Expression of aquaporin 1 and 4 in rats with acute hypoxic lung injury and its significance

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ABSTRACT. Aquaporin (AQP)-1 and AQP-4 expression in lung tissues of SD rats during high altitude hypoxic lung injury, and the relationship between AQP-1 and AQP-4 expression, and acute hypoxic lung injury was analyzed. Thirty six healthy SD rats were divided into hypoxia 1d, 2d, 3d, 5d, and 7d groups and control group (N = 6). Pathological changes in lung tissue were observed by hematoxylin and eosin staining; lung injury was scored, and ultrastructural changes in lung tissue were observed by transmission electron microscopy. Changes in moisture content in lung tissues were determined by analyzing the wet/dry weight ratio (W/D). Localization of AQP-1 and AQP-4 was determined by immunohistochemistry. AQP-1 and AQP-4 expression were detected by western blot. Lung W/D was lower in hypoxia groups than in control group, and the highest in 3d group (P < 0.05). Light microscopy revealed a thickening alveolar wall and outstretched and congestive alveolar wall in hypoxia group; electron microscopy revealed
the presence of abnormal alveolar type II epithelial cells, cavitation in cytoplasm, microvillus-like protrusions, and a reduced lamellar body. AQP-1 and AQP-4 were mainly distributed in the capillaries and lymphatic and alveolar epithelial cells and airway epithelial cells, respectively. AQP-1 protein expression was decreased (western blot) in hypoxia 1d group (the lowest in 3d group; P < 0.05); there were no significant changes about AQP-4 expression. Therefore, AQP-1 may be involved in abnormal transport of liquid ALI and pathogenesis of lung edema. AQP-4 may not be involved in the formation of ALI lung edema.

**Key words:** High altitude hypoxia; Lung injury; AQP-1; AQP-4