ABSTRACT

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Title of diploma thesis: Determination of ganciclovir in lung transplant recipients

Ganciclovir is a nucleoside analogue that is widely used for the treatment of infections caused by herpes viruses, including cytomegalovirus. Patients after lung transplantation are always given valganciclovir (ganciclovir prodrug) prophylactically to prevent cytomegalovirus infection. The aim of this thesis was to establish a reliable, sensitive and rapid analytical method for the determination of ganciclovir and to validate this method. Furthermore, to determine ganciclovir levels in patients after lung transplantation. The final objective was to evaluate the importance of therapeutic monitoring of ganciclovir. A liquid chromatography-tandem mass spectrometry method was established for the determination of ganciclovir. Validation parameters necessary for bioanalytical methods have been established.All validation parameters met the conditions for successful validation.Valganciclovir is used for oral administration of antiviral drugs and ganciclovir for intravenous administration. Patients after lung transplantation receive prophylactic oral valganciclovir 900 mg/day. After prophylaxis, ganciclovir is administered intravenously. In this thesis, ganciclovir concentrations were measured just prior to drug administration, three hours after, and then five hours after administration. Ganciclovir was determined in a total of 20 patients. Of the 20 patients, 13 patients received ganciclovir or valganciclovir prophylactically and 7 patients received ganciclovir for the treatment of cytomegalovirus infection. Results showed that of the total number of patients, 18 (90 %) patients did not reach the lower limit of the therapeutic range, only 1 (5 %) patient was in the therapeutic range, and 1 (5 %) patient was overdosed. Therapeutic drug monitoring is necessary in all patients after lung transplantation, because GCV may be toxic if the therapeutic range is exceeded. However, if the minimum level is not reached, treatment may not be effective or resistance to GCV may develop.