# An 84-month observational study of the changes in CD4 T-lymphocyte cell count of 110 HIV/AIDS patients treated with traditional Chinese medicine

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**Abstract** This study aimed to evaluate the therapeutic effect of traditional Chinese medicine (TCM) by observing the changes in CD4 T-lymphocyte cell count of 110 cases with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) treated continuously with TCM for 84 months. Information of 110 HIV/AIDS patients from 19 provinces and cities treated with TCM from 2004 to 2013 was collected. Changes in the indexes of CD4 counts ($\leqslant 200$, 201–350, 351–500 and $> 500$ cells/mm$^3$) at five time points (0, 12, 36, 60 and 84 months) and different treatments [TCM and TCM plus antiretroviral therapy (ART)] were compared. Repeated measures test indicated no interaction between group and time ($P > 0.05$). Degrees of increasing and decreasing CD4 count of the two groups at four different frames were statistically significant compared with the baseline. The CD4 count between the two groups was not statistically significant. For CD4 count of $\leqslant 200$ cells/mm$^3$, the mean CD4 count changes were 21 and 28 cells/mm$^3$ per year for the TCM group and TCM plus ART group, respectively. For CD4 count of 201–350 cells/mm$^3$, the mean CD4 count changes were 6 and 25 cells/mm$^3$ per year for the TCM group and TCM plus ART group, respectively. For CD4 count of 351–500 cells/mm$^3$, the mean CD4 count changes were $-13$ and $-7$ cells/mm$^3$ per year for the TCM group and TCM plus ART group, respectively. For CD4 count of $> 500$ cells/mm$^3$, the mean CD4 count changes were $-34$ and $-17$ cells/mm$^3$ per year for the TCM group and TCM plus ART group, respectively. Long-term use of TCM could maintain or slow the pace of declining CD4 counts in patients with HIV/AIDS, and may achieve lasting effectiveness.

**Keywords** AIDS; HIV; CD4; traditional Chinese medicine; linear models

## Introduction

Acquired immunodeficiency syndrome (AIDS) is caused by infection of the human immunodeficiency virus (HIV). By the end of September 2013, the cumulative total of reported HIV/AIDS cases was 434 000 in China [1]. Highly active antiretroviral therapy (HAART) is very effective in suppressing viral replication; it has led to a significant reduction in the

mortality rate of the disease, an increase in the life expectancy of HIV/AIDS patients and an improvement in the quality of life (QoL) of these HIV/AIDS patients [2–4]. However, issues such as viral reservoirs, drug resistance, high dosage and drug costs have led to a significant crisis in HIV/AIDS management, particularly in developing nations [5–7]. HAART does not provide a complete solution to these problems. Therefore, additional and alternative anti-HIV therapeutic strategies urgently need to be explored [8]. Traditional Chinese medicine (TCM) is a major practice in complementary and alternative medicine, and its use has increased [9]. Generally, people with HIV/AIDS use TCM for four main reasons: to

enhance their immune function, to treat symptoms, to improve their QoL and to reduce side effects related to medications [10,11].The CD4 T-lymphocyte cell count in HIV/AIDS patients can be used to evaluate their immune status, and it is a laboratory parameter for assessing disease progression and determining prognosis [12]. Few clinical studies have focused on using TCM for long-term treatment of HIV/AIDS [13–15]. Most studies used *t*-test, non-parametric tests and other methods to analyze the CD4 count changes, which do not fully reflect the efficacy of TCM. This article will be based on HIV/AIDS patients of the pilot project named "National Free TCM HIV/AIDS Treatment Program" using repeated measures ANOVA to study the effect of CD4 count changes on the long-term use of TCM, analyze the efficacy of TCM objectively and accurately and provide a reference for clinical practice and research.

## Materials and methods

### Participants

HIV patients were tested positive by western blot [16]. Patients included outpatients and inpatients from 19 pilot projects.

### Diagnostic criteria

Diagnostic criteria of western medicine were in accordance with the guidelines for treating AIDS [17]. Standards of syndrome differentiation were based on "Clinical Technology Solutions of National Free TCM HIV/AIDS Treatment Program"[18].

