Women's Embolism Risk Increases With BMI

BY NEIL OSTERWEIL

BOSTON — The more women weigh, the greater their risk for incident pulmonary embolism, according to an analysis of prospective data from more than 85,000 women enrolled in the Nurses' Health Study.

The investigators found a relative risk for pulmonary embolism (PE) of 1.08 for every 1-kg/m^2 increase in body mass index (BMI), said Dr. Christopher Kabrhel at a meeting of the International Society on Thrombosis and Haemostasis.

"We found that there is a strong, independent, positive, linear association between BMI and incident PE, and that this effect seems to impact not only obese subjects, but [also] subjects with relatively modest increases in their BMI," reported Dr. Kabrhel of Harvard Medical School and Massachusetts General Hospital, Boston, and his colleagues.

Cross-sectional and case-control studies have shown that patients who experience deep vein thrombosis and pulmonary embolism tend to have higher BMIs, and prospective studies have shown an association between severe overweight or obesity and pulmonary embolism, he noted.

The investigators examined the association between weight and thromboembolic events using data from 87,226 women enrolled in the prospective, longitudinal Nurses' Health Study, which has collected data on PE since its inception in 1976 and on diet, physical activity, and other risk factors for PE since 1984.

Participants enrolled in the Nurses' Health Study during 1984-2002, and were excluded from the current analysis if they had a PE diagnosis before 1984 or if their records were missing data necessary to calculate BMI.

The investigators divided participants into six BMI categories: less than 22.5 kg/m^2, 22.5-24.9, 25.0-27.4, 27.5-29.9, 30.0-34.9, and 35.0 or greater.

The primary outcome was idiopathic PE, defined as cases of PE that were confirmed in the medical record and not associated with prior surgery, trauma, or malignancy. The authors also performed a secondary analysis of nonidiopathic PE.

During the period studied, there were 157 incident cases of idiopathic PE and 338 cases of nonidiopathic PE, and these correlated strongly with BMI. For both idiopathic and nonidiopathic PE, the relative risk for every 1-kg/m^2 increase in BMI was 1.08. In multivariate analysis, the relative risk for idiopathic PE, compared with patients in the lowest BMI category (under 22.5), ranged from 1.37 among patients with BMIs of 22.5-24.9 (not significant) to 5.79 among patients with BMIs of 35 or higher (*P* less than .001).

Associations between BMI and nonidiopathic PE were similar, ranging from a relative risk of 1.48 for patients in the 22.5-24.9 range compared with those in the lowest BMI category, to a relative risk of 5.42 for patients in the highest vs. lowest BMI categories.

"There is a significant increase with the combined idiopathic PE and nonidiopathic PE. In other words, for our total PE, there is a significant increase in the risk of PE even with relatively modest increases in BMI—that is to say, subjects that would not be considered either overweight or obese, but within the normal range," Dr. Kabrhel said.

A potential mechanism for the association between BMI and PE is the regulatory hormone leptin, which has been shown to induce tissue-factor activity in vitro and to be elevated in obese individuals, he said.

Alternatively, estrogen and progesterone, which have been linked to obesity and the risk of PE in women, may play a role, although there was no evidence of a hormone-PE interaction in their study, he said.

Dr. Kabrhel acknowledged that the study was limited by its inclusion of only women, and by the racial and ethnic imbalance of the Nurses' Health Study cohort, which represents a demographic sample of nurses in the United States. The study may also be subject to measurement bias because it relied on subject-reported weights.

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