Molecular Detection of Enteropathogens from Diarrheic Stool of HIV positive Patients in Gondar, Ethiopia

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BACKGROUND
- Infectious diarrhea is a common problem in developing countries, especially among those living with HIV/AIDS.
- Conventional testing for bacterial, parasitic, and viral causes of diarrhea suffers from poor sensitivity.
- Molecular techniques for enteropathogen detection are emerging which improve sensitivity.
- Molecular detection of enteropathogens in people living with HIV/AIDS has not yet been explored.

OBJECTIVE
To characterize enteropathogens from diarrheic stools of HIV-positive patients in Gondar, Ethiopia using multiplex molecular panels targeting key infectious agents.

METHODS
- Cross-sectional study of HIV patients presenting with diarrhea at a local clinic in Gondar, Ethiopia from Jan, 2016 to May, 2016.
- Genomic DNA extracted from stool using QiAamp DNA Stool Mini Kit.
- Enteropathogens detected using Allplex™ (Seegene, Canada) Gastrointestinal multiplex molecular panel.

RESULTS
- Large degree of mixed enteropathogens detected, most of which are diarrheagenic strains of E. coli.
- Number of organisms detected was not associated with CD4 cell count.
- Enteric viruses more likely to occur when CD4<500/µL. Of these, only Norovirus GI/GII was statistically significant.
- STEC more common at higher CD4 cell counts, although sample size small: N=6

LIMITATIONS
- No control group for comparison.
- Sample size small for less commonly detected organisms (e.g. Adenovirus 40/41, Cryptosporidium).

CONCLUSIONS
- High number of mixed enteropathogens also seen in studies performing molecular analysis of stool from residents of, or travelers in, developing countries.
- Lower CD4 cell counts were associated with the presence of enteric viruses, particularly Norovirus GI/GII.
- Multiplex PCR panels are unable to determine colonization vs infection, making their clinical utility unclear.
- Research is ongoing to solve the above issues, such as with quantitative cutoffs.

REFERENCES

Figure 1: Enteropathogens Detected in HIV Patient Participants with Diarrhea (N=86)

Figure 2: Box Plot of Patients’ CD4 Cell Counts with Enteropathogen Detected (N=86)

Figure 3: Number of organisms detected per sample. N=86

Table 1: Characteristics of Included Study Participants

Table 2: Proportion of Pathogens Detected in Patients with CD4 Cell Counts <500/µL

Interorganism | CD4<500/µL (N=86) | CD4>500/µL (N=39) | p-value
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STEC (%) | 1.8 | 16.7 | 0.018
Norovirus GI/GII (%) | 23.2 | 5.3 | 0.029
Vibrio (%) | 4.7 | 0.0 | 0.293
Aeromonas (%) | 4.7 | 0.0 | 0.293
Salmonella (%) | 4.7 | 0.0 | 0.293
Campylobacter (%) | 4.7 | 0.0 | 0.293
EAEC (%) | 4.7 | 0.0 | 0.293
ETEC (%) | 4.7 | 0.0 | 0.293
G. lamblia (%) | 10.5 | 0.0 | 0.293
B. hominis (%) | 8.1 | 0.0 | 0.293
Cryptosporidium (%) | 16.3 | 0.0 | 0.293
D. fragilis (%) | 16.3 | 0.0 | 0.293
Adenovirus 40/41 (%) | 3.5 | 0.0 | 0.293
Norovirus GI/GII (%) | 16.3 | 0.0 | 0.293

Table 3: Number of organisms detected per sample. N=86

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