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PIEZO2: A Novel Molecule Involved in the Development of AIS

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Abstract

Study design: A case-control study.

Objective: This study aimed to investigate the potential role of PIEZO2 gene in the development of AIS.

Summary of background data: Mutations of PIEZO2 gene have been reported to be associated with progressive scoliosis and impaired proprioception. Previous studies showed that patients with AIS may have impaired proprioception. However, there is lack of knowledge concerning the mechanism underlying the proprioception of AIS patients and the role of PIEZO2 gene in the etiology of AIS.

Methods: Proprioception tests were performed in both AIS patients and age-matched healthy controls. Based on the falling risk scores, AIS patients were divided into impaired proprioception group and unimpaired proprioception group. Paraspinal muscle was collected from 34 AIS patients during surgery. The tissue expression of PIEZO2 was compared between the impaired group and the unimpaired group. In addition, the average number of muscle fibers in the muscle spindle was compared between the two groups.

Results: Proprioception test showed that patients had significantly higher falling index (41.7 ± 16.5 vs. 11.3 ± 8.3, P = 0.004). In addition, the expression of PIEZO2 gene was remarkably decreased in the impaired group (0.51 ± 0.24 vs. 1.00 ± 0.33, P = 0.04). The average number of muscle fibers in the muscle spindle was significantly decreased in AIS patients of the impaired group than those of the unimpaired group (2.2 ± 1.3 vs. 3.5 ± 2.1, P = 0.04). PIEZO2 expression level was remarkably correlated with the average number of muscle fibers in the muscle spindle (r = 0.352, P = 0.04).

Conclusion: Proprioception is remarkably impaired in patients with AIS. Abnormal expression of PIEZO2 may play a role in AIS via altered proprioception and number of muscle fibers in the muscle spindles. Further investigation is warranted to illustrate the mechanism regulating PIEZO2 expression in AIS.

Level of evidence: 4.

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