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■ Editorial ■

Is Body Mass Index a Useful Prognostic Factor for Critically Ill Patients?

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Body mass index (BMI) is a measure of body fat calculated by dividing weight by the square of height. Since the index was devised by Adolphe Quetelet and is defined by dividing one's body mass by the square of one's height (kg/m^2), BMI has been commonly used as proxy measure of excess body fat.

According to the literature, higher BMI was strongly associated with higher mortality in the general population.[1-4] However, critically ill patients' relative mortality risks associated with overweight or obesity are still subject to debate although underweight has been established as a strong predictor of their deaths.[5-8]

Several large-scale prospective studies have assessed the association between BMI and mortality in critically ill patients using (identical) cut off values. However, most of these studies were conducted on western populations.[9,10] The results of these studies cannot be generalized to Asian populations because of variations in body compositions and body fat distribution. Indeed, Asians have lower BMI but higher levels of body fat than Caucasians.[11]

In the local research context, Lim SY et al claimed that BMI was not significantly associated with mortality in critically ill patients and that mortality risk in critically ill patients was more associated with failed extubation and severity of illness.[8] In their retrospective study, BMI values were classified into three categories: underweight <18.5; normal weight=18.5-24.9 and overweight/obesity ≥25 kg/m^2) for analysis.

Recently, a prospective multicenter cohort study was also conducted to evaluate the prognostic performance of the Simplified Acute Physiology Score 3 in 3,655 critically ill patients in 22 different intensive care units in Korea.[12] Those patients were divided into five groups using the cut-off values: <18.5, 18.5-22.9, 23.0-24.9(reference category), 25.0-29.9, and >30.0 kg/m^2). Their findings showed that the Cox-proportional hazard ratios with exact partial likelihood to handle tied failures for hospital mortality comparing the BMI caretories with the reference category were 1.13 (0.88 to 1.44), 1.03 (0.84 to 1.26), 0.96 (0.76 to 1.22), and 0.68 (0.43 to 1.08) respectively, none of which were statistically significant. Nonetheless, a graded inverse association between BMI and mortality rate was evident. In other words, the lowest mortality rate was observed in the highest BMI group when surgical patients were excluded, and their findings were further explained by experimental evidence that adipocyte-secreted hormones such as

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interleukin-10[13] and leptin[14] decrease the inflammatory response and improve survival by regulating the immune system. Thus excess fat tissue can reduce the risk of complications that protein-catabolic critically ill patients can develop.

Another study also suggested the inverse relationship between BMI and mortality risk showing a greater mortality risk in the group with BMI of 22.6-27.5.[2] While the prevalence of obesity is rising worldwide, obesity is considered one of the most serious public health challenges. Obesity is even defined as a chronic disease based on its physiological disturbances and potential of causing other serious health problems. However, the independent prognostic role of obesity in development of disease and outcomes is still poorly understood.

To establish BMI as an independent predictor of increase mortality in critically ill patients, we need to pay more attention to the trend of increasing obesity and allocate more effort to studying relevant issues.

References

1) Haslam DW, James WP: Obesity. Lancet 2005; 366: 1197-209.
2) Zheng W, McLerran DF, Rolland B, Zhang X, Inoue M, Matsuo K, et al: Association between body-mass index and risk of death in more than 1 million Asians. N Engl J Med 2011; 364: 719-29.
3) Calle EE, Thun MJ, Petrelli JM, Rodriguez C, Heath CW Jr: Body-mass index and mortality in a prospective cohort of U.S. adults. N Engl J Med 1999; 341: 1097-105.
4) Berrington de Gonzalez A, Hartge P, Cerhan JR, Flint AJ, Hannan L, MacInnis RJ, et al: Body-mass index and mortality among 1.46 million white adults. N Engl J Med 2010; 363: 2211-9.
5) El-Solh A, Sikka P, Bozkanat E, Jaafar W, Davies J: Morbid obesity in the medical ICU. Chest 2001; 120: 1989-97.
6) Aldawood A, Arabi Y, Dabbagh O: Association of obesity with increased mortality in the critically ill patient. Anaesth Intensive Care 2006; 34: 629-33.
7) Hogue CW Jr, Stearns JD, Colantuoni E, Robinson KA, Stierer T, Mitter N, et al: The impact of obesity on outcomes after critical illness: a meta-analysis. Intensive Care Med 2009; 35: 1152-70.
8) Lim SY, Kim SI, Ryu YJ, Lee JH, Chun EM, Chang JH: The body mass index as a prognostic factor of critical care. Korean J Intern Med 2010; 25: 162-7.
9) Akinnusi ME, Pineda LA, El Solh AA: Effect of obesity on intensive care morbidity and mortality: a meta-analysis. Crit Care Med 2008; 36: 151-8.
10) Oliveros H, Villamor E: Obesity and mortality in critically ill adults: a systematic review and meta-analysis. Obesity (Silver Spring) 2008; 16: 515-21.
11) WHO Expert Consultation: Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet 2004; 363: 157-63.
12) Lim SY, Choi WI, Jeon K, Guallar E, Koh Y, Lim CM, et al: Body mass index and mortality in Korean intensive care units: a prospective multicenter cohort study. PloS one 2014; 9: e90039.
13) Divangahi M, Demoule A, Danialou G, Yahiaoui L, Bao W, Xing Z, et al: Impact of IL-10 on diaphragmatic cytokine expression and contractility during Pseudomonas Infection. Am J Respir Cell Mol Biol 2007; 36: 504-12.
14) Mancuso P, Gottschalk A, Phare SM, Peters-Golden M, Lukacs NW, Huffnagle GB: Leptin-deficient mice exhibit impaired host defense in Gram-negative pneumonia. J Immunol 2002; 168: 4018-24.

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