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abstract

Cyclosporine A Toxicity in Pediatric Allogeneic Hematopoietic Stem Cell Transplantation Patients

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Cyclosporine A Toxicity in Pediatric Allogeneic Hematopoietic Stem Cell Transplantation Patients

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Introduction: Cyclosporine (CSA) is used for graft-versus-host disease (GVHD) prophylaxis after allogeneic hematopoietic stem cell transplantation (HSCT). Due to its narrow therapeutic index and pharmacokinetic variability, CSA requires frequent monitoring and individualized dosing. This study aimed to evaluate the correlation between CSA trough levels and toxicity incidence, as well as the impact of CSA dosing, trough levels, voriconazole use, gender, and age on toxicity profiles.

Methodology: A retrospective analysis was conducted on 119 pediatric cancer patients who underwent allogeneic HSCT at CCHE 57357. CSA was administered intravenously at 1.5 mg/kg every 12 hours, with adjustments based on trough levels and toxicity. Trough levels were measured using the Emit 2000 Cyclosporine-A Assay, with target levels of 200-250 ng/ml in the first 30 days post-transplant and 150-200 ng/ml thereafter.

Results: The median patient age was 10 years. Antifungal prophylaxis included fluconazole (54.6%), voriconazole (43%), and posaconazole (2.5%). CSA toxicity occurred in 25 patients (21%), with neurological (9.2%) and renal toxicities being most common, followed by hepatotoxicity (5%) and hematological toxicity (0.84%). Some patients experienced multi-organ toxicity. Among patients with toxicity, 44% had CSA levels >250 ng/ml, 32% had levels between 200-250 ng/ml, and 24% had levels <200 ng/ml.

Voriconazole use, gender, age, and CSA dose showed no significant association with toxicity. Most toxicities occurred within the first 30 days post-transplant, peaking at day 20.

Conclusion: CSA levels above 250 ng/ml were linked to higher toxicity risk. Genetic variations and patient-specific factors may improve understanding of CSA toxicity mechanisms and dosing strategies. Early monitoring and intervention within the first 30 days post-transplant are critical, as most toxicities manifest during this period.