



The Usefulness Of The Omron's Portable ECG On Epidemiologic Research

Y. Ozawa, Y. Kasamaki, K. Iijima, M. Ota, I. Watanabe, S. Saito, X. Xu, Y. Ma, D. An, Y. Maimaiti, Y. Sakoda, N. Yamamoto, Nihon University, Xinjiang Medical University, Omron Healthcare Co., Ltd. (Tokyo, J; Urumqi, VRC; Kyoto, J)

Introduction

In the Xinjiang-Uygur region of China, there are two tribes; one is a long-lived tribe, Uygur in Hotan, and the other is a short-lived tribe, Kazakh. We have conducted epidemiologic studies on these tribes but were forced to limit the number of subjects because precision medical instruments were hard to carry to the locations due to the harsh climate. HCG-801(Omron Healthcare Co.) is a portable ECG monitor for home use. Since it is compact, it is easier to carry and take ECG data from a large number of people. Thus we used HCG-801 for the epidemiologic studies on the Kazakh tribe and evaluated the accuracy comparing with a 12-lead ECG device.

Purpose

To evaluate the accuracy of HCG-801 and verify its usefulness on epidemiologic studies as well as screening for cardiac disease.

Methods

Subjects : Kazakh who live in the Xinjiang-Uygur region of China (49 males and 47 females aging between 30-35, 28 males and 22 females aging between 9-10)

Period of the study : Sep.2005 – Aug.2005

Region of interest : HCG-801(1-lead) ... right hand – V4
12-lead ... references

Measurement time : HCG-801 ... 30 sec
12-lead electrocardiograph ... 10 sec

- ※Subjects took a measurement themselves after reading a simple instruction.
- ※Subjects sat when measuring with HCG-801 and lay down on their back with 12-lead ECG. It depends on a subject which type of device they took a measurement first with.

HCG-801

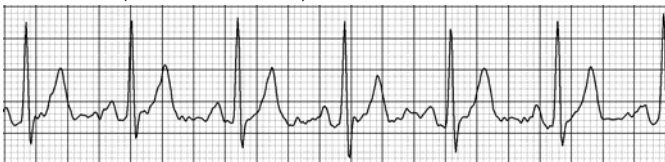


Induction system : Bipolar single channel
Heart rate range : 2 to 200 beats/min.
Accuracy : Bandwidth:0.05 to 40Hz
Sampling Rate:125Hz

Waveform Examples

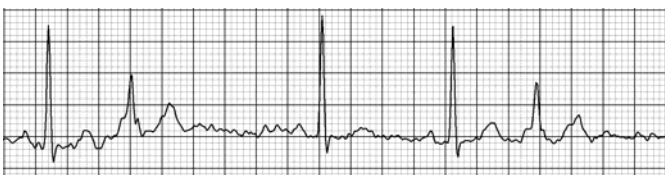
Normal sinus rhythm

HCG-801 (25mm/s, 10mm/mV)



VPC

HCG-801 (25mm/s, 10mm/mV)



Result

Comparison with 12-lead ECG at V4

Each parameter (R-R interval, PQ interval, QRS width, QT/QTc interval, R-wave height, S-wave depth and T-wave height) of the ECGs with HCG-801 had significant correlation with that of the 12-lead ECG at V4.

Fig.1 Correlation of R-R interval between 12-lead ECG (lead V4) and HCG801

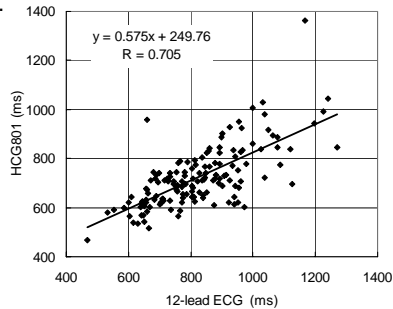


Fig.2 Correlation of QRS width between 12-lead ECG (lead V4) and HCG801

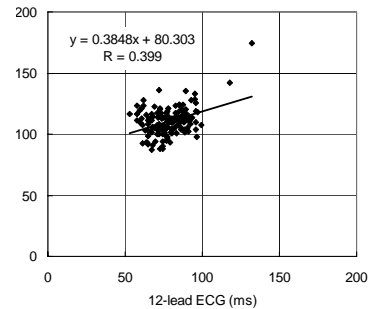


Fig.3 Correlation of QT interval between 12-lead ECG (lead V4) and HCG801

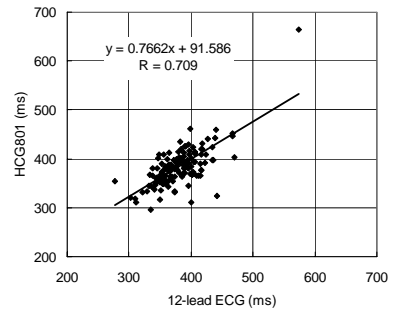
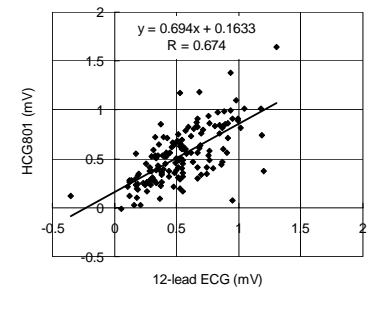


Fig.4 Correlation of T wave height between 12-lead ECG (lead V4) and HCG801



Concordance rates on the doctor's inspection of waveform between HCG-801 and 12-lead ECG

Concordance rate 95% (138 out of 146 cases)

<Details that does not concord>

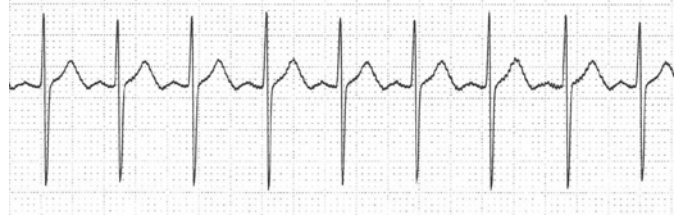
- false negative on inverted T wave ... 2 cases
- false negative on displacement of the heart to the right or RV enlargement (high RV1) ... 1 case
- arrhythmia detected exclusively with either HCG-801 or 12-lead ECG ... 5 cases

Tachy

HCG-801 (25mm/s, 10mm/mV)



12-lead ECG (25mm/s, 5mm/mV)



Conclusions

The accuracy of HCG-801 has been verified by comparing the ECGs with those of 12-lead ECG. The device can be certainly utilized for epidemiologic research besides home use. The information from the ECGs is very beneficial except artifacts.

In addition this study results indicate that HCG-801 is useful as a screening tool for cardiac disease.