

The relationship of ECG and the clinical manifestation in AIDS patients

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Abstract: Objective Find the relationship between ECG changes and clinical manifestation of AIDS by analyzing 489 AIDS patients. **Methods** Grouping the AIDS patients into fever group, respiratory infection group, diarrhea group, respiratory infection incorporate with diarrhea group or other clinical manifestation group by their clinical manifestation. Analyze the their ECG and the relationship between their ECG changes and clinical manifestation. **Results** ①Respiratory infection, diarrhea and fever are AIDS patient's frequent clinical manifestation; ②Fever group, respiratory infection group and respiratory infection incorporate with diarrhea group have higher ECG fast arrhythmia incidence rate than other clinical manifestation group ($P < 0.05$); ③Respiratory infection group has higher ECG right atrial hypertrophy and right ventricular hypertrophy incidence rate than fever group, diarrhea group and other clinical manifestation group. Respiratory infection incorporate with diarrhea group has higher ECG right atrial hypertrophy and right ventricular hypertrophy incidence rate than fever group and other clinical manifestation group ($P < 0.05$). **Conclusions** The AIDS patients with respiratory infection have high fast arrhythmia incidence rate, high right atrial hypertrophy and right ventricular hypertrophy incidence rate. And the right atrial hypertrophy and right ventricular hypertrophy is caused by respiratory infection in AIDS patients. [Shifeng Li, Jihong Shen, Fangfang Zhang, Lin Zhang, Liantao Nie, Zhongjian Li. **The relationship of ECG and the clinical manifestation in AIDS patients.** *Life Sci J* 2018;15(5):11-15]. ISSN: 1097-8135 (Print) / ISSN: 2372-613X (Online). <http://www.lifesciencesite.com>. 3. doi:[10.7537/marslsj150518.03](https://doi.org/10.7537/marslsj150518.03).

Keywords: AIDS; Electrocardiogram; Clinical Manifestation

1. Introduction

Acquired immune deficiency syndrome (AIDS) is a seriously communicable disease, which is caused by human immunodeficiency virus (HIV). AIDS is not only a severe disease, but also a important public health event and social hot spot. At present the AIDS's incidence rate and infection rate is still increasing, it endanger human healthy acutely. AIDS can wreak havoc on the patients' immune system, and impair their function. In clinic, they always coexist with all kinds of opportunistic infections and tumors. The patients' organ system are hurt by HIV directly or indirectly, and present with a wide variety of symptoms. In order to find the relationship between ECG changes and clinical manifestation in AIDS Patients, we collect 489 cases AIDS patients' clinical data. We hope that we can service AISD patients by our research results.

2. Methods

2.1 Date of Cases

Select 489 cases of AIDS Patients randomly. All the patients come from Henan Provincial Infectious Disease Hospital and Zhecheng County People's Hospital of Shangqiu. Most of the patients are farmers, a few of them are students, workers and other careers. The vast majority of AIDS patients have compensable

blood donation and transfusion history, and the others have sexual transmission history. In the 489 cases AIDS, 295 are male and 194 are female. The range of their age is from 12 to 77 years old, the average age is 40 ± 5 years old.

2.2 Detect Methods

Chose the AIDS patients whose diagnosis results come from authoritative Center of Disease Control. Then put them into different groups, the patients will be divided into fever groups (except caused by respiratory infection), respiratory infection group, diarrhea group, respiratory infection incorporate with diarrhea group and other clinical manifestation group by their clinical manifestation (see Diagnostic Criteria). All the patients are asked to lie supine position quietly, then use MAC1200-type synchronous 12-lead electrocardiograph to sample their ECG signal. The ECG professional doctor will give the diagnose of ECG, the ECG results include normal, fast arrhythmia, slow arrhythmia, left atrial hypertrophy and left ventricular hypertrophy, right atrial hypertrophy and right ventricular hypertrophy, ST-T and T wave change, and so on. All of the ECG diagnostic criteria source from Recommendations for the Standardization and Interpretation of the Electrocardiogram which was established by American Heart Association Electrocardiography and Arrhythmia Committee,

Council on Clinical Cardiology, the American College of Cardiology Foundation and the Heart Rhythm Society [1]. Finally, analyse the AIDS patients' ECG changes and clinical manifestation in each group.

2.3 Diagnostic Criteria

2.3.1. Clinical Manifestation: ①Fever [2]: The body temperature >37.3 °C, except the fever caused by respiratory infection; ②Respiratory infection [3]: The AIDS patients always have fever, cough, expectoration, respiration dyspnea, chest distress and pain, and other symptoms which caused by respiratory infection and imaging evidence; ③Diarrhea [4]: The AIDS patients have celiodynia, abdominal distention and diarrhea. The frequency of defecation >3 times a day, the stool weights > 200g/d, and the moisture capacity of the stool > 85%; ④Respiratory infection incorporate with diarrhea: The AIDS patients have respiratory infection and diarrhea ' s clinical manifestation at the same time; ⑤ Other clinical manifestation [5-6]: Like hypodynamia, singultus, sicchasia, blurred vision, dental ulcer, skin bleb, yellow urine, and so on.