### Inclusion criteria

HIV/AIDS patients were confirmed by the local center for disease control and prevention in accordance with the standards of syndrome differentiation of TCM. All the patients signed informed consent, and were treated continuously with TCM for 84 months.

### Methods

Repeated measures ANOVA was used for the longitudinal observational study of changes in the same indicators for 84 months. This method has more advantages than general ANOVA, considering the overall differences between the groups, time points and each observed individual, with three areas of hypothesis testing: treatment group effect, time effect and interaction between the treatment group and time point [19,20]. The change in CD4 count was determined and stratified according to baseline CD4 cell count( $\leqslant$ 200, 201–350, 351–500 and $>$ 500 cells/mm$^3$). Each stratification was further divided into two groups: TCM plus antiretroviral

therapy (ART) group and TCM group.

### Treatment

In accordance with the principle of "clinical technology solutions of national free TCM HIV/AIDS treatment program" [18], TCM treatment (preparation) and syndrome differentiation were selected. The treatment times of TCM and syndrome differentiation were every two to three months for a course of treatment, applying one or two courses. If the effect was unsatisfactory, other medicines were replaced. If the effect was satisfactory, treatment for one month was considered to be sufficient, and then treatment was repeated for another two months.

### Fixed TCM (preparation)

(1) To strengthen the spleen and kidney and clear away heat and toxic materials, Fuzhengkangdu and Kang'aibaosheng capsules were produced from the preparation room of the Yunnan Provinical Academy of Traditional Chinese Medicine Affiliated Hospital with approval number 2005L–ZJ002 and Yunnan pharmacists word (Z) 20090004A, respectively. The dosage was four times daily and six capsules each time. (2) To reinforce the spleen and kidney, supplement qi and consolidate origin, Qilingyiqi tablet was produced by Chengdu En'wei Pharmaceutical Limited Company with country medicine number of Z20050483. The dosage was three times a day and six tablets each time. (3) To reinforce the kidney, replenish qi, activate blood and resolve stasis, Ai'keqing capsule was produced by the Institute for Tropical Diseases of Guangzhou University of Chinese Medicine. The dosage was three times daily and three capsules each time. (4) To invigorate the spleen for eliminating dampness, tonifying qi and nourishing blood, Yi'aikang capsule was produced from the preparation room of the Affiliated Hospital of Henan Province Chinese Medicine Research Institute, with batch number 20050618. The dosage was three times daily and five capsules each time.

### Syndrome differentiation

Syndrome differentiation was based on the patient's symptoms, tongue and pulse, as shown in the "Clinical Technology Solutions of National Free TCM HIV/AIDS Treatment Program" [18].

### ART

HAART therapy mainly consisted of zidovudine (AZT)/ stavudine (d4T) + lamivudine (LAM) + nevirapine (NVP)/ efavirenz (EFV). AZT: 300 mg per time, twice daily; d4T: weight $\geqslant$ 60 kg, 40 mg per time, twice daily, weight $<$ 60 kg, 30 mg per time, twice daily; LAM: 300 mg per time, once

daily; EFV: 600 mg per time, once daily, before sleeping; NVP: 200 mg per time, once daily (pre-14 d), after 14 d: 200 mg per time, twice daily.

### Observation index

CD4 T-lymphocytes were detected before and after treatment in nationally recognized specialist laboratories of the local disease control department using flow cytometry and flow cytometry assay.

### Statistical methods

All analyses were performed using SPSS software version 17.0. Data are shown with $\bar{x} \pm s$. Repeated measures test and multivariate ANOVA of the general linear model in SPSS were used to compare data between different groups and time points. Mauchly's test of sphericity was used to estimate the relations among repeatedly measured data. If $P > 0.05$, multivariate ANOVA test of repeated measures design should be performed. If $P \leqslant 0.05$, Greenhouse-Geisser correction should be conducted. Treatment effects were evaluated by determining between-subject variability. Repeated measurement effect or its interactive effect with the treatment group was evaluated by determining within-subject variability. With multivariate ANOVA, data from different treatment groups of each measurement time were compared pairwise.

## Results

The demographics of 110 patients are listed in Table 1.

### Overall changes in CD4 count

The CD4 count for 84 months showed a slow upward trend. The highest CD4 count was detected in 36 months (Table 2).

