

Recovery of Aplastic Anemia Complicated by HIV Infection after Oxymetholone Therapy: A Case Report

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Abstract: Aplastic anemia is a hematopoietic stem cell defect possibly due to an autoimmune process. It is characterized by the combination of peripheral pancytopenia and the hypocellular bone marrow. Besides the horse antithymocyte globulin with cyclosporine or the stem cell transplantation, oxymetholone, the synthetic androgen, is also allowed to be the alternative treatment for non-severe aplastic anemia. And herein, the role of oxy-metholone as the treatment of aplastic anemia complicated by the human immunodeficiency virus (HIV) infection is reported. The patient was a 40-year-old Thai vendor who presented with the pancytopenia, Hb 7.1 g%, WBC 2,700/mm³, platelet 7,000/mm³, N 23 %, L 62 %, reticulocyte 0.8 % and diffuse medullary aplasia in the bone marrow. He was diagnosed as aplastic anemia and treated with oxymetholone 150 mg a day and on demand blood transfusion if Hb concentration less than 7.0 g%. Two years later, HIV antigen/antibody was tested and found positive. The CD4 count was 437/mm³ or 31 % and the anti-retroviral therapy was not initiated. Every year, the hematologic parameters as well as CD4 count were gradually increased every year during the long term oxymetholone therapy until transfusion was finally unnecessary although the viral load had never been studied through the follow-up period. The present hematologic parameters were: Hb 13.0 g%, WBC 5,300/mm³, platelet 24,000/mm³, and CD4 526/mm³. Our case seemed to slowly increase the CD4 count during the oxymetholone treatment without side effects although the anti-retroviral therapy was withheld.

Key words: Aplastic Anemia, HIV Infection, Oxymetholone

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บทคัดย่อ: **ไขกระดูกฝ่อที่แทรกซ้อนด้วยการติดเชื้อเอชไอวีดีขึ้นหลังการรักษาด้วยอ็อกซีเมโธโลน: รายงานผู้ป่วย 1 ราย**

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โรคไขกระดูกฝ่อ เป็นโรคของเซลล์ต้นกำเนิดเม็ดเลือด เชื่อว่าเกิดจากขบวนการภูมิคุ้มกันต่อต้านตนเองเป็นหลัก ผู้ป่วยจะมีลักษณะที่สำคัญคือ เม็ดเลือดขาว เม็ดเลือดแดง และเกล็ดเลือดต่ำ ร่วมกับเซลล์ต้นกำเนิดเม็ดเลือดในไขกระดูกน้อยลง การรักษานอกจะให้ horse antithymocyte globulin ร่วมกับ cyclosporine หรือการปลูกถ่ายเซลล์ต้นกำเนิดแล้ว อาจจะใช้อ็อกซีเมโธโลนซึ่งเป็นฮอร์โมนเพศชายสังเคราะห์รักษาก็ได้ ถ้าผู้ป่วยไม่ถึงขั้นเป็นไขกระดูกฝ่อแบบรุนแรงและในรายงานนี้เป็นการใช้อ็อกซีเมโธโลนรักษาโรคไขกระดูกฝ่อที่ถูกรักษาด้วยวิธีการติดเชื้อ human immunodeficiency virus (HIV) ซึ่งเป็นผู้ป่วยชายไทย อายุ 40 ปี อาชีพขายของเร่ ตรวจพบ pancytopenia, Hb 7.1 กรัม%, WBC 2,700/มม.³, platelet 7,000/มม.³, N 23 %, L 62 %, reticulocyte 0.8 % ร่วมกับไขกระดูกฝ่อ จึงให้การวินิจฉัยว่าเป็นโรคไขกระดูกฝ่อ และรักษาด้วยอ็อกซีเมโธโลน 150 มิลลิกรัมต่อวัน และให้เลือดทุกครั้งที่มีค่าความเข้มข้น Hb ต่ำกว่า 7.0 กรัม% 2 ปีถัดมา ผลตรวจเลือดพบว่า HIV antigen/antibody ให้ผลบวกและ CD4 count ได้ 437/มม.³ หรือ ร้อยละ 31 ยังไม่ได้เริ่มการรักษาด้วยยาต้านไวรัสเอชไอวี นัดตรวจอาการและตรวจเลือดบ่อย ๆ พบว่าในระหว่างที่กินยาอ็อกซีเมโธโลนเป็นเวลานาน ผลเลือดค่อย ๆ ดีขึ้นทุกปี เช่นเดียวกับค่า CD4 count จนสุดท้ายผู้ป่วยก็ไม่จำเป็นต้องรับเลือดอีกต่อไป แต่ในระหว่างนี้ ผู้ป่วยไม่ได้รับกาตรวจหา viral load ผลตรวจเลือดปัจจุบันคือ Hb 13.0 กรัม%, WBC 5,300/มม.³, platelet 24,000/มม.³ และ CD4 526/มม.³ ดูเหมือนว่าผู้ป่วยรายนี้มีค่า CD4 count เพิ่มขึ้นอย่างช้า ๆ ราวกับตอบสนองต่อการรักษา ด้วยอ็อกซีเมโธโลนโดยไม่มีผลข้างเคียงใด ๆ แม้ว่ายาต้านไวรัสจะยังไม่ได้เริ่มก็ตาม