2.3.1. Diagnostic Criteria of ECG [7]: ① Fast arrhythmia: Include sinus tachycardia, all kinds of ectopic pyknosphygmia and atrial fibrillation etc; ② Slow arrhythmia: Sinus bradycardia, slow guillotine commissurotome cardiac rhythm etc; ③ Left atrial hypertrophy and left ventricular hypertrophy: Include left atrial hypertrophy, left atrial overloaded, left ventricular hypertrophy, left ventricular supervoltage and RV4 supervoltage; ④Right atrial hypertrophy and right ventricular hypertrophy: Include right atrial hypertrophy and right ventricular hypertrophy; ⑤ST-T and T wave change: ST segment depression, elevation, T wave low and flat, biphasic, inverted. ⑥ Other ECG manifestation: Pre-excitation syndrome, old myocardial infarction, QRS low voltage, and so on.

2.4 Statistical Treatment

All of the data are dealt by SPSS 17.0 software. The statistical methods that we use are χ^2 test and u test of sample rate. P<0.05 was considered statistically significant.

3. Results

The AIDS patients are divided into 5 groups by their clinical manifestation: fever group, respiratory infection group, diarrhea group, respiratory infection incorporate with diarrhea group and other clinical manifestation group, which are presented in Table 1. Respiratory infection (190 case-times, account for 38.85%), diarrhea (121 case-times, account for 24.74%) and fever (except caused by respiratory infection, 118 case-times, account for 24.13%) are AIDS patient' s frequent clinical manifestation.

Table 1 The Clinical Grouping of AIDS Patients

Group	Number	Percentage
Fever group	118	24.13%
Respiratory infection group	149	30.47%
Diarrhea group	80	16.36%
ReSpiratory infection incorporate with diarrhea group	41	8.38%
Other group	101	20.65%
Total	489	100%

There are 1 pre-excitation syndrome and 1 old myocardial infarction in fever group; Respiratory infection group, diarrhea group and respiratory infection incorporate with diarrhea group have 1 QRS low voltage each. (Figure-1)



Figure-1 Female, 33 years old, case number 600544xx. Electrocardiogram diagnosis: 1. sinus tachycardia; 2. inferior wall, anterior lateral ST-T changes.

The diagnose of each group AIDS patients' ECG is presented in Table 2.

Table 2 The ECG Results of AIDS Patients In Each Group

Group	Number	Fast arrhythmia	Slow arrhythmia	Left heart hypertrophy	Right heart hypertrophy	ST-T and T wave change
Fever group	118(100%)	37(31.36%)	12(10.17%)	45(38.14%)	1(0.85%)	33(27.97%)
Respiratory infection group	149(100%)	52(34.90%)	11(7.38%)	58(38.93%)	15(10.07%)	44(29.53%)
Diarrhea group	80(100%)	21(26.25%)	3(3.75%)	28(35.00%)	2(2.50%)	31(38.75%)
Respiratory infection incorporate with diarrhea group	41(100%)	14(34.15%)	2(4.88%)	9(21.95%)	4(9.76%)	18(43.90%)
Other group	101(100%)	16(15.84%)	8(7.92%)	46(45.54%)	1(0.99%)	34(33.66%)

In other clinical manifestation group, there are 1 QRS low voltage and 1 old myocardial infarction. Use SPSS 15.0 deals with the data of AIDS patients, we find that fever group, respiratory infection group and respiratory infection incorporate with diarrhea group have higher ECG fast arrhythmia incidence rate than other clinical manifestation group ($P < 0.05$); (Figure-2 and figure-3)

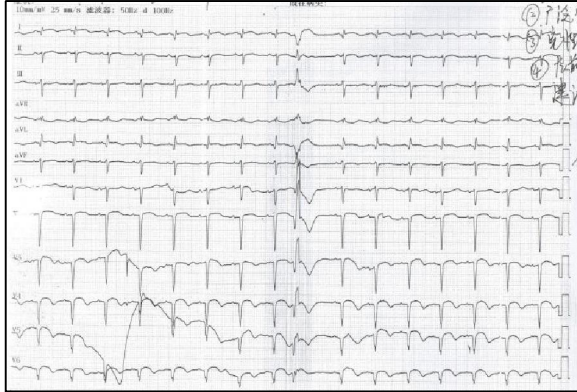


Figure-2 Female, 50 years old, case number 17040xx. Electrocardiogram diagnosis: 1. sinus rhythm; 2. abnormal Q wave of frontal wall changes; 3. occasional ventricular premature beat; 4. side wall ST-T changes.



Figure-3 Female, 55 years old, case number 17050xx. Electrocardiogram diagnosis: 1. sinus rhythm; 2. suggesting left atrial abnormalities; 3. inferior wall, anterior lateral ST-T changes.

