

OUTCOMES OF COMPARATIVE ANALYSIS OF CALCINEURIN INHIBITORS IN THE PREVENTION OF ACUTE GRAFT-VERSUS-HOST DISEASE: TACROLIMUS VERSUS CYCLOSPORINE

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Background: Calcineurin inhibitors (CNIs), primarily tacrolimus and cyclosporine, are the cornerstone of graft-versus-host disease (GVHD) prophylaxis following allogeneic hematopoietic stem cell transplantation (HSCT). However, comparative data regarding their efficacy and safety in resource-limited settings remain scarce.

Methods: We conducted a retrospective cohort study at the Bone Marrow Transplant Department, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences (GIMS), Pakistan. Eighty-nine patients who underwent allogeneic HSCT and survived beyond 100 days post-transplant were included. Patients received tacrolimus (n=35) or cyclosporine (n=54) as GVHD prophylaxis. The primary outcome was the incidence of grade II–IV acute GVHD. Secondary outcomes included overall survival (OS), disease-free survival (DFS), graft failure, engraftment, infectious and non-infectious complications. Kaplan-Meier analysis was used to estimate OS and DFS.

Results: The mean age was 9.8 ± 5.2 years in the tacrolimus group and 10.3 ± 6.1 years in the cyclosporine group ($p=0.72$). Most patients had β -thalassemia major or severe aplastic anemia. Grade II–IV acute GVHD occurred in 2.8% of patients receiving tacrolimus and 3.7% receiving cyclosporine ($p=1.00$). Rates of bacterial infection (14.2% vs. 18.5%), fungal infection (5.7% vs. 5.6%), CMV reactivation (17.1% vs. 16.7%), hypertension (8.5% vs. 11.1%), hyperglycemia (11.4% vs. 13.0%), hyperkalemia (5.7% vs. 7.4%), and neurotoxicity (2.8% vs. 5.5%) were comparable. Azotemia was more frequent with cyclosporine (31.5% vs. 11.4%, $p=0.04$). Thrombotic microangiopathy occurred only in the tacrolimus group (5.6%, $p=0.16$). Overall survival and disease-free survival were numerically higher with cyclosporine.

Conclusions: Tacrolimus and cyclosporine demonstrated comparable efficacy in preventing clinically significant acute GVHD, with similar overall safety profiles. Cyclosporine was associated with more azotemia but numerically superior OS and DFS. Prospective randomized studies are needed to optimize calcineurin inhibitor selection and dosing strategies for GVHD prophylaxis in resource-limited transplant settings.