

A Clinical Usefulness of Vibration Resonance Imaging (VRI™) Technology in Patients with Bronchial Asthma

S. Uh, M.D., PhD., Y.K. Kim, M.D., K.U. Kim, M.D., H.J. Park, M.D., D.J. Na, M.D., Y.T. Chung, M.D.,

Background

The Vibration Response Image (VRI™) is a novel technology providing dynamic image of the lung by a detection of vibrations produced by airflow during the respiratory cycle. The image of vibration is affected by structure and function of airway. An abnormal airway obstruction may create an abnormal vibration. In this study, we applied the VRI™ technology before and after treatment of acute exacerbation of bronchial asthma to know the role of VRI™ technology in the objective assessment of bronchial obstruction.

Methods

The vibration energy were collected by 36 sensors that were adhered to the subjects back and an image was assembled from frames for 0.17 seconds of energy. The image of the VRI™ technology was divided into normal or abnormal according to dynamic image and maximal energy frame. We measured the VRI™ technology and FEV1 before and after treatment of acute asthma.

Results

Nine patients with bronchial asthma were included and their mean age was 49 years old. A predicted FEV1 before and after treatment was $76\pm 18\%$ and $80\pm 20\%$, respectively. Before treatment of acute exacerbation, 8 patients showed abnormal and one patient showed normal pattern by the VRI™ technology. Among 8 patients with abnormal images by the VRI™ technology, 6 patients turned to a normal pattern by the VRI™ technology and 2 patients did not change after treatment of acute exacerbation. One patient showing normal pattern by the VRI™ technology showed abnormal pattern after treatment. Increased predicted FEV1 (increase more than 12%), no change, decreased FEV1 were observed in two, four, two patients after treatment of acute exacerbation.

Conclusion

The VRI™ technology may be a good objective indicator of improvement in acute exacerbation of bronchial asthma.