

Research Article

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Diarrhoeal diseases of acquired immunodeficiency syndrome stimulate more depletion of total antioxidant status

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Abstract

Persistent diarrhoea is a prominent feature of the Acquired Immunodeficiency Syndrome (AIDS).But its cause and effect on the total antioxidant status (TAS) of patients with Human Immunodeficiency Virus (HIV) infection requires wider investigation for the elucidation of TAS as a factor in the pathogenesis of HIV-positive patients with diarrhoeal diseases and 120 others without diarrhoeal diseases for serum plasma levels of total antioxidant status by standard commercial method (Randox,UK).HIV patients with diarrhoeal diseases had TSA level of 0.23 ± 1.1 mmol/L and those without diarrhoeal diseases had TAS level of 0.37 ± 0.19 mmol/L.The difference in the result was statistically significant, $P < 0.05$.Depletion of total antioxidant status is more expressed in diarrhoeal diseases of Acquired Immunodeficiency Syndrome.

Introduction

Repeated episode of diarrhoea often lead to increasingly severe protein energy malnutrition,specific micronutrient deficiency (eg zinc or vitamin A deficiency), or a combination of the two,especially when nutrient intake is limited¹.Independent of Human Immunodeficiency Virus (HIV) infection,malnutrition may inhibit host defences,ultimately compromising the ability to resolve acute diarrhoea².The impact of HIV infection in Sub-Saharan Africa is immense³, with over 22.58 million (68% of world total) reported to be living

in the Sub-region in recent times.When excessive reactive oxygen species produced in patients with HIV is not appropriately compensated by antioxidant molecules,an oxidative stress may occur which may also play an important role in the pathogenesis of HIV infection through various mechanisms^{4,5}.

Diarrhoea is a frequently reported cause of death among some groups of patients with HIV infection⁶.Diarrhoea also causes great morbidity and mortality in African

children with Human Immunodeficiency Virus type-I (HIV-I) infection, accounting for up to 605 of the recorded illnesses in Rwanda⁷, and afflicting 80% of HIV-I infected infants in the second year of life in Zambia⁸. The risk factors for diarrhoea and its natural history in patients with HIV infection demands wider investigation. This report describes the result of plasma total antioxidant status in HIV patients with diarrhoeal diseases and HIV patients without diarrhoeal diseases in Maiduguri and environs, Nigeria.

Materials and Methods

Subjects: 151 adult patients with HIV-I and HIV-2 co-infection who had chronic diarrhoea and gastrointestinal complaints, and 120 others with HIV-1 and HIV-2 co-infection but without diarrhoeal diseases who attended the University of Maiduguri Teaching Hospital and the Borno State Government Hospitals at Auno and Mafa districts were studied. All medical care and assessments for clinical status were provided by the attending clinicians according to standard protocol⁹. By this, acute diarrhoea was defined as a change in normal stool pattern, characterised by at least one day of increased frequency, liquidity, blood

or mucus. Episodes lasting at least 14 days were considered to be persistent diarrhoea.

Methods

After counselling and informed consent in each case, blood was taken by venepuncture using a hypodermic syringe from the anti-cubital vein into plain and heparinized containers. HIV status was determined by Genescreen ELISA (Biorad, France). HIV antibody-positive individuals were confirmed using Immunocomb II HIV-1 and 2 Confirm kit (Orgemics, Israel) on a fresh sample. Plasma total antioxidant status (TAS) levels were determined using a commercial kit (Randox, UK). CD4⁺ T-cell count was determined by a standard commercial method (Dynabeads, France). The results were analysed using Elilinfo 6.04 Statistical package. The data were summarised as mean \pm SD and compared by Mann Whitney U test for non-normally distributed data. Differences between the mean results for the groups was inferred to be significant at $P < 0.05$.

Results

Table 1: plasma total antioxidant status (TAS) and CD4⁺ Count results for the patients studied in Maiduguri and environs

Group	TAS Value		CD4 Count
	n	(mmol/L)	(/mm ³)
Diarrhoeal patients	151	0.23 \pm 0.11	186 \pm 2.3
Non-Diarrhoeal patients	120	0.37 \pm 0.19	190 \pm 3.5

U=412.500, p=0.000

151 HIV/AIDS patients with diarrhoeal diseases had mean plasma total antioxidant status level of 0.23 \pm 0.11mmol/L and mean CD4⁺ count of 186 \pm 2.3. The HIV patients without diarrhoeal diseases had mean plasma TAS level of 0.37 \pm 0.19 and CD4⁺ count of 193.0 \pm 35 (table 1). The differences in the mean TAS results between the two groups was statistically significant, (u = 412.500, p = 0.000).

