

Table 2
Compared the Airtraq with the Macintosh laryngoscope at tracheal intubation in subgroup analysis

		Number of trials	RR or WMD (95% CI)	P-value	Cochrane's Q	I ² statistic, %
The success rate	Total	31	1.07 (1.03 to 1.11)	0.001*	108.6	72
	Normal airway	18	1.02 (0.98, 1.07)	0.34	45.8	63
	Difficult airway	13	1.15 (1.07 to 1.23)	0.0002*	59.4	80
	Novice	9	1.14 (1.03 to 1.27)	0.01*	32.1	75
	Experience	22	1.05 (1.01 to 1.10)	0.03*	76.3	72
The intubation time	Total	28	−9.66 (−13.7 to −5.62)	<0.0001*	1070.1	97
	Normal airway	16	−2.87 (−8.00 to 2.27)	0.27	433.2	97
	Difficult airway	12	−19.6 (−26.6 to −12.6)	<0.0001*	451.1	98
	Novice	6	−17.3 (−28.7 to −5.99)	0.003*	54.2	91
	Experience	22	−7.96 (−12.4 to −3.50)	0.0005*	9998.9	98
The glottis visualization	Total	17	1.23 (1.13 to 1.33)	<0.00001*	79.7	80
	Normal airway	8	1.07 (1.01 to 1.15)	0.03*	16.8	58
	Difficult airway	9	1.43 (1.25 to 1.63)	<0.00001*	31.7	75
	Novice	4	1.15 (1.01 to 1.30)	0.03*	13.8	78
	Experience	13	1.26 (1.14 to 1.40)	<0.0001*	61.8	81

RR: relative risk, WMD: weight mean difference, CI: confidence intervals, N/A: not applicable.

* Significant difference.

laryngoscope (RR = 1.23, 95% CI, 1.01–1.30, $P < 0.00001$, Cochrane's Q = 79.7, $I^2 = 80\%$). The 95% CI was corrected to 1.12–1.34 by TSA, which also showed the accrued information size ($n = 1510$) to be 91.6% of the previously estimated RIS ($n = 1648$). In subgroup analysis, the Airtraq is more effective in terms of successful tracheal intubation, intubation time, and better visualization of the glottis in difficult airway conditions and when used by novice or experienced laryngoscopists. However, the success rate and intubation time of tracheal intubation with the Airtraq were not significantly different from those with the Macintosh in normal airway settings (Table 2).

When using the Macintosh laryngoscope to intubate the trachea, the laryngoscopist must align the oral, pharyngeal, and laryngeal axes extending from the incisors to the larynx. However, the lens located in the tip of the Airtraq blade displays a high-resolution image of the glottis on the separate liquid-crystal display of the device [1]. For several reasons, such as tongue edema and limited neck movement, it can be difficult to align these axes in a difficult airway when using the Macintosh laryngoscope. This could worsen glottic visualization and lead to a failure to intubate with the Macintosh laryngoscope. However, when the glottis is visualized on the Airtraq monitor, it is possible to intubate the trachea, even in difficult airways, under indirect visual guidance. This increases the success of tracheal intubation and permits excellent glottic visualization.

In conclusion, the Airtraq is superior to the Macintosh laryngoscope in terms of success rate, intubation time, and glottic visualization during tracheal intubation.

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Multiplex polymerase chain reaction test to diagnose infectious diarrhea in the emergency department



Acute diarrheal illnesses are common presentations in US Emergency Departments (ED) with over 500,000 visits in 2014 [1]. In presumed infectious diarrhea, culture-based diagnosis is the standard means of identifying a causative agent and directing management [2,3]. Results of

culture are not available during a single ED visit, limiting their ability to affect clinical decision making. As a result, empiric antibiotic treatment is given to patients with the highest likelihood of bacterial infection based on clinical factors such as fever, bloody diarrhea and recent travel [2,3]. Empiric antibiotic treatment may decrease symptoms in bacterial diarrhea such as *Shigella*, *Salmonella*, *Campylobacter* and Shiga toxin-producing *E. coli* [4,5]; however, empiric treatment can lead to antibiotic overuse when given to patients with viral diarrhea. The multiplex gastrointestinal (GI) polymerase chain reaction (PCR) test may potentially improve antibiotic stewardship by identifying a specific pathogen in real time. In this study, we sought to compare ED patients with suspected infectious diarrhea who received the multiplex GI PCR panel against those who did not receive the panel to assess differences in clinical severity, rate of antibiotics prescribed, and ED length of stay (Table 1).

