

USEFULNESS OF CYSTATIN C AS A BIOMARKER OF RENAL FUNCTION IN DRUG DOSING IN A HAEMATOLOGIC PATIENT WITH PROTEIN MALNUTRITION

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Serum cystatin C (CysC) is a marker that could be useful in hematologic adult patients with protein malnutrition (hypoalbuminemia) secondary to oral mucositis and gut graft-vs-host-disease, because it detects acute renal failure (ARF) earlier than serum creatinine, the standard marker, and is not affected by gender, age or muscle mass.

Objective

To describe the usefulness of CysC as a predictor of glomerular filtration rate (GFR) in a hematologic patient with low serum creatinine concentration (CrC) and protein malnutrition, where the value of creatinine clearance (CrCl) to evaluate ARF is limited.

Materials and methods

A 62-year-old patient with acute myeloid leukemia was admitted for allogeneic hematopoietic stem cell transplantation not related with myeloablative conditioning. Tacrolimus and methotrexate were administered as graft-vs-host-disease prophylaxis. Patient weight, albumin, CrC and CysC, and tacrolimus dosage were obtained from medical records. Tacrolimus levels were measured in the autoanalyzer Architect i1000 (Abbott). CrCl and CysC clearance (CysCl) were estimated by the Cockcroft-Gault and Larsson formulas respectively. The influence of ARF on the clearance of tacrolimus and dose requirements was assessed by the level/dose ratio.

Results

- Day +0**
 - Tacrolimus was initiated at a dose of 1.3 mg (0.02 mg/kg) IV daily.
 - Normal renal function (CrCl=89.22 mL/min).
 - No interactions with tacrolimus or other nephrotoxic drugs were found.
- Day +10**
 - Individual dose to reach therapeutic range was adjusted to 0.6 mg/day IV (level/dose: 12.50 ng/mL*mg).
 - Invasive fungal infection -> amphotericin B liposomal was started.
 - Protein malnutrition: Albumin: 2.6 g/ dL and edema.
- Day +13**
 - An increase in serum concentrations was detected and a dose adjustment was necessary (level/dose: 29.10 ng/mL*mg). CrCL was 75.27 mL/min, not reflecting severe ARF
 - Hyperphosphatemia and dermal toxicity secondary to amphotericin were observed.
 - **A CysCl control of 34.58 mL/min confirmed a worsening of kidney function** and explained the increase in level/dose for tacrolimus.

Conclusion

Given that CrCl presents major limitations in adult hematologic patients with protein malnutrition, CysCl could be a useful marker for ARF to guide dose adjustments of drugs with renal elimination. Pharmacokinetic studies evaluating the relationship between CysCl and drug clearance would be desirable.