คำสำคัญ: ไขกระดูกฝ่อ, การติดเชื้อเอชไอวี, อ็อกซีเมโธโลน

Introduction

Aplastic anemia (AA) is mainly an acquired hematopoietic stem cell defect leading to the decreased hematopoietic cell precursors in the bone marrow and the peripheral pancytopenia. Its basic pathogenesis is believed to be an immune mediated, viz., the autoreactive lymphocytes mediating the destruction of hematopoietic stem cells. Exposures to drugs,

viruses, and toxins, are thought to trigger the aberrant immune response in some patients, but most cases are classified as idiopathic⁽¹⁾. And the important treatment for the patients with severe aplastic anemia, reticulocyte <20,000/mm³, neutrophil <500/mm³, platelet <20,000/mm³ and the cellularity <25 % in the bone marrow⁽²⁾, includes the horse antithymocyte globulin with cyclosporine, the stem cell transplanta-

tion in cases of the younger age group and the available compatible donors⁽³⁾.

Oxymetholone is a synthetic androgen which has been accepted by the US FDA for treating the patients with inadequate production of the red blood cells due to the bone marrow failure such as aplastic anemia, congenital or acquired⁽⁴⁾, and sickle cell anemia⁽⁵⁾. Other indications include the fatigue and wasting in HIV-infected persons⁽⁶⁾. Herein, the role of oxymetholone in the treatment of the patient with aplastic anemia who was complicated by HIV infection was reported.

Case Report

A 40-year-old Thai man was found to recover nearly completely from aplastic anemia and CD4 lymphocytopenia during HIV infection after oxymetholone therapy for many years, viz., the blood tests were: Hb 13.0 g% Hct 40.6 %, WBC 5,300/mm³, platelet 24,000/mm³.

Five years ago, he was definitely diagnosed as having aplastic anemia based on the combination of the peripheral pancytopenia and the diffuse medullary aplasia in the bone marrow biopsy, Hb 7.1 g%, WBC 2,700/mm³, platelet 7,000/mm³, N 23 %, L 62 %, reticulocyte 0.8 %, MCV 97.9 fL, MCH 32.9 pg, serum erythropoietin >200 mU/ml (normal 2.6-34.0), normal liver and kidney function tests, albumin 4.2 g%, globulin 3.2 g% and negative for HIV antibody test. And he was treated with oxymetholone 150mg a day. He regularly attended our clinic every 1-3 months and he would be transfused if his Hb concentration was less than 7.0 g%.

Three years ago, he was tested and found to have positive HIV antigen/antibody, negative

for VDRL, HBsAg, anti-HCV and anti-HAV IgM whereas the simultaneous CD4 count was 437/mm³ or 31 %. The anti-retroviral therapy was not initiated while the oxymetholone therapy was still continued. And his hematologic parameters including the CD4 count were gradually improved as shown in the table.

	Hb (g%)	WBC (/mm ³)	Platelet (/mm ³)	CD4 (/mm ³)
2010	7.1	2,700	7,000	-
2011	6.6	2,200	4,000	-
2012	7.3	2,800	14,000	437
2012	9.1	3,800	14,000	439
1014	10.2	3,800	20,000	460
2015	13.0	5,300	24,000	526

One year after the HIV infection was recognized, he did not need the blood transfusion. When his Hb concentration was normalized (Hb 13 g%), the dose of oxymetholone was lowered to be 100 mg a day and he could maintain his Hb and the WBC count within the normal ranges although the platelet count was still markedly low. Although the antiretroviral therapy was not initiated, the CD4 count was gradually increased every year.

For the side effects of oxymetholone, no gynecomastia was noticed. The body weight, the liver function and kidney function tests were not changed during the long term therapy.

Discussion

In HIV-infected persons, AA can be more commonly found because the HIV can indirectly damage the hematopoietic stem cells in the bone marrow leading to the decreased production of one, two or all cell lines resulting in AA^(7,8). On the other hand, the aplastic anemia patients always need frequent blood

transfusion and this can contribute the risk of HIV infection even in cases of HIV-negative blood^(9,10).

