Abstract T4P124

Obesity with lower comorbidity burden is associated with substantial survival improvement in patients hospitalized with pneumonia

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Chang, S.
Family Medicine, Taipei Medical University Hospital, Taipei/Taiwan

Introduction: Obesity prevalence is increasing steadily throughout the world's population in most countries and pneumonia is one of the most common infectious diseases; however, there is uncertainty about an inverse relationship between obesity and pneumonia mortality. One meta-analysis suggests that an 'obesity survival paradox' exists for pneumonia, but high heterogeneity were existed among these studies. This study aimed to determine the impact of being overweight and obese on pneumonia patients, by conducting a population-based 1:1:1 propensity score (PS) matched cohort study.

Methods: Using the Nationwide Readmission database of the US from 2013 to 2014, we identified patients hospitalized with pneumonia. A pneumonia-associated hospitalization was defined as one in which the discharge record listed a principal diagnosis of pneumonia or a secondary diagnosis of pneumonia if the principal diagnosis was respiratory failure or sepsis. Use of mechanical ventilation was used to stratify pneumonia of different severity. Hospitalized pneumonia patients were categorized into normal, overweight (BMI ≥ 25 & < 30), and obese (BMI ≥ 30). To minimize baseline imbalance between patients with different body weight, we carried out PS-matched analysis, using 1:1:1 PS matching technique. PS contains 41 variables including demographics, social economic status, chronic comorbidities, and severity of pneumonia. We assess the association between body weight and 30-day in-hospital mortality by univariate Cox proportional hazard model stratified on the PS-matched pairs.

Results: A total of 1,690,760 pneumonia hospitalization episode fulfilled the inclusion criteria, of which 17,992 were overweight, 195,889 were obese, and 1,476,879 were normal weight. Compared with normal weight patients without use of ventilator, overweight (hazard ratio [HR], 0.77; 95% CI, 0.62–0.95) and obese (HR, 0.71; 95% CI, 0.64–0.79) patients were associated with an improved survival in the 1:1:1 PS-matched cohort. Similar results were obtained in the cohort requiring the use of ventilator (Table 1). To investigate whether there was a differential risk of 30-day mortality among different obese populations, we stratified patients into different subgroups and adjust the risk for mortality using PS score (Figure 1). Although the survival benefit of obesity is consistent in all subgroups, patients with lower comorbidity burden/severity is associated with substantially better survival. For example, patients with lowest comorbidity quartile is associated with 53% improvement in survival (HR, 0.47; 95% CI, 0.37–0.60) and patients with lowest severity is associated with 67% improvement in survival (HR, 0.33; 95% CI, 0.12–0.94).

Conclusion: Using a large and nationally representative sample of over 1,000 hospitals in the US, we found that increase in BMI was significantly associated with improved survival in obese patients. We also found that severity and comorbidity burden had a modifying effect on survival.

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**Fig. 1.** Risk of 30-day mortality in different patient subgroups in obesity vs. normal weight patients. HR refers to hazard ratio, LCL refers to lower confidence interval and UCL refers to upper confidence interval.