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Opportunities of using DNA nanosensors for monitoring hepatitis E virus RNA in infectious hospitals

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Background-aim

Hepatitis E virus (HEV) often causes asymptomatic or mild infections, therefore it remains undetected. However, HEV poses a great risk for patients with: immunodeficiencies of various origins, after organ transplantation, chemotherapy, during pregnancy, and in the presence of some infectious diseases including COVID. In Belarus, the prevalence of HEV is monitored in several hospitals. Annually, IgG antibodies are detected in 1.4–7.3 % of patients with or without changes in biochemical…

Methods

The study included 250 adult patients (feces, urine, plasma) and 100 children under 12 years old who underwent treatment at the adult and children's infectious hospitals in Minsk (Belarus) from 2022 to 2023 and had altered liver enzyme levels or other signs of acute infectious diseases. Total RNA was extracted using Viral RNA+DNA Preparation Kit (Jena Bioscience GmbH, Germany), reverse transcription was performed using ArtMMLV Total (LLC "ArtBioTech", Belarus). The reference method was HEV…

Results

DNA nanosensors are an accurate and convenient for HEV RNA recognizing. Probes can bind to short (20–30 nucleotides) conservative regions of the HEV genome, which is not available for methods based on PCR. HEV RNA was detected in 6/250 (2.4 %) adult patients and 8/100 (8 %) children using DNA nanosensors. The qPCR method failed to detect HEV RNA in 2 children, the results matched in adults 100 %.…

Conclusions

The use of DNA nanosensors for monitoring HEV RNA in patients of infectious hospitals has high potential. The technology allows for effective recognition of nucleic acids of pathogens with low % of conservative sequences and surpasses qPCR by this parameter....

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