A Comparison of Peripheral and Centrally Collected Cyclosporine A Blood Levels in Pediatric Patients Undergoing Stem Cell Transplant

Anne Mary Senner, RN, MS, Karen Johnston, RN, MN, and Andrew J. McLachlan, B Pharm, PhD, MPS, MACPP

Cyclosporine A (CSA) is an immunosuppressant agent used either alone or in combination with other therapies in allogeneic stem cell transplant (SCT), for prophylaxis and treatment of graft-versus-host disease (GVHD). GVHD is a potentially serious complication of SCT, and subtherapeutic blood CSA concentrations may increase a patient’s risk for developing GVHD (Yee et al., 1988). CSA concentration monitoring is essential in the clinical management of patients undergoing SCT to ensure adequate dosing and to minimize the toxicity of the medication (Kami et al., 2000; Morris et al., 2002). Significant variability among patients in the metabolism of CSA, medication interaction, and clinical condition requires regular monitoring.

To ensure reliable CSA concentrations, the standard of practice at the authors’ institution was changed from monitoring CSA trough concentrations in blood collected from the double-lumen tunneled central venous line to peripheral blood (venipuncture or capillary sample) sample. This change occurred because of an apparent variability in CSA trough concentrations when collected via the central line.

Several investigations have evaluated the administration and therapeutic monitoring of CSA with attention to the method of blood collection. Blifeld and Ettenger (1987) reported their experiences with two renal allograft recipients who received IV CSA via an indwelling, single-lumen, polyurethane catheter and subsequently had trough CSA concentrations collected from the same catheter. These researchers reported unusually elevated CSA trough concentrations and subsequently collected peripheral and indwelling catheter trough levels that showed a significant difference between the two samples. They postulated that CSA adheres to the intraluminal plastic in the central venous line. This finding highlighted a potential problem with the reliability of the CSA trough concentration blood samples that were collected from the same lumen by which the CSA was administered. Leson, Bryson, Giesbrecht, and Saunders...