In the study of 31 patients with idiopathic or drug-induced AA, oxymetholone, 3-5 mg/kg/day for 2 months and then 1.5-2 mg/kg/day, were found clinically and hematologically effective, 10 with partial remission and 1 with complete remission⁽¹¹⁾. Our case was firstly diagnosed as AA although he was later complicated by HIV infection, the long term oxymetholone therapy could still induce partial remission of AA.

During long term oxymetholone therapy, the CD4 count is gradually increased every year until it is more than 500/mm³ although the HAART therapy has never been initiated. In the study of oxymetholone 50 mg a day in conjunction with testosterone replacement in HIV-infected men, it does not affect the CD4 level⁽¹²⁾. On contrary, oxymetholone 50 mg a day in combination with proteinase inhibitors can increase CD4 value overtime⁽¹³⁾. While in the double-blind, randomized, placebo-controlled trial of oxymetholone for HIV-related wasting syndrome, the increase of CD4 is found in the oxymetholone 100 mg a day group but not found in the 150 mg a day of oxymetholone group or placebo group and the investigators conclude that the increment is the effect of the intensification of HAART⁽¹⁴⁾. However, the effect of oxymetholone 100-150 mg a day for the augmentation of the CD4 in HIV-infected patients should be verified in the further extensive studies.

Oxymetholone is demonstrated to increase the body weight as compared with the placebo in cases with eugonadal males and females with HIV infection⁽¹⁴⁾ but the body weight as well as other side effects was not changed in our case.

Conclusion

A 46-year-old Thai man was definitely diagnosed as having aplastic anemia and treated with oxymetholone 150 mg a day. Two years later he was found to have an HIV infection, oxymetholone was still continued but HAART was not initiated. One year later, the Hb concentration and the WBC became normal whereas the CD4 count was gradually increased every year and they were presumed to be due to the direct effect of oxymetholone itself.

References

1. Brodsky RA, Jones RJ. Aplastic anemia. *Lancet* 2005; 365: 1647-56.
2. Camitta BM, Storb R, Thomas ED. Aplastic anemia (first of two parts): pathogenesis, diagnosis, and prognosis. *N Engl J Med* 1982; 306: 645-52.
3. Marsh JCW, Ball SE, Cavenagh J, Darbyshire P, Dokal I, Gordon-Smith EC, et al. Guidelines for the diagnosis and management of aplastic anemia. *Br J Haematol* 2009; 147: 43-70.
4. Alexanian R, Nadell J, Alfrey C. Oxymetholone treatment for the anemia of bone marrow failure. *Blood* 1972; 40: 353-65.
5. Alexanian R, Nadell J. Oxymetholone treatment for sickle cell anemia. *Blood* 1975; 45: 769-77.
6. Pavlatos AM, Fultz O, Monberg MJ, Vootkur A. Review of oxymetholone: a 17 alpha-alkylated anabolic-andro-genic steroid. *ClinTher* 2001; 23: 789-801.
7. Kyeyune R, Saathoff E, Ezeamama AE, Löscher T, Fawzi W, Guwatudde D. Prevalence and correlates of cytopenias in HIV-infected adults initiating highly active antiretroviral therapy in Uganda. *BMC Infect Dis* 2014; 14: 496. doi: 10.1186/1471-2334-14-496.
8. Scadden DT, Shen H, Cheng T. Hematopoietic stem cells in HIV disease. *J Natl Cancer Inst Monogr* 2001; 28: 24-9.

9. Isarangkura P, Chiewsilp P, Tanprasert S, Nuchprayoon C. Transmission of HIV infection by seronegative blood in Thailand. *J Med Assoc Thai* 1993; 76 Suppl 2: 106-13.
10. Costa AS, BrasilienseDM. HIV seroconversion in blood donors from coordinating blood bank in the State of Para. *Rev Bras Hematol Hemoter* 2011; 33: 342-6.
11. Mir MA, Delamore IW. Oxymetholone in aplastic anemia. *Postgrad Med J* 1974; 50: 166-71.
12. Cohan G, Fields-Gardner C. Pilot study of oxymetholone in conjunction with testosterone replacement in HIV+ men. *J Acad Nutr Dietetics* 1999; 99: A14.
13. Urbina A, Miller M, Hance I. Oxymetholone as therapy to maintain body composition in HIV positive men. CD Only: The XV International AIDS Conference: Abstract no. B12432
14. Hengge UR, Stocks K, Faulkner S, Wiehler H, Lorenz C, Jentzen W, et al. Oxymetholone for the treatment of HIV-wasting: a double-blind, randomized, placebo-controlled phase III trial in eugonadal men and women. *HIV Clin Trials* 2003;4:150-63.