### General linear model

The changes in the indexes of CD4 counts ( $\leqslant$ 200, 201–350, 351–500 and $>$ 500 cells/mm$^3$) were compared. The time factors of four stratifications on CD4 count demonstrated a significant difference, indicating that the CD4 count was different in at least two time frames ($P \leqslant 0.05$). Interaction (time $\times$ group) for CD4 count of 351–500 cells/mm$^3$ was significant. $P$ value of treatments of four stratifications was $>$ 0.05. The effect between groups (different treatments) was undifferentiated with no significant difference (Table 3).

### CD4 count stratification

For CD4 count of $\leqslant$ 200 cells/mm$^3$, the mean CD4 count changes were 21 and 28 cells/mm$^3$ per year for TCM group

**Table 1** Demographics of 110 HIV/AIDS patients

| Characteristic | $n$ (%) |
|---|---|
| Gender | |
| Male | 28 (25.45%) |
| Female | 82 (74.55%) |
| Age, median years | 41.48±8.13 |
| Marriage | |
| Married | 103 (93.64%) |
| Unmarried | 5 (4.55%) |
| Divorced | 1 (0.91%) |
| Widowed | 1 (0.91%) |
| Education | |
| Above college | 1 (0.91%) |
| Senior middle school | 4 (3.64%) |
| Junior high school | 62 (56.36%) |
| Primary school | 6 (5.45%) |
| Preschool | 37 (33.64%) |
| Profession | |
| Farmer | 100 (90.91%) |
| Unemployment | 8 (7.27%) |
| Retirement | 1 (0.91%) |
| Small private business | 1 (0.91%) |
| Route of infection | |
| Paid blood donation | 92 (83.64%) |
| Sexual transmission | 12 (10.91%) |
| Unknown reasons | 4 (3.64%) |
| Intravenous drug | 2(1.82%) |
| Had antiretroviral drugs | |
| CD4 of $\leqslant$ 200 cells/mm$^3$ | 11 (42.31%) |
| CD4 of 201–350 cells/mm$^3$ | 13 (29.55%) |
| CD4 of 351–500 cells/mm$^3$ | 12 (46.15%) |
| CD4 of $>$ 500 cells/mm$^3$ | 6 (42.86%) |

**Table 2** Overall changes in CD4 count at different time frames in 110 HIV/AIDS patients

| Time frame | $\bar{x} \pm s$ | Median |
|---|---|---|
| 0 month | 317.56±167.97 | 298 |
| 12 months | 323.89±151.24 | 325.5 |
| 36 months | 373.13±191.97 | 355 |
| 60 months | 341.45±180.06 | 331.5 |
| 84 months | 363.51±179.39 | 343.5 |

and TCM plus ART group, respectively. For CD4 count of 201–350 cells/mm$^3$, the mean CD4 count changes were 6 and 25 cells/mm$^3$ per year for the TCM group and TCM plus ART group, respectively. For CD4 count of 351–500 cells/mm$^3$, the mean CD4 count changes were $-13$ and $-7$ cells/mm$^3$ per year for the TCM group and TCM plus ART group, respectively. For CD4 count of $>$ 500 cells/mm$^3$, the mean

**Table 3**  Results of repeated measures test and multivariate ANOVA of general linear model

| CD4 count | Mauchly's $W$ | $P$ | Time | | Time × group | | Group | |
|---|---|---|---|---|---|---|---|---|
| | | | $F$ | $P$ | $F$ | $P$ | $F$ | $P$ |
| $\leqslant 200$ cells/mm$^3$ | 0.477 | 0.056 | 14.109 | 0.000 | 0.176 | 0.950 | 0.296 | 0.591 |
| 201–350 cells/mm$^3$ | 0.451 | 0.000 | 7.461 | 0.000 | 1.269 | 0.284 | 2.934 | 0.094 |
| 351–500 cells/mm$^3$ | 0.711 | 0.572 | 2.563 | 0.043 | 2.837 | 0.028 | 1.035 | 0.319 |
| $>500$ cells/mm$^3$ | 0.434 | 0.471 | 5.360 | 0.001 | 0.375 | 0.825 | 0.100 | 0.757 |

