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4CPS-169: Should we take the serum albumin value into account when adjusting the vancomycin dosage?



Hospital
Cascais

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Background and Importance

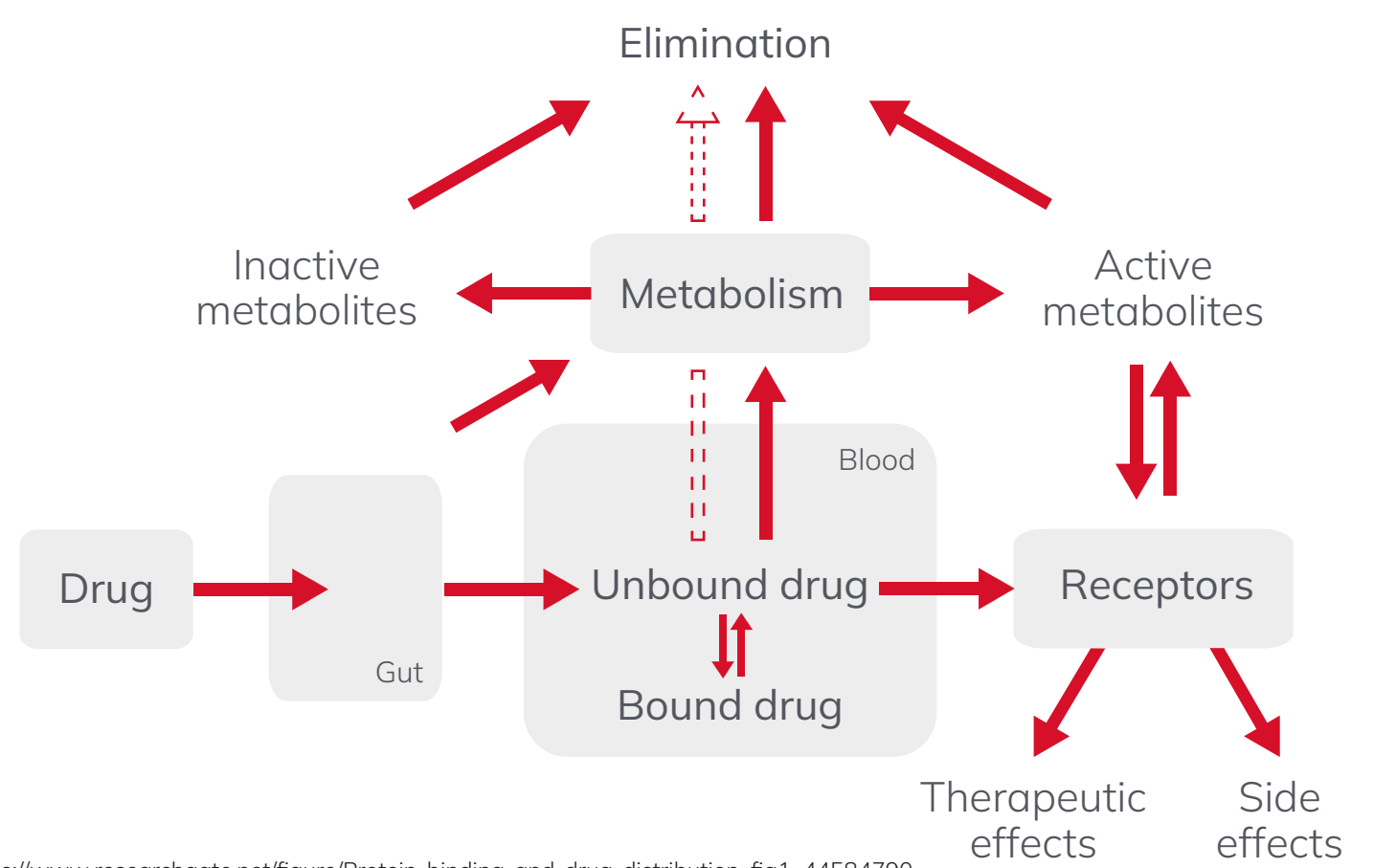
Pharmacokinetic monitoring of drugs with a narrow therapeutic margin is a practice that allows optimizing treatment by increasing efficacy and avoiding toxicity. Vancomycin is excreted mainly by glomerular filtration, with a percentage of binding to plasma proteins around 55. (1) Serum albumin is the main transport protein in circulation. Changes in its physiology, such as hypoalbuminemia, affect the pharmacokinetic and pharmacodynamic properties of the drugs to which it binds. (2) In our clinical practice we have found that some patients present a considerable deviation from the predicted vancomycin trough with serum concentrations higher than expected. The common characteristic of these patients, the majority of whom are elderly, is the fact that they have hypoalbuminemia.

AIM and Objectives

To review the impact of hypoalbuminemia on vancomycin pharmacokinetics.