We performed this study at an academic urban hospital in Washington, DC with approximately 80,000 annual ED visits. The study design was a retrospective cohort of patients with a final ED diagnosis

of diarrhea or infectious gastroenteritis. The review was conducted during a 7-month period from June 1, 2016 to January 12, 2017 according to accepted methodology [6]. Potential subjects were identified by electronic medical record search with the following inclusion criteria: patients aged 18 years or older and ED final diagnoses of A09 (infectious gastroenteritis and colitis, unspecified), R19.7 (unspecified diarrhea). Individual charts were then searched for data corresponding to the acute infectious diarrhea. Continuous and discrete data were summarized using mean (standard deviation) and frequency (percentage), respectively. *t*-Test was used to compare continuous variables and Chi-square/Fisher's exact test was performed to compare discrete variables. An alpha of 0.05 was used as the cutoff for significance. Inter-rater agreements were estimated using kappa coefficient for categorical outcomes and concordance correlation coefficient for continuous outcomes. All analyses were performed using SAS 9.4 (SAS Institute, Cary, NC).

In total, 272 subjects were identified by electronic medical record search and confirmed by manual search. 22 patients had an ED final diagnosis of A09 (infectious gastroenteritis and colitis, unspecified), 249 had an ED final diagnosis of R19.7 (unspecified diarrhea). One patient was identified by free text search of chief complaint. One or more pathogens were identified in forty-two out of the sixty-four (65.6%) patients who received the GI PCR test. The pathogen most frequently identified by GI PCR was enteropathogenic *Escherichia coli* (EPEC), followed by *Campylobacter jejuni* and *Salmonella enteritidis* (Fig. 1.) Fifteen patients out of the forty-two who had a positive test had more than one pathogen identified by GI PCR. Patients who received the GI PCR were more likely to present with tachycardia (33% vs 17%, $p < 0.007$), bloody diarrhea (33% vs 9%, $p < 0.0001$), or recent travel (38% vs 18%, $p < 0.0049$). In addition, patients who received the GI PCR test spent more time in the ED (4.7 h vs 3.7 h, $p = 0.0137$) compared to patients who did not receive the GI PCR. Overall, patients who received the GI PCR test were more likely to receive antibiotics for diarrhea (39% vs 9%, $p < 0.0001$) (Fig. 2). No patients who tested positive only for a virus with a GI PCR test received antibiotics for diarrhea. Inter-observer agreement was calculated by kappa statistics for 3% of the total charts.

Distinguishing patients with acute infectious diarrhea due to viruses versus bacteria can be difficult based on clinical evidence alone. This is the first study to attempt to quantify how practitioners are incorporating a rapid PCR test into practice. In theory, a rapid diagnostic test would allow for earlier antibiotic treatment for patients who are most likely to benefit. Rapid diagnostic testing might also decrease empiric antibiotics usage in patients who are less likely to benefit from them. Overuse of antibiotics has been

Table 1

Comparison of ED patients with infectious diarrhea who received GI-PCR versus did not receive GI-PCR.

Characteristic of potential risk factors	GI PCR performed		P-value
	Yes (64)	No (208)	
Time from triage to ED Dispo decision, mean (SD), hours	4.36 (2.24)	3.67 (2.20)	0.0137
Age, mean (SD), years	41.78 (16.74)	42.90 (17.69)	0.7937
Gender, female/male, (%)	34/30 (53/47)	124/84 (60/40)	0.3575
Temp, mean (SD), Celsius	36.77 (0.70)	36.62 (0.54)	0.4132
SBP, high (≥ 90)/low (< 90), (%)	63/1 (98/2)	206/2 (99/1)	0.5543
SBP, mean (SD), mm Hg	129.11 (22.34)	134.24 (24.94)	0.2410
HR, high (≥ 100)/low (< 100), (%)	21/43 (33/67)	36/172 (17/83)	0.0070
Duration, long (≥ 24 h)/short (< 24 h), (%)	54/10 (84/16)	142/63 (69/31)	0.0177
Bloody, yes/no, (%)	19/39 (33/67)	16/165 (9/91)	<0.0001
Abdominal pain, yes/no, (%)	45/17 (73/27)	137/66 (67/33)	0.4492
Vomiting, yes/no, (%)	16/44 (27/73)	77/125 (38/62)	0.1036
Recent travel, yes/no, (%)	18/29 (38/62)	26/116 (18/82)	0.0049
HIV, yes/no, (%)	7/57 (11/89)	10/198 (5/95)	0.1344
Diabetes, yes/no, (%)	8/56 (13/87)	32/176 (15/85)	0.5688
Received antibiotics for diarrhea, yes/no, (%)	23/36 (39/61)	18/183 (9/91)	<0.0001
Stool culture performed, yes/no, (%)	21/43 (33/67)	3/205 (1/99)	<0.0001

ED: emergency department, GI PCR: gastrointestinal polymerase chain reaction, SBP: systolic blood pressure, HR: heart rate, HIV: human immunodeficiency virus.

