

Respiratory characteristics of inhalation burn

Yuhui Won^{1*}, So Young Joo²

Research Institute of Clinical Medicine of Chonbuk National University?Biomedical Research Institute of Chonbuk National University Hospital, Department of Physical Medicine and Rehabilitation¹, Hangang Sacred Heart Hospital, Hallym University, Department of Rehabilitation Medicine²

Purpose

Inhalation burn injury and lung complications caused by large surface burns occurring during fire remain serious problems. We performed pulmonary function evaluation in patients with thermal injury in order to study respiratory characteristics of smoke inhalation and large surface burns.

Methods

Forty-four patients who had burn injury were included. Pulmonary function was measured at 95.2 ± 27.86 days after burn injury. Pulmonary function tests including forced vital capacity(FVC), forced expiratory volume during 1 second (FEV1), forced expiratory flow rate between 25 and 75% of the FVC (FEF25-75), FEV1/FVC ratio and peak expiratory flow (PEF), maximum voluntary ventilation (MVV) and respiratory muscles strength (maximal expiratory pressure; MEP, maximal inspiratory pressure; MIP) were done. Values for FVC, FEV1, FEF25-75, MIP and MEP were expressed as percent of predicted values. Values of MVV and PEF are expressed by numerical value. Diaphragmatic mobility was measured by calculating the distance between the diaphragmatic dome in maximal expiration and inspiration for the right and left hemidiaphragms by fluoroscopy.

Results

The values of FVC, FEV1, FVC/FEV1, FEF25-75, MVV, PEF, MIP and MEP were 91.5%, 89.7%, 81.6, 85.4%, 96.2 L/min, 10.4 L/sec, 86.3%, and 67.1%, respectively. Diaphragmatic mobility was measured as 4.95cm on right 4.76cm on left side by fluoroscopy. The pulmonary function test showed mild reduction of pulmonary parameters with restrictive pattern. Among these values, MEP% of predicted value and degree of diaphragmatic mobility were largely reduced compared to other pulmonary parameters.

Conclusions

This study showed that large surface burn and smoke inhalation caused deterioration in pulmonary function, especially in expiratory muscle strength and diaphragm mobility. With this result, we concluded the pulmonary rehabilitation focusing on improving expiratory muscle function and assisting diaphragmatic movement would be helpful to the patients with large surface burn and smoke inhalation.

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