Respiratory infection group has higher ECG right atrial hypertrophy and right ventricular hypertrophy incidence rate than fever group, diarrhea group and other clinical manifestation group. Respiratory infection incorporate with diarrhea group has higher ECG right atrial hypertrophy and right ventricular hypertrophy incidence rate than fever group and other clinical manifestation group ($P < 0.05$). (Figure-4

and figure-5)

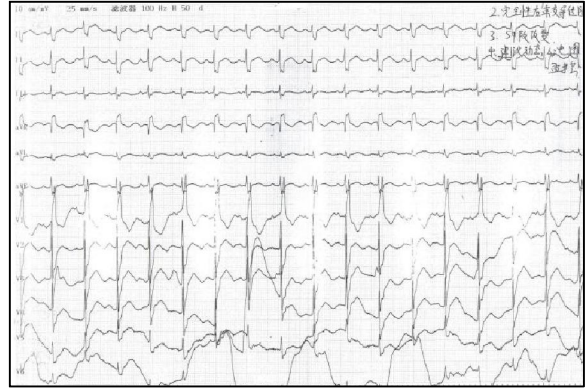


Figure-4 Male, 43 years old, case number 600547xx. Electrocardiogram diagnosis: 1. sinus rhythm; 2. complete right bundle branch block.



Figure-5 Male, 26 years old, case number 600528xx. Electrocardiogram diagnosis: 1. sinus rhythm; 2. complete right bundle branch block; 3. the lower wall QRS wave was hooked R wave changes.

4. Discussions

Through analyzing the 489 AIDS patients' clinical manifestation, we find that respiratory infection, diarrhea and fever are AIDS patient's frequent clinical manifestation. Because AIDS patient's immune system is damaged severely, various kinds of causative organism can invade their interior easily, so the patients have the liability of opportunistic infections and tumors [8]. In these complications, respiratory infection is most common, because the systema respiratorium has connection with the outside and the causative organisms reach it at first. The AIDS patient's clinical manifestations are cough, expectoration, respiration dyspnea, chest distress and chest complaint etc [9]. The diarrhea usually happen has two reasons: ① The infection: Because of the poor immunity, the AIDS patients usually have intestinal infection (protozoan, bacterium, eumycete and virus);

②The noninfection: The tumor intrude into intestinal tract (like Kaposi sarcoma), anti-acquired immunodeficiency syndrome drugs (like HAART treatment), and intestinal tract normal flora excessive multiplication. The fever which happens to AIDS patients caused by opportunistic infections and tumors, the Pathogenesis is inflammatory reaction and immunologic response^[10]. So fever is also common in AIDS patients.

The AIDS patients who have fever (except caused by respiratory infection), respiratory infection and diarrhea have higher ECG fast arrhythmia incidence rate than other clinical manifestation ($P < 0.05$). It indicates that when the AIDS patients have fever or respiratory infection, their ECG shows fast arrhythmia high incidence rate (most are sinus tachycardia), and has statistical significance^[11]. The research shows that the fever can cause pyknosphygmia reflectivity, at that time the electrocardiogram shows sinus tachycardia. And the respiratory infection always has respiration dyspnea except for fever. respiration dyspnea leads to oxygen deficiency, it will cause pyknosphygmia reflectivity else. The respiratory infection group has higher ECG right atrial hypertrophy and right ventricular hypertrophy incidence rate than fever group, diarrhea group and other clinical manifestation group; Respiratory infection incorporate with diarrhea group has higher ECG right atrial hypertrophy and right ventricular hypertrophy incidence rate than fever group and other clinical manifestation group ($P < 0.05$). The AIDS patients' ECG shows right atrial hypertrophy and right ventricular hypertrophy is closely related to respiratory infection^[12]. The intermediate and advanced AIDS patients' low immunologic function frequently causes pulmonary opportunistic infection^[13]. The pulmonary opportunistic infection will lead to high pulmonary arterial pressure, then the resistance of pulmonary circulation is high, at last appears right atrial hypertrophy and right ventricular hypertrophy. Use ECG examines these patients will find right atrial hypertrophy and right ventricular hypertrophy.

AIDS patients found slow arrhythmia by electrocardiogram have no relationship with their clinical manifestation, the reason which causes slow arrhythmia is older age. Because the slow arrhythmia usually occurs most often in elderly people, the older the higher incidence rate^[14]. Many AIDS patients have left atrial hypertrophy and left ventricular hypertrophy in ECG. Some of them body is emaciated, their chest wall is thinness, so their left chest lead will turn up supervoltage^[15]; The others have high blood pressure and other cardiac disorder which can cause left atrial hypertrophy and left ventricular hypertrophy

^[16]. We also find many AIDS patients have ST-T and T wave change, but they are caused by coronary artery insufficiency which can result in heart muscle ischemia and have no relationship with the clinical manifestation.

In conclusion, our data delineate the AIDS patients with respiratory infection have high fast arrhythmia incidence rate, high right atrial hypertrophy and right ventricular hypertrophy incidence rate. And the right atrial hypertrophy and right ventricular hypertrophy is closely related to respiratory infection in AIDS patients. We hope our study could service clinician and the AIDS patients.

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