慢性腎衰竭接受維持性透析療法病人之心室型心律不整以非侵襲性心臟電氣學方法預測評估

Evaluation of Ventricular Arrhythmic Predictors in Chronic Renal Failure Patients Under Maintenance Hemodialysis Therapy Using Non-invasive Electrocardiological Methods

中文摘要

本份論文主要在於敘述末期慢性腎衰竭接受維持性透析療法病人之心室型心律不整以非侵襲性心臟電氣學方法來預測的評估，我們首先回顧傳統十二電極心電圖和平均訊號心電圖的歷史。在這裡我們介紹具臨床實用性及可重覆之簡單而且沒有危險性的心臟電氣學方法，也就是利用傳統十二電極心電圖中的 QT 離散 (QT dispersion) 和平均訊號心電圖技術(Signal-averaged ECG)，來偵測具致命性的心臟血管併發症，並且同時評估其臨床實用性及可信度。慢性腎衰竭接受維持性透析療法病人較諸正常人有較高的心臟血管疾病發生率。在這之前真正造成這些心臟血管疾病發生的機制已被完整的研究與報告，它們也許是一個多源性因素影響的結果。在這些因素之中，心室型心律不整是最常見的最終結果之一。也因此，如何有效而且快速地偵測到這些發生在透析病人身上之高危險的併發症，並且加以有效地治療，已成爲臨床上一個重要的課題。

在近世紀生物醫學最重大的進展之一，就是融合臨床上先進的生物醫學訊號處理技術我們可以使用非侵襲性的方法來記錄人體的正常生理功能。有幾種用來分析心臟所產生之生物醫訊號的方法已被發展出來，且在臨床上有所應用，也就是平均訊號心電圖，心跳速率變異性(Heart rate variability)，廿四小時可移動式心電圖監視器(Holter monitor)，等等。

一個簡單的構想，就是說結合傳統十二電極心電圖中的 QT 離散和平均訊號心電圖中不同的指標值這兩者來提供一個十分簡單，敏感，和具經濟效益的方法來預測慢性腎衰竭接受維持性透析療法病人發生自發性(spontaneous) 或具誘導性 (inducible) 的心室型心律不整的發生。由於這兩者方法的便利性，可以很簡單的在慢性腎衰竭接受維持性透析療法病人每次接受透析治療前後被當做一種例行性的檢查。符合這個任務需求之全自動化心臟電氣學運算的方法不但可以做爲一種預測方式而且可以做爲拯救生命的利器。

英文摘要

This dissertation has described series of researches concerning the clinical evaluation of ventricular arrhythmic predictors in the end-stage renal failure (ESRF) patients under maintenance hemodialysis therapy using non-invasive electrocardiological methods. The history of the development of conventional 12-lead electrocardiography

(ECG) and signal-averaged ECG (SAECG) are first of all reviewed. Simple and risk free electrocardiological methods, namely 12-lead ECG QT dispersion and SAECG were utilized to detect the life-threatening cardiovascular complications and for their clinical availability and reproducibility were also investigated.

The clinical emergence of non-invasive recording techniques for the physiological function of human body is one of the most important recent developments in the biomedical sciences of this decade. Methods used to analyze these biomedical signals of the heart are being developed in several aspects; namely, signal-averaged electrocardiogram (SAECG), heart rate variability, 24 hour ambulatory electrocardiogram (Holter ECG) monitoring, etc.

A simple algorithm is that if both 12-leads QT dispersion and the various parameters in SAECG can provides an relatively easy, sensitive and cost effective method for predicting spontaneous or inducible ventricular tachyarrhythmias in high-risk ESRF patients receiving maintenance hemodialysis therapy. The ease of these two techniques to be performed at the bedside for ESRF patients will even make them possible as a routinely used procedure before and after each hemodialysis session in the foreseeable future. Not only as a predictor, but also as a rescuer of life, these automated computing electrocardiological methods will fulfill this task.