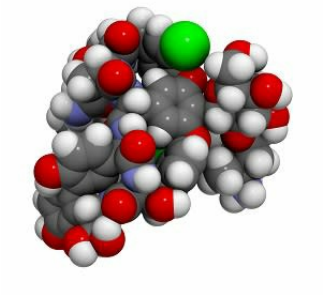
ICU
MANAGEMENT & PRACTICE

Vancomycin pharmacokinetics in critically ill obese patients



Limited data are available assessing vancomycin concentrations in obese critically ill patients. Several physiologic changes in obesity affect antimicrobial pharmacokinetics. For example, the volume of distribution in obese patients is greater due to increased lean body mass and adipose tissue. Drug clearance may also be further enhanced due to increased kidney mass and filtration.

A recent study, by Hsin Lin, PharmD (Department of Pharmacy, Massachusetts General Hospital, Boston) and co-researchers, showed that critically ill obese patients treated with continuous infusion of vancomycin (CIV) required a significantly lower maintenance dose per unit of body weight than non-obese patients to achieve the same target level. CIV clearance is similar in obese and non-obese patients and does not increase proportionally to total body weight, according to the study published in the journal Critical Care.

The recently published study by Lin et al. provides valid pharmacokinetic (PK) data regarding utilisation of CIV in obese versus non-obese patients, says a commentary also published in the journal.

"From a PK viewpoint, the study of Lin et al. is highly informative, yet some restraint is required before translating these results into clinical scenarios," according to Patrick M. Honore, MD, PhD, FCCM (ICU Department, Centre Hospitalier Universitaire Brugmann-Brugmann University Hospital, Brussels) and co-authors, writing in the commentary.

Based on Lin et al.'s study, CIV in obese patients, whether or not receiving renal replacement therapy, consistently produced target “therapeutic” serum concentrations and resulted in a lower weight-based daily vancomycin exposure as compared to non-obese subjects.

However, a shortcoming of this study is that it lacks information on bacterial susceptibility to vancomycin, according to the commentary, which notes that "vancomycin exerts slow bactericidal activity and has low tissue penetration, and serum levels poorly correlate with microbiological or clinical success." Dr. Honore and co-authors also point out that the majority of cultured bacteria in the study of Lin et al. are coagulase-negative staphylococci which remain largely susceptible to vancomycin in adult patients.

Furthermore, Lin et al. also did not assess vancomycin concentrations after the loading dose (approximately 25 mg/kg) and at 24 hours. To emphasise the importance of measuring vancomycin concentrations, the commentators cite the study conducted by Cristallini et al.

"In septic patients, Cristallini et al. applied a loading dose of 35 mg/kg followed by a daily CIV dose adapted to creatinine clearance. Therapeutic concentrations of 20 to 30 mg/L were obtained in 54% of patients after 24 hours. Thus, early relevant vancomycin levels were obtained in only half of a representative critically ill patient cohort despite utilising a substantially higher loading dose and aiming at higher steady state vancomycin concentrations than Lin et al," Dr. Honore and co-authors explain.

Source: Critical Care
Image Credit: iStock

Published on : Wed, 23 Jan 2019