



# Use of Biofire® Filmarray gastrointestinal panel on clinical decision making and infection control in a General Pediatric department.

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## BACKGROUND

The new Biofire® Filmarray Gastrointestinal Panel (BFGI-BioMérieux, France) offers advantage against conventional cultures of gastrointestinal tract specimens with rapid detection and a broader pathogen identification. The objective of this study is to evaluate the use of BFGI and compare detection of pathogens in GI samples with conventional cultures in hospitalized children with gastroenteritis.

## METHODS

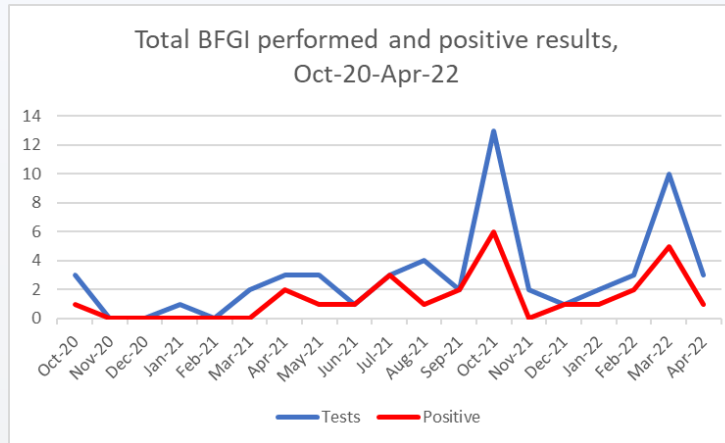
A retrospective study was conducted in a General tertiary level Pediatric department from Jan 2020 to Apr 2022. Children were included if an appropriate GI tract specimen was obtained for clinical evaluation and was assessed by BFGI. Results were compared with conventional cultures. Demographic, clinical and laboratory data as well as treatment and the effect of the BFGI on clinical decision making were analyzed.

## RESULTS

- Fifty-eight children were included, 27(46%) females, with mean age 5.1 (IQR 9.35). Thirty-one (53%) had a chronic/ underlying condition, or a prolonged hospital stay.
- All children had diarrhea, 44% had fever and 25% had vomits.
- The most common pathogens were Norovirus (8/58), Campylobacter (7/58) and Enteropathogenic Escherichia coli (EPEC, 6/58), followed by Clostridium difficile, Rotavirus and Salmonella spp.
- In five patients there was a co-infection with 2 or more pathogens.

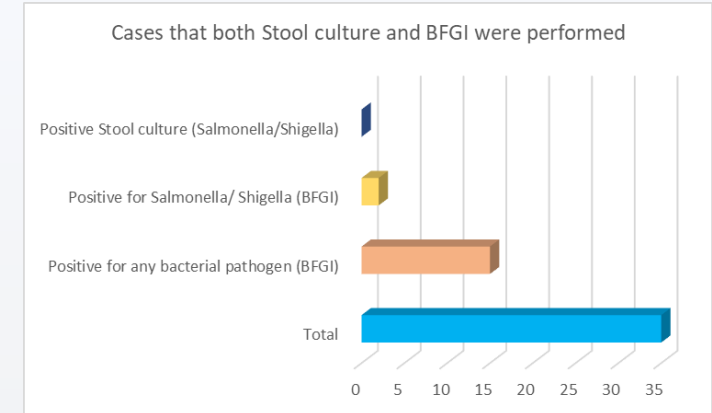
| Pathogen              | N | f% |
|-----------------------|---|----|
| Norovirus             | 8 | 22 |
| Campylobacter jejuni  | 7 | 20 |
| EPEC                  | 6 | 17 |
| Clostridium difficile | 3 | 8  |
| Rotavirus             | 2 | 6  |
| Salmonella spp        | 2 | 6  |
| EAEC                  | 3 | 8  |
| Cryptosporidium       | 2 | 6  |
| ETEC                  | 1 | 3  |
| Sapovirus             | 1 | 3  |

Table 1: Pathogens detected by BFGI



Graph 1: Total BFGI performed from October 2020- April 2022, and positive results. •

- In October 2021, as shown in graph 1, we detected five Norovirus cases within a 10-day period, in children that were hospitalized for other reasons, indicating an intrahospital outbreak. BFGI allowed as to recognize the outbreak early and enhance the infection control measures.
- Only two cases of Rotavirus were detected, probably because most children with GI symptoms initially underwent an antigen Rota-Adeno test. To those with a positive result, we did not proceed to a BFGI.
- Two cases of Cryptosporidium were also detected, one 2.5yo and one 6yo with eosinophilic esophagitis and failure to thrive. Those findings were not confirmed with acid-fast staining.
- In 35 patients a stool culture (salmonella and shigella) was performed (graph 2). All cultures were negative, in 20 (57%) patients in accordance with a negative BFGI. In the rest 15 (42%) patients the PCR detected at least one bacterial pathogen, while in only two cases Salmonella spp., suggesting that BFGI offered a more precise result, along with the possibility to detect a broader spectrum of pathogens.



Graph 2: Cases that both a stool culture and a BFGI were performed

Only 17 patients were treated with antimicrobials, mostly because of the young age (<3 months) or the severity of disease/ comorbidities. A macrolide was prescribed in all campylobacter cases (clarithromycin, 57%, azithromycin, 43%).

## CONCLUSIONS

- In this cohort of hospitalized patients with gastroenteritis, BFGI offered a rapid and more precise result in comparison to cultures. It helped recognizing a norovirus outbreak in the department and improving the infection control measures. Finally, it assisted the clinical decision making leading to more rational and targeted antibiotic administration.
- There is limited data in literature about the use of multiplex PCR for GI pathogens in pediatric population, with encouraging results (1-3). Taking in consideration the significant cost of the test, cost effectiveness studies should be carried out.

## References

1) Yoo IH et al. Quality Improvements in Management of Children with Acute Diarrhea Using a Multiplex-PCR-Based Gastrointestinal Pathogen Panel. *Diagnostics (Basel)*. 2021 Jun 28;11(7):1175. 2) Truong J et al. Clinical impact of a gastrointestinal PCR panel in children with infectious diarrhoea. *Arch Dis Child*. 2022 Jun;107(6):601-605. 3) Stockmann C et al. Detection of 23 Gastrointestinal Pathogens Among Children Who Present With Diarrhea. *J Pediatric Infect Dis Soc*. 2017 Sep 1;6(3):231-238.