



Is obesity associated with the prognosis of papillary thyroid carcinoma?

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Response to: Sun Y, Liu S. Metastasis of papillary thyroid cancer: does body mass index (BMI) is the key factor? *Gland Surg* 2022;11:1439-40.

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I would like to take this opportunity to respond to some of the questions raised by Sun and Liu (1) in the subsequent comments of my paper “*The clinical importance of overweight or obesity on tumor recurrence in papillary thyroid carcinoma*” (2).

First of all, I strongly agree with the authors’ view of the association overweight or obesity and poor prognosis of papillary thyroid carcinoma. They pointed out two aspects: (I) un-differentiation of overweight state and obesity; (II) and unknown duration of overweight or obese state. Both may cover up the significance of obesity.

First, I discuss un-differentiation of overweight state and obesity.

Diagnosis of obesity and treatment decisions are based on a body mass index (BMI) greater than or equal to 30 kg/m² in obesity treatment guidelines (3-6).

Many extensive population studies have showed a J-shaped relationship between BMI and mortality or morbidity (7,8). A BMI greater than or equal to 30 kg/m² (which defines obesity in guidelines) is associated with increased mortality or morbidity (7,8).

World Health Organization (WHO) describes “*for adults, WHO defines overweight and obesity as follows: overweight is a BMI greater than or equal to 25; and obesity is a BMI greater than or equal to 30*”. And “*BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered a rough guide because it may not correspond to the same degree of fitness in different individuals*” (9).

Therefore, the WHO Asia-Pacific region (10) and the Korean Society of Obesity (11) defined obesity as a BMI greater than or equal to 25 kg/m², based on evidence for a significant increase in obesity-related diseases. In conclusion,

a BMI greater than or equal to 25 meets the definition of obesity in Korea. And to avoid confusion, I have marked a BMI greater than or equal to as overweight or obese.

In the meta-analysis written by Renehan *et al.* (12), mentioned by the authors, only 1 out of 5 thyroid papers was Asia-pacific. It showed a 5 kg/m² increased BMI was strongly associated with the incidence of thyroid carcinoma (1.33, P=0.02) (12), not the prognosis of thyroid carcinoma.

And my study has few patients with a BMI greater than or equal to 30 kg/m², so I did not draw any meaningful analysis results based on a BMI greater than or equal to 30 kg/m². However, now that the number of obese people is increasing more than before, I think the prognosis of papillary thyroid carcinoma in people with a BMI greater than or equal to 30 kg/m² will be different.

Second, I discuss unknown duration of overweight or obese state. Both may cover up the significance of obesity.

In fact, I really want to know duration of overweight or obese state of patients with papillary thyroid carcinoma. However, in this study, all patients visit the doctor once every 6 months or a year. Unless they had a metabolic disease, their weight was not measured frequently. Of the 403 patients, only 85 had additional weight records over an average 6.8 years follow-up period (median: 6.5 years). Eighty-five patients had a change in BMI, a mean of 0.35 kg/m², and a median of 0.45 (range, -10.67 to +5.62) kg/m², which is a slight change.

A prospective cohort study using US National Health and Nutrition Examination Survey including 36,051 people aged 40 years or over showed stable obesity across adulthood, weight gain from young to middle adulthood, and weight loss from middle to late adulthood were associated with increased

risks of mortality (13). Therefore, when looking at weight changes, it is thought that age is also essential. It would not be possible to predict that weight changes in a 25-year-old and an 80-year-old patient would have the same prognosis.

From my limited experience, I agree with the significance of obesity in the prognosis of papillary thyroid carcinoma. I hope that a future prospective study to investigate the relationship between obesity and thyroid cancer will become.

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