Obesity worsens impact of asthma

Obesity can worsen the impact of asthma and may also mask its severity in standard tests, according to researchers in New Zealand, who studied lung function in asthmatic women with a range of body mass indexes (BMIs).

This is the first prospective study to reveal a significant comparative difference in how the airways and lungs respond to a simulated asthma attack in obese and non-obese individuals.

The research is reported in the first issue for May of the *American Journal of Respiratory and Critical Care Medicine*, published by the American Thoracic Society. It establishes a direct link between obesity and the development of a phenomenon known as "dynamic hyperinflation"—when air breathed into the lungs cannot be exhaled. This often occurs with acute asthma, but is more frequent in obese individuals.

"We have demonstrated significant differences in the changes in respiratory function that occur with asthmatic bronchoconstriction in relation to obesity," said principal investigator, D. Robin Taylor, M.D., of the University of Otago in New Zealand.

The researchers recruited 30 asthmatic women and divided them into three groups by BMI: normal weight, overweight and obese. Each woman breathed nebulized methacholine to artificially induce an asthma-like attack, and was then assessed for changes in lung function on several measures, including how much air remained in her lungs after exhalation (functional residual capacity, or FRC) and how much air she could breathe in on her next breath (inspiratory capacity, or IC).

"After the methacholine challenge, the amount of bronchoconstriction was identical for each of the three groups, but the changes in FRC and IC were greatest in the obese group. This indicated to us that greater dynamic hyperinflation was occurring among obese individuals," said Dr. Taylor.

With increasing BMI, FRC was higher, whereas IC was significantly decreased. "This means that among women with greater BMI, an asthma-like episode has the potential to cause greater breathing difficulties than in non-obese women," said Dr. Taylor. "The greater dynamic hyperinflation means that obese individuals lose the ability to inhale as deeply or exhale as fully as normal weight individuals."

Curiously, the group of obese individuals with asthma differed from their non-asthmatic counterparts in having a lower FRC before the methacholine challenge than the non-obese group, yet still recorded a greater increase in FRC after the methacholine challenge. "This is the surprising finding in our study. It is quite counterintuitive. You would expect individuals with a heavier chest wall not to develop hyperinflation quite so readily as those who are lighter. But that is not what happened," said Dr. Taylor.

Perhaps most importantly, these findings point to fundamental differences in the way that obese individuals might experience shortness of breath if they have asthma. "We know that asthma in obese subjects is more likely to persist and is more likely to be perceived to be severe. These individuals often require more treatment to achieve asthma control. Our study provides an insight into why this might be happening–the same asthma "trigger" produces a greater effect in obese individuals."

The study also showed that simple spirometry was inadequate to determine the level of pulmonary dysfunction which was occurring in obese individuals.

"Our findings need to be explored further. We need to confirm that the differences in dynamic hyperinflation between obese and non-obese asthmatics are sufficient to explain the differences in symptoms between the two groups. Our study was not large enough to do this," said Dr. Taylor.

Source: American Thoracic Society