Occurrence of HBV/HIV coinfection by laboratory values in Roma, Lesotho

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Abstract

Objective This study was an assessment of the coinfection status of patients with human immunodeficiency virus (HIV) and hepatitis B virus (HBV) in Lesotho, and this has been rarely reported.

Methods This was a retrospective study, in a laboratory setting, on HBV/HIV coinfection among 304 HIV-positive patients who were screened for HBsAg in St Joseph's Hospital records between March 2011 and December 2013. Demographic characteristics, HIV status, indications for HBsAg screening, HBsAg results and liver function test results including alanine transaminase (ALT), aspartate transaminase (AST) and alkaline phosphatase were reviewed from the patient and laboratory registers.

Results In this study 10.5% of 304 HIV-positive patients had HBV/HIV coinfection. With respect to gender, males had a significantly higher ($p=0.048$) rate of HBV/HIV coinfection in this study. Increased levels of ALT ($p=0.013$) and AST ($p=0.014$) were significantly associated with HBV/HIV coinfection status.

Conclusion Gender and liver function tests are important predictors for HBV/HIV coinfection. Screening for HBV coinfection in HIV-positive patients is recommended.

Keywords Hepatitis B, HBsAg, HIV, Lesotho

Introduction

Coinfection with human immunodeficiency virus-1 (HIV) and hepatitis B virus (HBV) is estimated at 10% in the HIV-infected population worldwide.¹ Rates of coinfection have been reported to be as high as 25% in HIV-endemic areas in southern Africa.¹ People coinfecting with HBV and HIV have higher levels of HBV viremia, immune reconstitution to HBV and faster progression to liver-related liver cirrhosis and hepatocellular carcinoma.^{2,3}

Whilst the prevalence of HIV in Lesotho is estimated at 23%,⁴ the prevalence of HIV in the Roma area of Lesotho is estimated at 27%.⁵ Data on HIV/HBV coinfection in this population are scarce. The study assessed the prevalence of HBV in HIV-positive patients and the predictors of HBV/HIV coinfection in the Roma area of Lesotho.

Methods

Study design and data collection

In this retrospective study, routine laboratory records for HIV-positive patients on antiretrovi-

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ral treatment over 5 years (March 2011-Dec 2013) were reviewed. Out of 6000 patients, 304 HIV-positive patients who had signs of liver disease, defined as jaundice or elevated liver enzymes (alanine transaminase – ALT, aspartate transaminase – AST and alkaline phosphatase – ALP), were screened for hepatitis B at St Joseph's Hospital using Dialab® HBsAg ELISA kit (Dialab GmbH, Vienna, Austria) that detects all HBV genotypes and subtypes. St Joseph's Hospital is a district hospital serving the Roma rural area. The Roma constitutes about 6% of Lesotho's population.⁵ Lesotho (GPS coordinates: L29° 30'S, L28° 30'E) is a small landlocked country completely surrounded by South Africa.

Demographic characteristics, HIV status, indications for HBsAg screening, HBsAg results, latest CD4 count, and liver function tests (LFT) results including ALT, AST and ALP were collected from the patient and laboratory register at St Joseph's Hospital.

The study was approved on the 20th of January 2014 (ID15-2014) by the Ministry of Health of Lesotho. All ethical considerations were observed during data collection.

Statistical analysis

Data was analyzed using STATA® version 12 (StataCorp, Texas, USA). The demographic variables such as age and gender were summarized and the proportion of HBV/HIV coinfecting patients calculated. LFT results of HBV/HIV coinfecting patients were compared to those of non-coinfecting HIV-positive patients using *t*-test. Tests of association between HBV/HIV coinfection status and demographic variables were performed using Fischer's exact test. In addition, HBV/HIV coinfection status was cross tabulated against indications for HBsAg screening.

Results

In total, 304 patients were included in the study. The ages of the patients ranged from 14 to 67. The median age was 35.6 (IQR: 28-41). The proportion of males was 47% (n=143) and that of females was 53% (n=161). Out of the 304 HIV positive patients, 32 (10.5%) patients were

HBsAg positive. Among the 32 HBsAg positive patients only 16 had presented at screening with jaundice.

The mean ALT, AST and ALP levels were 41.7 IU/L (IQR: 17-35), 47.9 IU/L (IQR: 23-43) and 92.1 IU/L (IQR: 59-106), respectively. The Table presents the distribution and association of test variables versus HBV/HIV coinfection status. With respect to gender, males had a significantly higher ($p=0.048$) rate of HBV/HIV coinfection in this study. Increased levels of ALT ($p=0.013$) and AST ($p=0.014$) were significantly associated with HBV/HIV coinfection status. Age ($p=0.280$), ALP ($p=0.120$) and CD4 count ($p=0.792$) were not significantly associated with either HBV/HIV coinfection or the HIV-1 mono-infection group (Table).