Discussion

This study provides evidence that plasma total antioxidant status is more depleted in HIV patients with diarrhoeal disease compared to these without diarrhoeal. This finding is consistent with a previous cross-sectional data from a Cohort study showing that diarrhoeal was associated with severe malnutrition and HIV -1 infection¹⁰. There is palpable poverty and poor socioeconomic conditions in the area of the study. The basic example diet among the peasant inhabitants of

the local community are mainly carbohydrate in nature- rice, maize and rarely, beans. Some of the increased risk of death among the infants with HIV-1 infection may be attributable to the effects of malnutrition. Poor nutrition had earlier been reported to be related to the occurrence of both recurrent¹² and persistent^{13,14} diarrhoea in populations without HIV-infection, and it is a reported risk factor for death from persistent diarrhoea¹⁵.

Antioxidants are compounds with chemical affinity for free radicals. They exist in abundance in nature. Antioxidants are reported¹¹, to be classes- enzymes such as catalases; peroxidases and superoxide dismutases; peptides such as glutathione; phenolic compounds like vitamin E and plant flavonoids; nitrogen compounds which includes various amino acids carotenoids, most notably beta- Carotene thus part of nutrition.

The HIV patients used in the study had low CD4+ counts. Whether this increase immunosuppression was due entirely to the effects of HIV infect itself or was in part due to the effects of resulting malnutrition is not clear. However the cyclic effects of diarrhoea, malnutrition and immune dysfunction can produce an accelerated downward course in the patients. By the results of this study, it is recommended that new management strategies for HIV/AIDS patients recognise the importance of plasma total antioxidant status.

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References

1. Keusch, G.T. (1990). Malnutrition, Infection and Immune Function. Nestle Nutrition, In: Suskind, R.M., Le Winter-Suskind, L. ed. The Malnourished Child. Workshop Series. Vevey, Switzerland, 19:37-55.
2. Keusch, G.T., Wilson, C.S. and Waksal, S.D. (1983). Nutrition, Host Defenses, and the Lymphoid System, In: Gallin, J.I. & Fauci, A.S. eds. Advances in Host Defense Mechanisms. Lymphoid Cells. Raven Press, New York. 2:275-359.
3. Ofosu-Barto, K. (1998). The Current Global Status of the HIV/AIDS Epidemic: What are the Driving Forces. First National AIDS Conference. Abuja, December 15-18.
4. Baruched, S. And Wainberg, M.A. (1992). The Role of Oxidative stress in Disease Progression in Individuals Infected by HIV. *J. Leukoc. Biol.*, 52: 111-114 (Abstract).
5. Israel, N. And Gougerot-Pocidallo, M.A. (1997). Oxidative Stress in Human Immunodeficiency Virus Infection. *Cell Mol. Life Sci.* 53: 864-870.
6. Nsanga, B., Ryder, R., Nsuami, M., Matela, B. and Nsa, W. (1989). High HIV-associated Infant Mortality Correlates with Poor Post-partum Maternal Health: 18 months Follow-up of 477 Children Born to HIV Positive Mother in Zaire, In: Proceedings of the 5th International Conference on AIDS. Montreal. June 4-9:324 (Abstract).
7. Malek, A.N.A., Mukelabai, K. and Luo, N.P. (1989). HIV Disease in Infants and Children: 22-Month Prospective Study, In: Proceedings of the 5th International Conference on AIDS, Montreal. June 4-9:392 (Abstract).
8. Hira, S.K., Kamnga, J. and Bhat, G.J. (1989). Perinatal Transmission of HIV-1 in Zambia. *BMJ*, 299: 2853-2859.
9. World Health Organisation (1984). Programme for Control of Diarrhoeal Diseases: a Manual for the Treatment of Acute Diarrhoea for use by Physicians and other Senior Health Workers. Geneva.
10. Pavia, A.T., Long, E.G. and Ryder, R.W. (1992). Diarrhoea among African Children Born to HIV-1 Infected Mothers: Clinical, Microbiologic and Epidemiologic Features. *iPediatr. Infected Disease Journal*, 11: 996-1003.
11. Diplock, A. (1991). Antioxidant Nutrients and Disease Prevention: an Overview. *Am. J. Clin. Nutr.*; 53: 189s-193s
12. Sepulveda, J., Willet, W. and Munoz, A. (1998). Malnutrition and Diarrhoea: a Longitudinal Study among Urban Mexican Children. *am. j. Epidemiol.*; 127: 365-376.
13. Black, R.E., Brown, K.H. and Becker, S. (1984). Malnutrition is a Determining Factor in Diarrhoeal Duration, but not Incidence, among Young Children in a Longitudinal Study in Rural Bangladesh. *Am. J. Clin. Nutr.*; 39: 87-94.
14. Bairagi, R., Chowdhury, M.K., Kim, Y.J., Curlin, G.T. and Gray, R.H. (1987). The Association Between Malnutrition and Diarrhoea in Rural Bangladesh. *Int. J. Epidemiol.*; 16: 477-481.
15. Centre for Disease Control (1992/1993). Revised Classification System for HIV Infection and Expanded Surveillance Case Definitions of AIDS among Adolescents and Adults. *Morbidity and Mortality Weekly Report*; 41(RR-17): 1-19.

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