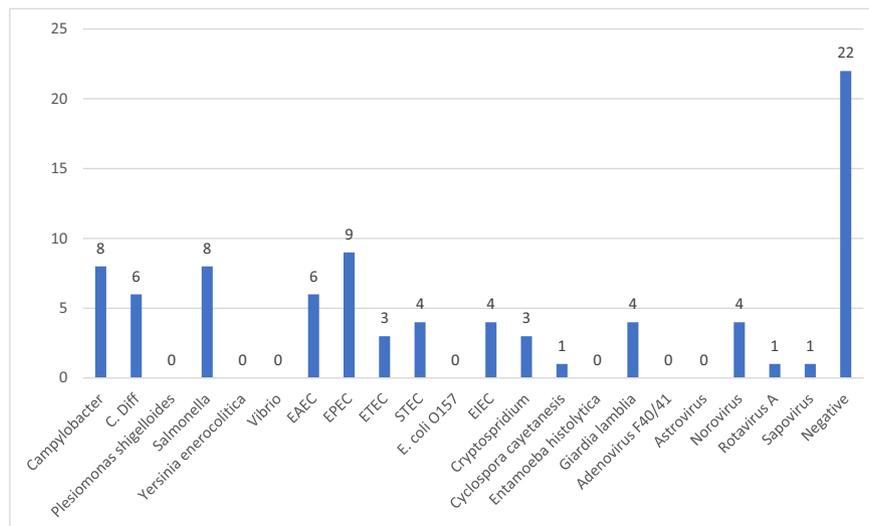


Fig. 1. Results of GI PCR testing.

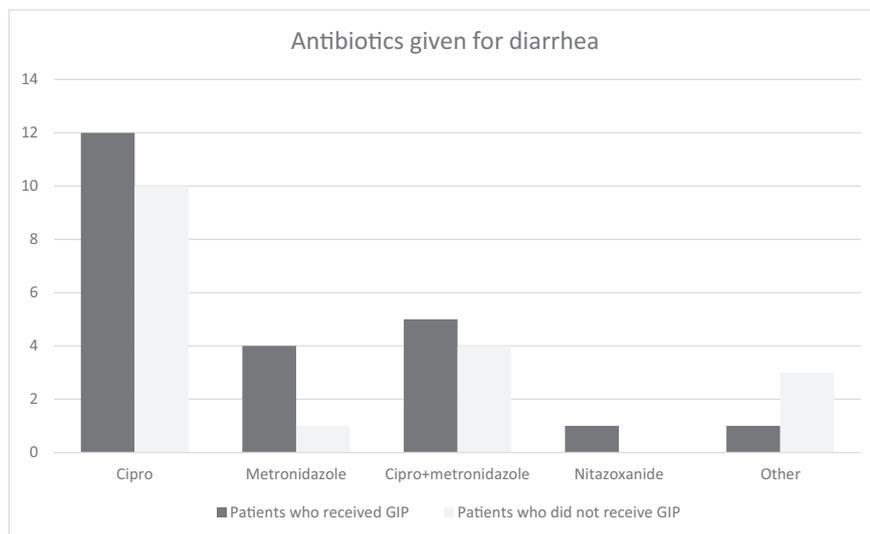


Fig. 2. Antibiotics given for diarrhea.

linked to an increased incidence of antibiotic resistance as well as rates of hemolytic-uremic syndrome (HUS) [4,5,7]. Of the patients who tested positive for only a virus, none were given antibiotics for diarrhea, highlighting the utility of the GI PCR test in identifying patients with viral etiologies to avoid empiric antibiotic use. Potential disadvantages of GI PCR in the ED include increased costs, greater detection of asymptomatic colonization [8], and increased ED length of stay. Others disadvantage of GI PCR is that it lacks the ability to test for antibiotic resistance, perform genome sequencing or perform serotyping [9]. The most significant limitation of this study is that the difference in antibiotic prescribing rates may have been due to differences in clinical severity and not due to results of the GI PCR.

Author contributions

ACM, AL, ST contributed to study concept and design, acquisition of the data.

ACM, YM, HW, AL, ST contributed to analysis and interpretation of the data.

YM and HW contributed statistical expertise.

AL, ACM, HW, ML, ST, YM contributed to drafting and critical revision of the manuscript.

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Early diagnosis of acute respiratory failure using an E-health application in patients requiring oxygen therapy



Dear editor-in-chief

Patients without life-threatening conditions, who require a treatment at the hospital, are admitted to a medical unit without continuous monitoring. Monitoring of patients by the nurse is performed manually with a maximum frequency of three or four times per day. In addition to this monitoring, these patients could be real-time monitored, using Sensium® E-health technology [1]. This wearable and wireless Patch measures heart rate (HR), respiration rate (RR) and axillary temperature, and provides updated data every 2 min. The Emergency physician is notified by E-mail and I-phone® (Apple) application of abnormal