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4th generation HIV testing false positivity by Siemens ADVIA Centaur® XP: a retrospective study

[Siemens ADVIA Centaur® XP ile dördüncü kuşak HIV testi yalancı pozitiflik: bir retrospektif çalışma]

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ABSTRACT

4th generation HIV assay evolved to include both HIV antibodies and p24 antigen. There has been much recent debate to use this new chemiluminometric assay for primary testing in low prevalence populations. Higher false-positive and false-negative rates were also obtained from this assay pointing out the p24 portion of the test. This paper describes a retrospective evaluation of patient records for HIV positivity from Siemens ADVIA Centaur® XP 4th generation assay in a physical medicine and rehabilitation training and research hospital. The HIV positive results were compared with another 4th generation HIV assay (Roche Diagnostics HIV combi assay). Furthermore, Western Blot analysis was performed if a suspicious result was obtained.

Key Words: Advia, 4th generation, HIV, false positive
Conflict of Interest: Author has no conflict of interest.

ÖZET

4. kuşak HIV testi hem HIV antikorlarını hem de p24 antijenini kapsayacak şekilde geliştirilmiştir. Yakın zamanda prevalansı düşük olan popülasyonlarda bu yeni kemilüminesans testi kullanma konusunda tartışmalar olmaktadır. Yüksek yalancı pozitif ve yalancı negatif oranların elde edilmesi dikkati testin p24 kısmına çekmiştir. Bu makale, 4. kuşak Siemens ADVIA Centaur® XP kullanan bir fizik tedavi ve rehabilitasyon eğitim ve araştırma hastanesindeki hasta kayıtlarının HIV pozitifliği için retrospektif incelenmesini sunmaktadır. HIV pozitif sonuçlar bir diğer 4. kuşak test ile kıyaslanmış (Roche Diagnostics HIV combi assay). Ayrıca, şüpheli bir sonuç elde edildiğinde Western Blot testi yapılmıştır.

Anahtar Kelimeler: Advia, 4. kuşak, HIV, yalancı pozitif
Çıkar Çatışması: Yazarın çıkar çatışması bulunmamaktadır.

Introduction

4th generation HIV assays, generally known as combo assays, entered practice in 2010 after FDA approval. Main difference from its former version is the test now can detect p24 antigen which permits earlier detection of infection. Various companies introduced their combo assays for their immunoassay systems: Siemens HIV antigen/antibody (Ag/Ab) Combo Assay for Siemens ADVIA Centaur® XP (ADVIA); and Roche Diagnostics HIV combi assay for Roche Modular Analytics E170 (Roche). ADVIA uses antigen-bridging, magnetic-microparticle chemiluminometric immunoassay for: HIV-1 groups M and O antibodies; and HIV-2 antibodies; and HIV-1 p24 antigen. Roche uses electrochemiluminescence immunoassay for same antibodies and antigen. The results from both systems are expressed in index values and an index value higher than 1.0 is commonly considered initial positive. This initial positive sample is repeatedly tested in duplicate and then if either or both replicates a positive result, the sample then considered repeatedly positive. Afterwards, confirmation of HIV status is made by Western Blot (WB) analysis with or without the need of RNA Nucleic Acid Amplification test depending on the WB result.

Discussion

Very low false-positive and false-negative rates for ADVIA were recently reported (Sensitivity: 100%; 95% confidence interval: 99.39-100.00%. Specificity: 99.74%; 95% confidence interval: 99.60-99.84%) [1]. On the other hand, a study performed in UK with a 4th generation HIV POCT kit showed high false positive results for p24 portion of the kit and authors suggested using a 3rd generation HIV kit for outreach testing and with a backup of 4th generation laboratory-based EIA for high-risk individuals [2]. Hence the only difference between 3rd and 4th generation HIV assays is 4th generation having additional antibodies for p24, the probability of cross-reaction to self or external source antigens, antibodies or peptides is higher.

A retrospective cohort evaluation of patient records in a physical medicine and rehabilitation training and research hospital from September 1, 2011 to December 12, 2011 gave out 4 samples with repeatedly positive EIA results with ADVIA in 831 samples. 3 of the patients had index values between 1.0 and 2.0 and one patient had 11.5. These 4 samples had additional testing with Roche which showed non-reactive results. The sample with index value of 11.5 also underwent WB analysis. The result was negative for HIV infection.

The 4 false positive results from ADVIA indicate a lower specificity compared to Roche. Key points causing this are thought to be differences in detection systems and discrete antibodies, antigens and peptides used. The above situation suggests, although both assays are 4th generation, ADVIA has a higher false positive rate and results must be confirmed with another test before reporting as positive for HIV infection, especially if the patient has a low risk for HIV infection.

Conclusion

Reporting HIV positive results gives responsibility to the laboratory. False positive results may cause problems. Clinicians who are not familiar with similar cases may blame laboratory for false positive results. Laboratory directors should regularly give feed-back to clinicians about tests run in the laboratory and their performance data.

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Conflict of interest

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References

[1] Pumarola T, Freeman J, Saxton E, et al. Performance evaluation of the ADVIA Centaur® HIV Ag/Ab Combo assay. J Virol Methods. 2010 Dec;170(1-2):16-20.

[2] Taegtmeyer M, Macpherson P, Jones K, et al. Programmatic Evaluation of a Combined Antigen and Antibody Test for Rapid HIV Diagnosis in a Community and Sexual Health Clinic Screening Programme. PLoS One. 2011;6(11):e28019.