Table. Comparison between test variables and HBV/HIV coinfection status

Variable	HBsAg negative (n=272)	HBsAg positive (n=32)	p-value ^a
Age (Y), mean (IQR)	35.4 (28-40)	37.3 (32-43)	$p=0.280$
Gender, male (%)	123 (86.0)	20 (14.0)	$p=0.048^{**}$
Gender, female (%)	149 (92.6)	12 (7.4)	$p=0.048^{**}$
ALT, mean [95% CI]	28.4 [25.7-31.1]	46.6 [32.8-60.4]	$p=0.013^{**}$
AST, mean [95% CI]	35.5 [32.6-38.5]	62.6 [41.8-83.4]	$p=0.014^{**}$
ALP, mean [95% CI]	90.4 [82.4-98.4]	110.5 [85.8-135.3]	$p=0.120$
^b CD4, mean [95% CI]	246.7 [170.6-322.7]	264.8 [134.6-394.9]	$p=0.792$

^a*p*-values for categorical and continuous variables were calculated using Fischer's exact test and *t*-test respectively; ^{**}Significant *p*-values; ^bCD4 = CD4 count in cells/cmm. ALT, AST and ALP are in IU/L.

ALP – alkaline phosphatase; ALT – alanine transaminase; AST – aspartate transaminase; CI – confidence interval; Y – years

Discussion

The occurrence of HBV/HIV coinfection in this study was 10.5% out of the total number of 304 HIV-positive patients. The national prevalence of HBV/HIV coinfection reported in 2010 in Lesotho was 5.5% (2.8%-9.6%, n=205).⁶ The higher occurrence of HBV/HIV coinfection in the Roma area of Lesotho could be due to the high prevalence of HIV (27%)⁵ in the Maseru district where Roma is located. The occurrence of HBV/HIV coinfection in this study was higher than the one reported in Swaziland,⁷ where 5.1% (n=782) of adults included in the study were HBV/HIV coinfecting. In South Africa an HBV/HIV coinfection rate of 10.0%⁸ was reported in 2012.

In Malawi where the national prevalence of HIV is reported to be 14%,⁹ HBV/HIV coinfection was reported to be as high as 20.4% (n=226) in one study.¹⁰ In Kenya where the prevalence of HIV-1 is about 14.3%,¹¹ another study¹² reported a prevalence of 6% (n=378). In West Africa, Cameroon, where there was a reported HIV prevalence of 3.1%¹³ in 2007, 12.6% (95% CI 10.1-15.1, n=690)¹⁴ had HBV/HIV coinfection.

With respect to gender, males had a significantly higher (p=0.048) rate of HBV/HIV coinfection in this study. According to the Lesotho Demographic and Health Survey 2009,⁵ more women (27%) in Lesotho are HIV-positive compared to 18% of men. Therefore the results of this study may suggest that more males have HBV/HIV coinfection despite them having lower rates of HIV infection. However, another study in Lesotho⁶ reported that the rate of HBV/HIV coinfection was independent of gender.

CD4 count was not significantly different between the HBV/HIV coinfection and HIV-1 mono-infection groups in this study. Another study in Lesotho⁶ also found no significant difference in the CD4 count between HBV/HIV coinfection and HIV-1 mono-infection groups.

HBV/HIV coinfecting patients in this study had significantly higher levels of ALT (p=0.013) and AST (p=0.014) compared to HIV-1 mono-infected patients. According to a study in Kenya,¹⁵ HBV/HIV coinfecting women have a higher risk for abnormal ALT elevations

compared to HIV-1 mono-infected women (HR 2.37; 95% CI 1.1-5.3). In Nigeria,¹⁶ HBV/HIV coinfecting patients had impaired liver function enzymes more than the controls (p=0.04). ALP was also significantly higher in the HBV/HIV coinfection group than in the HIV-1 mono-infection group. However, ALP was not significantly (p=0.120) raised in the HBV/HIV coinfection group.

The major limitation in this study was the possibility of confounding variables in the testing of association between HBV/HIV coinfection and the test variables. The other limitation was that the study did not confirm HBsAg results with HBV DNA tests. However, this study highlights the high risk of HBV/HIV coinfection among the HIV-positive patients in Lesotho.

Conclusion

There is a high risk of HBV coinfection in HIV-positive patients in the Roma area of Lesotho. The risk of HBV coinfection is higher among HIV-positive males and HIV-positive patients with raised ALT and AST. Gender and liver function tests are important predictors for HBV/HIV coinfection. Screening for HBV coinfection in HIV-positive patients is recommended.

