Detection of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) in male urethral swabs after gamma-irradiation

Katie Bowden1, Christi Phillips1, Evelyn Nash1, Mary Jong Choi2, Deborah Cannon, John Klena, Shelley Brown, Pierre Rollin2, Aaron Kofman2, John Papp1

1Division of STD Prevention, Centers for Disease Control and Prevention (CDC), Atlanta, GA; 2Viral Special Pathogens Branch (VSPB), CDC, Atlanta, GA.

Introduction

Men who survive and recover from Ebola virus disease (EVD) can shed Ebola virus RNA in the semen for up to a year or longer after Ebola treatment unit discharge, requiring unique specimen handling and laboratory containment when testing for other sexually-transmitted diseases. Gamma-irradiation is the standard method for inactivation of Ebola virus specimens and has been shown to have little to no effect on amplification of nucleic acids from Staphylococcus aureus, Staphylococcus epidermidis, and Escherichia coli. There is no data on the prevalence of CT and NG in male EVD survivors or the impact of gamma-irradiation has on CT and NG nucleic acids. This study sets out to validate gamma-irradiation inactivation on CT and NG swabs using two FDA-approved CT/NG diagnostic platforms and to determine prevalence of CT and NG in male EVD survivors from Liberia. Data in this study support that gamma-irradiation did not affect sensitivity of either CT/NG assay.

Methods

• Serial dilutions for swab collection of CT serovar E (clinical isolate UW1090), CT serovar J (clinical isolate UW-3), and NG (ATCC 49226) were prepared in 1X PBS for testing on the Hologic AptaDNA Combo 2® and Cepheid Xpert® CT/NG platforms.
• One set of swabs for each assay and strain was subjected to gamma-irradiation (5x10^6 rads) in the CDC Viral Special Pathogens Branch laboratory according to a standard inactivation procedure and results were compared to non-gamma-irradiated swabs.
• To determine prevalence of CT and NG in male EVD survivors aged 18-69 years, 134 archived, gamma-irradiated urethral swabs from male EVD survivors were tested on the Hologic AptaDNA Combo 2® platform. All swabs tested maintained the same freeze/thaw workflow.

Conclusions

• The impact of gamma-irradiation on the sensitivity of CT and NG detection is strain, target and assay dependent.
• The Hologic AptaDNA Combo 2® assay is more sensitive than the GeneXpert assay for detection of NG.
• Gamma-irradiation does not negatively impact the sensitivity of the Hologic AptaDNA Combo 2® Assay and Cepheid GeneXpert® CT/NG Assay for the detection of CT and NG in swab specimens.
• Determination of a low prevalence of CT and NG in male EVD survivors in Liberia was successful.

Results

• There was 98.8% (158/160) agreement between gamma-irradiated and non-irradiated mock specimen swabs.
• Gamma-irradiation had no impact on sensitivity for detection of CT serovar E on either platform (Fig. 1), NG using the NG2 target on the GeneXpert® CT/NG platform (Fig. 3), or NG on the Hologic AptaDNA Combo 2® platform (Fig. 3 and 4).
• Gamma-irradiation improved the sensitivity by one log for detection of both CT serovar J on the Hologic AptaDNA Combo 2® platform (Fig. 2) and NG using the NG4 target on the GeneXpert® CT/NG platform (Fig. 4).
• The prevalence of CT and NG in the sample population was 2.2% (3/134) and 0.7% (1/134), respectively (Fig. 5). No CT/NG co-infections were detected.

References

• Shehata et al. 2011. ACHVirus 2:3.
• Temtamy et al. 2006. MMWR 55: 1271-75.

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Division of STD Prevention