**Table 4**  Changes in CD4 count at different time frames of the TCM group and TCM plus ART group

| CD4 count (cells/mm$^3$) | Group | 0 month | 12 months | 36 months | 60 months | 84 months |
|---|---|---|---|---|---|---|
| $\leqslant 200$ | A ($n = 15$) | 124.67±41.02 | 227.13±154.16 | 299.00±184.83 | 272.60±126.91 | 279.60±148.93 |
| | B ($n = 11$) | 127.36±52.94 | 244.00±130.99 | 337.27±202.45 | 291.27±184.40 | 325.09±156.39 |
| 201–350 | A ($n = 31$) | 284.06±40.16 | 298.81±91.12 | 334.13±143.01 | 332.29±168.93 | 386.42±204.71 |
| | B ($n = 13$) | 265.69±42.03 | 366.31±197.74 | 427.31±228.36 | 430.77±214.99 | 459.46±194.24 |
| 351–500 | A ($n = 14$) | 405.21±38.79 | 319.07±139.02 | 308.79±129.11 | 361.29±139.65 | 299.57±128.94 |
| | B ($n = 12$) | 399.50±37.10 | 400.75±138.24 | 427.00±159.23 | 318.05±154.32 | 341.5±168.82 |
| $>500$ | A ($n = 8$) | 641.83±89.78 | 476.17±110.14 | 518.83±244.36 | 348.87±274.50 | 389.17±98.30 |
| | B ($n = 6$) | 635.38±179.71 | 422.38±171.92 | 553.50±250.21 | 424.75±236.80 | 454.63±197.66 |

A, TCM group; B, TCM plus ART group.

CD4 count changes were $-34$ and $-17$ cells/mm$^3$ per year for the TCM group and TCM plus ART group, respectively (Table 4).

## Discussion

Repeated measures test is used when the same object is observed at different times or in various environments using multiple measurements to analyze the related trends and influencing factors. As of this writing, only few studies have used repeated measures ANOVA [21,22].

Initial treatment of HIV/AIDS with TCM emphasizes the dialectical relationship between HIV (evil) and the immune system (vital qi) in the course of HIV infection, which concerns adjustment of immune system functions by regulating the body's resistance to disease defense mechanisms for anti-HIV infection purposes [23]. TCM improved the CD4 count by stimulating the body's specific and non-specific immune responses. For CD4 of $\leqslant 200$ cells/mm$^3$ and CD4 of 201–350 cells/mm$^3$, repeated measures test was performed for the two groups at various monitoring time frames (M12, M36, M60 and M84). The CD4 counts increased compared with the baseline, and the differences between the two groups were statistically significant. No interaction between group and time was observed. Thus, TCM played a role in the immune functions of HIV/AIDS patients during treatment. For CD4 of 351–500 cells/mm$^3$ and CD4 of $>500$ cells/mm$^3$, the CD4 count declined compared with the baseline, and the differences between the two groups were statistically significant. The CD4 counts of the two groups were not

statistically significant, which may be attributed to the relatively small number of cases.

The course of AIDS is long, and the incubation period is generally from eight to ten years. After HIV infection, the body's immune function gradually decreases, and the CD4 count is monitored as a marker of HIV disease progression [24]. In the absence of treatment, the mean CD4 count change ranges from $-30$ cells/mm$^3$ per year to $-50$ cells/mm$^3$ per year [25]. If the CD4 count can be maintained in long-term treatment or the rate of decline can be delayed, CD4 can play a role in delaying disease progression. Our previous study [26] showed that the CD4 count of 8946 HIV/AIDS patients treated with TCM in the asymptomatic period decreased with time, whereas that of AIDS patients increased. TCM therapy can enhance and stabilize immune functions. In 110 cases of HIV/AIDS treated continuously with TCM for 84 months, the CD4 count levels were equivalent to the level before treatment, suggesting that TCM could delay the progress of the disease to a certain extent and had better long-term effects. Based on CD4 count stratification, immune functions showed the highest increase for CD4 of $\leqslant 200$ cells/mm$^3$ (HAART therapy), indicating that TCM plus ART could increase the CD4 count. For CD4 of 201–350 cells/mm$^3$, TCM could increase the CD4 count (TCM therapy). For CD4 of 351–500 cells/mm$^3$ and CD4 of $>500$ cells/mm$^3$, TCM had a role of stabilizing or slowing the rate of decline in immune function (TCM therapy). The results of this study were consistent with that of a previous paper for CD4 count of $\leqslant 200$ cells/mm$^3$, in which patients with HIV/AIDS treated continuously with TCM plus ART for 60 months progressed better than patients with TCM alone [9].