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Authors' contributions statement: All authors contributed equally to study design, implementation and analysis.

Conflicts of interest: All authors – none to declare.

References

1. Thio CL. Hepatitis B and human immunodeficiency virus coinfection. *Hepatology*. 2009;49:S138-45. [[CrossRef](#)] [[PubMed](#)]
2. Kourtis AP, Bulterys M, Hu DJ, Jamieson DJ. HIV-HBV coinfection—a global challenge. *N Engl J Med*. 2012;366:1749-52. [[CrossRef](#)] [[PubMed](#)]
3. Hoffmann CJ, Thio CL. Clinical implications of HIV and hepatitis B co-infection in Asia and Africa. *Lancet Infect Dis*. 2007;7:402-9. [[CrossRef](#)] [[PubMed](#)]
4. Government of Lesotho (GoL). 2012. Lesotho global AIDS response report. Accessed on: March 05, 2014. Available at: http://www.unaids.org/sites/default/files/country/documents/ce_LS_Narrative_Report%5B1%5D.pdf

5. Ministry of Health and Social Welfare (MOHSW) [Lesotho] and ICF Macro. 2010. Lesotho Demographic and Health Survey 2009. Maseru, Lesotho: MOHSW and ICF Macro. Accessed on: June 01, 2014. Available at: http://pdf.usaid.gov/pdf_docs/PNADU407.pdf
6. Rabenau HF, Lennemann T, Kircher C, et al. Prevalence- and gender-specific immune response to opportunistic infections in HIV-infected patients in Lesotho. *Sex Transm Dis*. 2010;37:454-9. [[CrossRef](#)] [[PubMed](#)]
7. Dziuban EJ, Marton SA, Hughey AB, Mbingo TL, Draper HR, Schutze GE. Seroprevalence of hepatitis B in a cohort of HIV-infected children and adults in Swaziland. *Int J STD AIDS*. 2013;24:561-5. [[CrossRef](#)] [[PubMed](#)]
8. Mayaphi SH, Roussow TM, Masemola DP, Olorunju SA, Mphahlele MJ, Martin DJ. HBV/HIV co-infection: the dynamics of HBV in South African patients with AIDS. *S Afr Med J*. 2012;102:157-62. [[PubMed](#)]
9. Chimphambano C, Komolafe I, Muula A. Prevalence of HIV, HepBsAg and Hep C antibodies among inmates in Chichiri prison, Blantyre, Malawi. *Malawi Med J*. 2007;19:107-10. [[PubMed](#)] [[FullText](#)]
10. Nyirenda M, Beadsworth MB, Stephany P, et al. Prevalence of infection with hepatitis B and C virus and coinfection with HIV in medical inpatients in Malawi. *J Infect*. 2008;57:72-7. [[CrossRef](#)] [[PubMed](#)]
11. Foglia G, Saterren WB, Renzullo PO, et al. High prevalence of HIV infection among rural tea plantation residents in Kericho, Kenya. *Epidemiol Infect*. 2008;136:694-702. [[CrossRef](#)] [[PubMed](#)] [[FullText](#)]
12. Harania RS, Karuru J, Nelson M, Stebbing J. HIV, hepatitis B and hepatitis C coinfection in Kenya. *AIDS*. 2008;22:1221-2. [[CrossRef](#)] [[PubMed](#)]
13. Torimiro JN, Wolfe ND, Thomas A, et al. Frequency of CCR5 variants among rural populations with low HIV-1 prevalence in Cameroon. *AIDS*. 2007;21:527-8. [[CrossRef](#)] [[PubMed](#)]
14. Zoufaly A, Onyoh EF, Tih PM, Awasom CN, Feldt T. High prevalence of hepatitis B and syphilis co-infections among HIV patients initiating antiretroviral therapy in the north-west region of Cameroon. *Int J STD AIDS*. 2012;23:435-8. [[CrossRef](#)] [[PubMed](#)]
15. Day SL, Odem-Davis K, Mandaliya KN, et al. Prevalence, clinical and virologic outcomes of hepatitis B virus co-infection in HIV-1 positive Kenyan women on antiretroviral therapy. *PLoS One*. 2013;8:e59346. [[CrossRef](#)] [[PubMed](#)] [[FullText](#)]
16. Iroezindu MO, Agbaji OO, Daniyam CA, Isiguzo GC, Isichei C, Akanbi MO. Liver function test abnormalities in Nigerian patients with human immunodeficiency virus and hepatitis B virus co-infection. *Int J STD AIDS*. 2013;24:461-7. [[CrossRef](#)] [[PubMed](#)]

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