Vancomycin AUC-based dosing: A primer for medical professionals

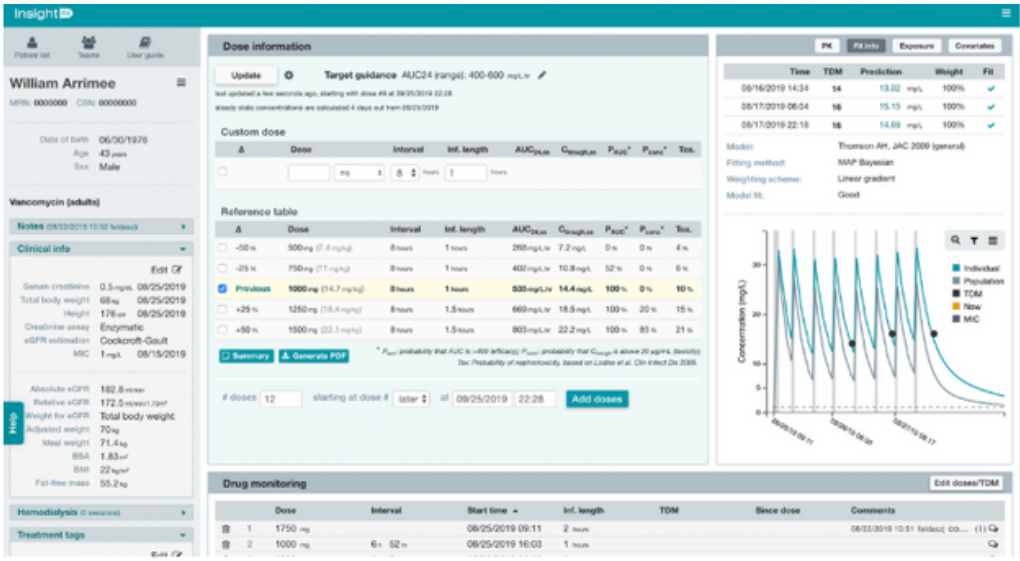
What is AUC and why is it replacing troughs for vancomycin monitoring?

Catholic Health

In order to improve the efficacy and decrease the toxicity of vancomycin, the updated consensus guidelines for therapeutic monitoring of vancomycin [1] recommend a change in practice for vancomycin monitoring from the prior standard—targeting vancomycin trough concentrations—to a new standard: targeting overall vancomycin exposure, as measured by the area under the 24-hour concentration curve, or AUC24 (sometimes simply denoted AUC). A vancomycin AUC of 400-600 mg/L*h is recommended for most severe infections due to Staphylococcus aureus.

How do we measure AUC?

As opposed to troughs, which are measured and interpreted at face value, AUC must be calculated using pharmacokinetic analysis. One way to calculate AUC is by using InsightRX. InsightRX is a secure web-based precision dosing application that provides drug exposure predictions using measured levels and population pharmacokinetic models, through MAP-Bayesian forecasting. Studies show that use of InsightRX enhances the accuracy and precision of drug dosing.[2][3]



How does this change practice?

Performing AUC based dosing using InsightRX results in decreased vancomycin use and more flexibility in vancomycin dosing and sampling. Along with these improvements come some expected changes:

1. AUC-based dosing of vancomycin generally requires lower doses of vancomycin, so vancomycin troughs that may have been interpreted as low during trough-based dosing may actually be therapeutic in AUC-based dosing
2. Because AUC must be calculated, vancomycin concentrations can seldom be taken at face value. If you have concerns regarding a vancomycin concentration and would like a prompt interpretation, you should consult a clinical pharmacist. As part of the consult to dose vancomycin, pharmacists will place progress notes after levels are drawn, translating the random level to AUC and outlining the ongoing plan of care.
3. InsightRX is able to interpret levels drawn at almost any time (not just steady-state troughs), so you may see more variety in the timing of levels, both with regard to how many vancomycin doses have been received as well as when during the dosing interval the level is drawn.

[1] Rybak MJ et al. Therapeutic monitoring of vancomycin: a revised guideline and review of the American Society of Health-System Pharmacists, the Infectious Diseases Society of America, the Pediatric Infectious Diseases Society and the Society of Infectious Diseases Pharmacists [draft manuscript ahead of print] https://www.ashp.org/media/assets/policy-guidelines/docs/draft-guidelines/draft-guidelines-ASHP-IDSA-PIDS-SIDP-therapeutic-vancomycin.ashx Accessed 1/31/20
[2] Hughes DM et al. Bayesian clinical decision support-guided versus clinician-guided vancomycin dosing in attainment of targeted pharmacokinetic parameters in a paediatric population. J Antimicrob Chemother 2020;75(2):434-437
[3]Yu CZ et al. Simulated comparison of a Bayesian clinical decision support system versus standard of care for achieving gentamicin pharmacokinetic targets in neonates. [accessed ahead of print] Pediatr Infect Dis J 2020;39(6)