Analysis of the Validity of Urine LAM ELISA for Tuberculosis Infection

ABSTRACT

Objective: To explore the validity of urinary lipoarabinomannan (LAM) enzyme-linked immunosorbent assay (ELISA) assay technology for detecting MTB infection in the double infection of acquired immunodeficiency syndrome (AIDS) and human immunodeficiency virus-tuberculosis (HIV-TB) population with sputum-producing problems, and to explore the background value and medical reference value range of urinary LAM in the general population and people living with human immunodeficiency virus (HIV) or patients with acquired immunodeficiency syndrome (HIV/AIDS population). Method: About 307 individuals from the general population group, HIV/AIDS population group, TB population group and HIV-TB population group provided by Seventh Hospital of Tangshan city were selected for early morning urine analysis. LAM ELISA competition method and double antibody sandwich method were used to detect the concentration of LAM in urine. Standard curves of LAM optical density OD value were drawn. The differences in LAM concentration in different groups of urine were calculated, and the diagnostic validity of LAM ELISA techniques was explored. Result: (1) The corresponding curve formula of the ELISA competition method was $y = 1.696-0.087x+3.100/x2$; The corresponding curve formula for the double antibody sandwich method was $y = -0.205+0.587x-0.097x2 +0.001x3$. (2) In LAM ELISA competition method, the difference in LAM OD values between the TB population group and the general population group was statistically significant ($t = 3.393$, $p <0.05$), and the difference in LAM OD values between the HIV-TB population group and the HIV/AIDS population group was statistically significant ($t = 2.294$, $p <0.05$); The difference in LAM concentration between TB population group and general population group was statistically significant ($t = -4.642$, $p <0.05$), and the difference in LAM concentration between HIV-TB population group and HIV/AIDS population group was statistically significant ($t = -4.737$, $p <0.05$). In LAM ELISA double antibody sandwich method, there was a statistically significant difference in LAM OD values between TB population group and the general population group ($t = -2.566$, $p <0.05$), and there was a statistically significant difference in LAM OD values between HIV-TB population group and HIV/AIDS population group ($t = -3.212$, $p <0.05$); The difference in LAM concentration between TB population group and general population group was statistically significant ($t = -5.722$, $p <0.05$), and the difference in LAM concentration between HIV-TB population group and HIV/AIDS group was statistically significant ($t = -8.118$, $p <0.05$). (3) Receiver operating characteristic curve (ROC) curve analysis showed that in the LAM ELISA competition method, the SPE of TB infection in the HIV-TB population

group diagnosed with urine LAM was higher than those in TB population group, with a statistically significant difference ($F = 31.227$, $p < 0.05$). Compared to the general population group, LAM ELISA competition method SEN in TB population group was lower than that in the ELISA double antibody sandwich method, and the difference was statistically significant ($F = 15.667$, $p < 0.05$). Conclusion: The validity of urine LAM ELISA technology in the HIV-TB population group with TB infection was better than that in TB population group, and the validity of the LAM ELISA double antibody sandwich method was better than that in ELISA competitive method. The feasibility of urine LAM ELISA technology in HIV-TB was worthy of recognition, and the technology could be further improved and promoted.