Material and Methods

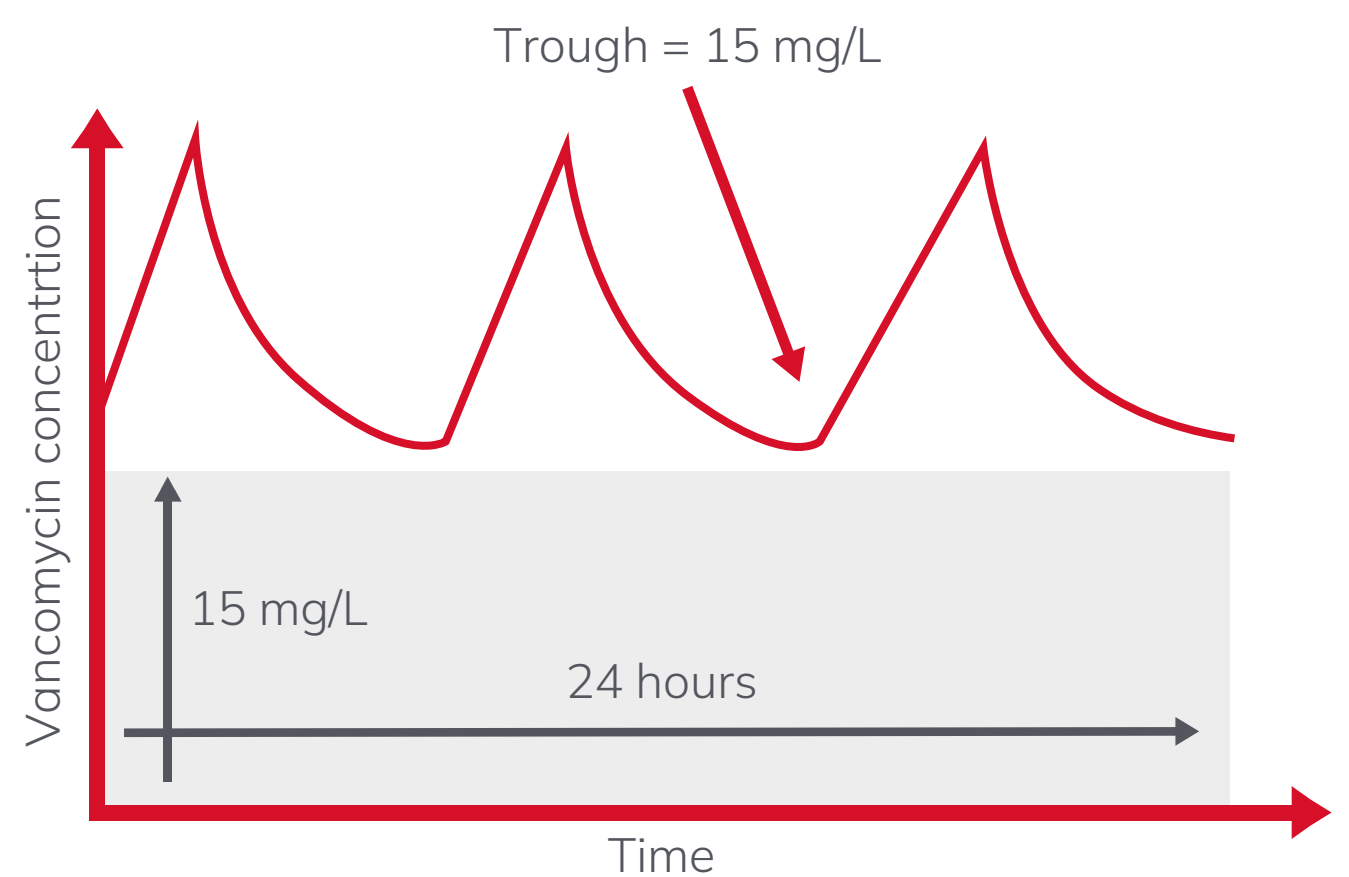
Literature review, in August 2024, searching for articles in PubMed using the terms “vancomycin” and “hypoalbuminemia”. We had 37 results but only 2 met the criteria within the scope of our question.



https://www.researchgate.net/figure/Protein-binding-and-drug-distribution_fig1_44584790

Results

In the study carried out on septic adult patients (41% over 65 years old) with severe hypoalbuminemia (2.5 g/dL), there was a high probability that the loading dose would not be necessary and was even associated with toxic minimum vancomycin concentration values. (3) In the second study with adult population (50% over 75 years old) it was found that the half-life of vancomycin in patients with severe hypoalbuminemia (2.5 g/dL) was significantly longer than in patients with non-severe hypoalbuminemia (33.2 + 5.4 vs 24.9 + 1.6; P = 0.049). (4) The same study identified a higher percentage of vancomycin-associated nephrotoxicity in patients with severe hypoalbuminemia compared to patients with non-severe hypoalbuminemia. (26% vs 8%; P < 0.001).



<https://www.idstewardship.com/curve-enthusiasm-auc-guided-vancomycin-dosing-monitoring/>

Conclusion and Relevance

The literature review allowed us to identify two studies that enhance hypoalbuminemia as an important factor to take into account when adjusting the dose of vancomycin in adult patients. These results are in line with the hypothesis generated during the pharmacokinetic monitoring of patients undergoing treatment with vancomycin in our hospital. In this context, in order to ensure the impact of hypoalbuminemia on the pharmacokinetics of vancomycin, our future objective is to develop a robust research protocol that corroborates the reviewed studies.

References

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