## Conclusions

Long-term use of TCM could maintain or slow the pace of CD4 counts declining in patients with HIV/AIDS, and may achieve lasting effectiveness.

## Acknowledgements

## Compliance with ethics guidelines

Jian Wang, Biyan Liang, Xiaoping Zhang, Liran Xu, Xin Deng, Xiuhui Li, Lu Fang, Xinghua Tan, Yuxiang Mao, Guoliang Zhang and Yuguang Wang declare that they have no conflict of interest. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the *Helsinki Declaration* of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for inclusion in the study.

## References

1. National Center for AIDS/STD Control and Prevention, China CDC. Work background of AIDS control and prevention in China. 2014. http://www.chinaids.org.cn/jkjy/sjazbr1/rdgz1/201312/t20131201_90825.htm

2. Hogg RS, Heath KV, Yip B, Craib KJ, O'Shaughnessy MV, Schechter MT, Montaner JS. Improved survival among HIV-infected individuals following initiation of antiretroviral therapy. JAMA 1998; 279(6): 450–454

3. Mocroft A, Vella S, Benfield TL, Chiesi A, Miller V, Gargalianos P, d'Arminio Monforte A, Yust I, Bruun JN, Phillips AN, Lundgren JD. Changing patterns of mortality across Europe in patients infected with HIV-1. EuroSIDA Study Group. Lancet 1998; 352 (9142): 1725–1730

4. Palella FJ Jr, Delaney KM, Moorman AC, Loveless MO, Fuhrer J, Satten GA, Aschman DJ, Holmberg SD. Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. HIV Outpatient Study Investigators. N Engl J Med 1998; 338(13): 853–860

5. Chou R, Huffman LH, Fu R, Smits AK, Korthuis PT; US Preventive Services Task Force. Screening for HIV: a review of the evidence for the U.S. Preventive Services Task Force. Ann Intern Med 2005; 143 (1): 55–73

6. Hawkins T. Appearance-related side effects of HIV-1 treatment. AIDS Patient Care STDS 2006; 20(1): 6–18

7. d'Arminio Monforte A, Lepri AC, Rezza G, Pezzotti P, Antinori A, Phillips AN, Angarano G, Colangeli V, De Luca A, Ippolito G, Caggese L, Soscia F, Filice G, Gritti F, Narciso P, Tirelli U, Moroni M. Insights into the reasons for discontinuation of the first highly active antiretroviral therapy (HAART) regimen in a cohort of antiretroviral naïve patients. I.CO.N.A. Study Group. Italian Cohort

8. of Antiretroviral-Naïve Patients. AIDS 2000; 14(5): 499–507

8. Park IW, Han C, Song X, Green LA, Wang T, Liu Y, Cen C, Song X, Yang B, Chen G, He JJ. Inhibition of HIV-1 entry by extracts derived from traditional Chinese medicinal herbal plants. BMC Complement Altern Med 2009; 9(1): 29

9. Vickers A. Recent advances: complementary medicine. BMJ 2000; 321(7262): 683–686

10. Liu J. The use of herbal medicines in early drug development for the treatment of HIV infections and AIDS. Expert Opin Investig Drugs 2007; 16(9): 1355–1364

11. Wang J, Zou W, Liu Y. Use of traditional Chinese medicine in HIV/ AIDS in China. J Biomed Sci Eng 2010; 3(8): 828–831

12. Chu CX, Xu YS, Li J, Zhao SP, Li YF. Analysis on first detection of $CD4^+$ T lymphocytes for new HIV-infected persons in Kunming in 2011. Pract Prev Med (Shi Yong Yu Fang Yi Xue) 2013; 20(6): 705–707 (in Chinese)

