±0.15（P<0.001）。Bcl-2净灰度、阳性灰度积和阳性比于PFD术前分别为84.4±35.8、10.6×10<sup>4</sup>±6.1×10<sup>4</sup>和0.40±0.17，术后改善为101.6±33.3（P=0.197）、21.3×10<sup>4</sup>±9.2×10<sup>4</sup>（P=0.001）和0.85±0.19（P<0.001）。结论 Chiari畸形/脊髓空洞伴脊柱侧凸患者椎旁肌的失神经支配于PFD术后获得改善，提示此类患者的脊髓功能损害可能是一种可逆的病理过程。

关键词: 脊柱侧凸 Arnold-Chiari畸形 脊髓空洞症

**Abstract:** Objective To investigate the influence of posterior fossa decompression (PFD) on denervation of the paraspinal muscles in patients with scoliosis secondary to Chiari malformation and syringomyelia through evaluating the alterations in expression of Bax and Bcl-2. Methods Fourteen patients with scoliosis secondary to Chiari malformation and syringomyelia treated between July 2011 and July 2012 were prospectively enrolled. Bilateral biopsy of paraspinal muscles was performed during PFD and subsequent scoliosis surgery. Bax and Bcl-2 protein levels were examined by Western blotting and then quantitatively assessed using a scanning densitometer. Results The initial age and primary curve magnitude were 16.0±3.3 years and 63.8°±18.3°, respectively. At 7.6±2.6 months post-PFD, net gray value, positive area and positive ratio for the 20710<sup>3</sup> Bax protein were 73.9±38.5, 5.6710<sup>4</sup>±6.1710<sup>4</sup> and 0.28±0.15, respectively, representing a significant decrease when compared with those observed at the time of PFD (106.2±30.9, P=0.021; 12.6710<sup>4</sup>±9.4710<sup>4</sup>, P=0.013; 0.75±0.13, P<0.001). The 25710<sup>3</sup> Bcl-2 protein, in contrast, appeared to be enriched over the same period in protein lysates from paraspinal muscles. Specifically, the positive area and positive ratio changed from 10.6710<sup>4</sup>±6.1710<sup>4</sup> and 0.40±0.17 to 21.3710<sup>4</sup>±9.2710<sup>4</sup> (P=0.001) and 0.85±0.19 (P<0.001). Concerning the net gray value, a similar upward trend was demonstrated though not reaching statistical significance (84.4±35.8 versus 101.6±33.3, P=0.197). Conclusion Improvement in denervation of the paraspinal muscles was demonstrated following PFD, indicating that the impairment of spinal cord function may be reversible in patients with Chiari malformation and syringomyelia.

Key words: Scoliosis Arnold-Chiari malformation Syringomyelia

收稿日期: 2013-12-08;

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SHA Shi-Fu,ZHU Ze-Zhang,QIU Yong et al. Influence of posterior fossa decompression on denervation of the paraspinal muscles in patients with scoliosis secondary to Chiari malformation and syringomyelia[J]. Chin J Orthop, 2014, 34(4): 361-365.

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