Automated algorithms to characterize myocardial optical coherence tomography imaging

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Technology description

Summary

Despite risks of complication and suboptimal diagnostic yield, endomyocardial biopsy (EMB), an invasive procedure in which a piece of heart tissue is extracted and analyzed, remains the gold standard for diagnosing unexplained myocardial disease. Currently, EMB is performed by randomly sampling myocardial tissue. This tissue is then examined under a microscope for diagnosis. The diagnostic yield of the procedure is low because a relatively small area of the heart is sampled. Alternatively, increasing the number of samples increases cardiac scarring, which is also undesirable. This technology describes a non-invasive method of imaging over large areas of the heart that can be used to provide more information than EMB alone. This technology could be used by research laboratories and academic institutions to improve the detection of heart transplant rejection and cardiomyopathies, as well as provide information regarding the outcomes of treatment decisions and new therapy options.

Algorithm for increasing the diagnostic yield of endomyocardial biopsy

This technology is an automated tissue classification system for cardiac tissue using optical coherence tomography (OCT) imaging. Images of the heart are acquired through an optical biopsy and the OCT images are then processed through algorithms for assessment of ventricular remodeling, scarring, and rejection. The algorithms utilize a database of OCT images of myocardial pathologies and related histopathologies, which together serve as diagnostic criteria and quantitative tools for cardiac tissue classification. As such, this process will decrease sampling error of endomyocardial biopsy in order to increase diagnostic sensitivity and specificity, and may allow for earlier treatment interventions.

Application area

Cardiac tissue sampling
Monitoring atherosclerotic and hypertrophic cardiovascular changes
Monitoring heart transplant rejection

Advantages

Decreases the number of tissue samples required
Increases the diagnostic yield of tissue sampling
Allows clinician to avoid biopsy of important structures

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