13. Xu LR, Li FZ, He Y, Guo JZ, Wang D. Sixty- month clinical observation of HIV carriers/ AIDS patients treated with Yiaikang capsule in terms of theirs $CD4^+$ T counts and viral loads. Chin J AIDS STD (Zhongguo Ai Zi Bing Xing Bing) 2010; 16(3): 231–233 (in Chinese)

14. Wang J, Liu Y, Zou W, Xu LR, Fang L, Wang YG, Zhang GL, Lu JM, Zhou J. Clinical observation of effect of traditional Chinese herbs on CD4 count in 807 people living with HIV/AIDS. Chin J AIDS STD (Zhongguo Ai Zi Bing Xing Bing) 2010; 16(3): 208–210 (in Chinese)

15. Wang J, Liang BY, Lu JM, Zhang XP, Xu LR, Deng X, Li XH, Fang L, Tan XH, Mao YX, Zhang GL. A sixty-months study of the change of CD4 T-lymphocyte cell count treated with traditional Chinese medicine in 565 HIV/AIDS patients. Chin J AIDS STD (Zhongguo Ai Zi Bing Xing Bing) 2013; 19(7): 468–471 (in Chinese)

16. Ma YC, Qin GM, Zheng GY, Liu L, Zhang LL, Liu G, Mao XY. Study on combined test with two kinds of different format HIV-Ab ELISAs as a substitute for western blot. Chin J STD/AIDS Prev Cont (Zhongguo Xing Bing Ai Zi Bing Fang Zhi) 2002; 8(6): 335–336 (in Chinese)

17. AIDS group of Society of Infectious Diseases, CMA. Guidelines for treating AIDS. Chin J Infect Dis (Zhonghua Chuan Ran Bing Za Zhi) 2006; 24(2): 137 (in Chinese)

18. Experts Group of Treating HIV/AIDS with TCM of National Health and Family Planning Commission of the People's Republic of China. Clinical Technology Solutions of National Free Treating HIV/AIDS with TCM Program (Trial). Health Office Medical Care Administration File [2005] No. 19 (in Chinese)

19. Finney DJ. Repeated measurements: what is measured and what repeats? Stat Med 1990; 9(6): 639–644

20. Yu SL, Xiang HY. Analysis of Variance and SAS Program of Repeated Data. Beijing: Science Press, 2004: 12–40 (in Chinese)

21. Liu L, Gao Y. Study on the correlation between traditional Chinese medicine syndrome and short-term prognosis of ischemic stroke using logistic regression model and repeated-measures analysis of variance. J Chin Integr Med (Zhong Xi Yi Jie He Xue Bao) 2012; 10 (9): 983–990 (in Chinese)

22. Qiu H, Jin GQ, Jin RF, Zhao WK. Analysis of variance of repeated data measured by water maze with SPSS. J Chin Integr Med (Zhong Xi Yi Jie He Xue Bao) 2007; 5(1): 101–105 (in Chinese)

23. Zhao HX, Zhang FJ. Opportunities and challenges of treating HIV/AIDS with TCM plus western medicine. Chin J AIDS STD (Zhongguo Ai Zi Bing Xing Bing) 2008; 14(4): 425–427 (in Chinese)

24. Badri M, Ehrlich R, Wood R, Maartens G. Initiating co-trimoxazole prophylaxis in HIV-infected patients in Africa: an evaluation of the provisional WHO/UNAIDS recommendations. AIDS 2001; 15(9): 1143–1148

25. Cen YW, Fu LC, Tan XH, Zhang MM, Ma BY. Investigation of TCM syndrome in HIV/AIDS patients of Guangdong. Chin Arch Tradit Chin Med (Zhonghua Zhong Yi Yao Xue Kan) 2008; 26(5): 958–961 (in Chinese)

26. Wang J, Liang BY, Yan SY, Lu JM, Xu LR, Wang YG, Fang L, Zhang GL, Li XH, Mao YX, Deng X, Li XD, Wang JW. Clinical observation on 8946 AIDS cases treated by traditional Chinese medicine. J Tradit Chin Med (Zhong Yi Za Zhi) 2011; 52(5): 395–398 (in Chinese)