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2016/2017 Grant Recipient

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RESEARCH TOPIC:

Investigation of the mechanisms of disease in patients suffering from idiopathic dilated cardiomyopathy.

RESEARCH PROPOSAL ABSTRACT

Cardiomyopathies pose the greatest threat of all cardiovascular disease in Africa because of the socioeconomic conditions in sub-Saharan Africa and most of the population plagued by diseases related to pestilence and famine. In several heart failure studies in sub-Saharan Africa, dilated cardiomyopathy has emerged as an important cause. In the Heart of Soweto study, the three commonest causes were hypertension (33%), idiopathic dilated cardiomyopathy (28%) and rheumatic heart disease (27%). The patients hospitalised for the treatment of heart failure were young – mean age 55 +/-16 years, and the majority were black women. In another study, The Sub-Saharan Africa Survey of Heart Failure study, the causes of heart failure in twelve tertiary institutions in nine sub-Saharan countries were investigated. Once again hypertension was found to be the leading cause of heart failure, accounting for 45% of patients. It was followed by idiopathic dilated cardiomyopathy (30%) and rheumatic heart disease was the third cause accounting for 14% of the patients.

There is a large number of patients who have preceding viral myocarditis which then progresses to dilated cardiomyopathy and heart failure. The resulting myocardial infection leads to damage of the cardiomyocytes due to the innate immune response, but also pathogenic mechanisms such as apoptosis caused by viral infection. Apoptosis leads to degradation of genomic DNA and cellular degeneration. Identifying patients earlier with active viral replication allows for earlier treatment with antivirals, a reduced viral titer which leads to a decreased innate immune response, inflammation and the resultant tissue damage.

This study forms part of a larger study of idiopathic cardiomyopathy being done in collaboration with the Department of Cardiology at the University of the Free State and Universitas Tertiary hospital in Bloemfontein. There will be HIV and non-HIV cohorts of patients recruited over a period of three years from 2017-2019. I will receive and process blood and endomyocardial biopsy samples for each of the patients that will be required for my investigations.

RESEARCH AIMS

1. Investigate pathogenic mechanisms of disease such as apoptosis and its pathways in idiopathic cardiomyopathy.
2. To develop, optimize and validate a rapid test that would allow for the simultaneous detection of the most prevalent causative viruses in both the HIV and non-HIV cohorts of patients.