

**Prophylactic use of human umbilical cord blood derived mesenchymal stem cells transfusion in monocrotaline-induced pulmonary artery hypertension rats**

*Hong Y.M.(1), Kim K.C.(2)*

*Department of Pediatrics(1), Department of Thoracic and Cardiovascular Surgery(2), Ewha Womans University, Seoul, Korea*

Background: Pulmonary artery hypertension (PAH) is a life threatening disease but it shows less response to traditional therapeutic regimens. Stem cells have the ability to secrete paracrine factors, attenuate pathological vascular remodeling and promote regeneration. Mesenchymal stem cells can be a promising resource for the treatment of refractory diseases such as PAH. However, prophylactic use of human umbilical cord blood derived mesenchymal stem cells (hUCB-MSCs) in PAH models are still controversial. Therefore, we investigated the differential effects such as hemodynamics, pathologic finding and gene expressions of hUCB-MSCs according to transfusion timing.

Methods: 6-week Sprague Dawley rats were used in this research. The experimental groups were divided into the control group, the monocrotaline (M) group (60 mg/kg) and the treatment groups which were subdivided into two groups, the UA group (hUCB-MSCs were administered 1 day after MCT injection); the UB group (hUCB-MSCs are administered 1 week after MCT injection). Hemodynamics, pathological changes and protein expressions were investigated.

Results: Mean right ventricular pressure (RVP) was significantly reduced in all U groups compared with the M group at weeks 2 and 4. RV/RV+S ratio was significantly decreased in the UA and UB groups compared with the M group at week 1. RV/RV+S ratio was decreased in the UB group compared UA group at week 4. In aspect of pathological changes, medial wall thickness and the number of intra-acinar arteries were significantly improved in two treatment groups at week 4. The protein expressions of endothelin-1, B cell leukemia lymphoma-2 and vascular endothelial growth factor in the lung tissues were significantly decreased in the UA and UB group at week 4. Collagen I and III protein expressions in the heart tissues were significantly decreased in the UB group compared with UA group.

Conclusion: A prophylactic injection of hUCB-MSCs was not as effective as a treatment injection after the occurrence of PAH in MCT rats.