Steroids not as effective in obese asthma patients

16 September 2008

Researchers at National Jewish Health have shown that glucocorticoids, the primary controller medication for asthma, are 40 percent less effective in overweight and obese asthma patients than in those of normal weight. The findings identify a potential mechanism involved in the resistance, which suggests therapeutic targets for future medications. The study, by Associate Professor of Medicine E. Rand Sutherland, MD, MPH and his colleagues at National Jewish Health, appears in the October 1, 2008, issue of the American Journal of Respiratory and Critical Care Medicine.

"This study identifies what could be a significant issue for the 20 million Americans with asthma; specifically, the main controller medication might be less effective if you are overweight or obese," said Dr. Sutherland. "These findings should spur doctors to carefully evaluate response to treatment in overweight and obese asthmatics and consider optimizing therapeutic regimens as indicated. We also hope they will spur additional research into the treatment of obese patients with asthma."

Nearly half of the people who suffer from asthma are classified as either overweight or obese, with a body mass index (BMI) of greater than 25. An increasing body of literature suggests a connection between obesity and asthma. Obese people often have higher levels of inflammatory molecules in their bodies; asthma is characterized in part by inflamed airways. Studies suggest that being overweight or obese increases asthma incidence and makes asthma more difficult to control.

The study at National Jewish Health sought to understand why glucocorticoids, commonly called steroids, might be less effective in overweight and obese asthma patients. Dr. Sutherland and his colleagues enrolled 45 nonsmoking adults, 33 of whom had asthma, and measured the response of cells in the blood and the lungs to the steroid dexamethasone.

Steroids interfere with inflammatory signaling pathways by raising the level of a molecule known as MAP kinase phosphatase-1 (MKP-1). When the researchers applied the steroid dexamethasone to cultures of the participants' blood cells, they found that steroids did not increase MKP-1 as effectively in overweight and obese asthmatics when compared to lean asthmatics. Dexamethasone increased the levels of MKP-1 by 5.27 times in cultured blood cells from lean asthma patients, whereas MKP-1 levels in overweight and obese asthmatics increased by only 3.11 times, a 41 percent smaller response. The heavier a person was the less their cells were likely to respond to dexamethasone.

This negative relationship between weight and response to steroids did not occur in participants who did not have asthma.

"Steroids were clearly less effective in overweight and obese asthma patients," said Dr. Sutherland. "Previous studies have suggested a link between weight and response to steroids in patients, and this study suggests a potential mechanism by which this occurs. It also suggests that future research should be directed specifically to understanding how asthma medications work in overweight and obese asthmatics.

"It is important to note, however, that inhaled steroids are still effective in overweight and obese asthmatics, and if patients are concerned that their asthma controller medication is not working, they should discuss this with their physician rather than simply quit taking their medication or increase their prescribed dosage."

Dr. Sutherland and his colleagues have begun a longer-term study to further evaluate the clinical effects of steroid resistance among overweight and obese asthma patients and to further clarify the signaling pathways involved.

Source: National Jewish Medical and Research Center