

Research Article

Are Inactive *E. coli* Always Commensals?

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Abstract: Diarrhegenic *Escherichia coli* remain an important cause of diarrhea in developing countries. Inactive *E. coli* constituent strains which are non motile, non lactose fermenters notification diarrhea is controversial. Inactive *E. coli* include Entero-invasive *E. coli* (EIEC) known to cause diarrhea in young children in developing countries. The aim of the study was to study the isolates of inactive *E. coli* from stool specimens of patients presenting with acute gastroenteritis and discussed their probable role of being pathogenic. Total 234 stool specimens studied over a period of 1 year from patients with acute gastroenteritis. Specimens were subjected to microscopy and culture. Identification was done by standard tests and motility, antimicrobial sensitivity testing performed by standard procedures. 38% of stool specimens from symptomatic patients which indicated bacterial infection on microscopy grew inactive *E. coli* in the absence of any other diarrhegenic pathogen. Such as commensals without confirmation & reporting should be considered.

Keywords: Atypical *E. coli*, Gastroenteritis, Diarrhoea.

INTRODUCTION

Diarrhegenic *E. coli* is a significant cause of diarrhoea in developing countries. The causes of diarrhea include a wide range of viruses, bacteria and parasites. Amongst the bacterial pathogens *E. coli* plays an important role. EPEC is an important category of diarrhoeagenic *E. coli* which has been linked to infant diarrhoeagenic *E. coli* which has been linked to infant diarrhea in the developing world [1]. Diarrhoeagenic *E. coli* strains are transmitted by faecal oral route. Inactive *E. coli* are Lactose negative, anaerogenic, non-motile [2]. Enteroinvasive *E. coli* are inactive and established pathogens. Confirmation by detection of ipaH gene – rare EIEC seldom identified [3].

MATERIALS AND METHODS

Study was conducted at tertiary care teaching hospital from September 2012 to September 2013. A total of 234 samples from clinically suspected gastroenteritis, diarrhoea and dysentery were collected. In microscopy saline and iodine mount were seen. The specimens were cultured on Blood agar and Mac Conkey agar. Non lactose fermenting colonies were processed for identification by biochemical testing,

motility. Agglutination with Shigella antisera was performed to differentiate it from Shigella. Antimicrobial Susceptibility Testing as per standard techniques was performed by Kirby Baur's disc diffusion method.

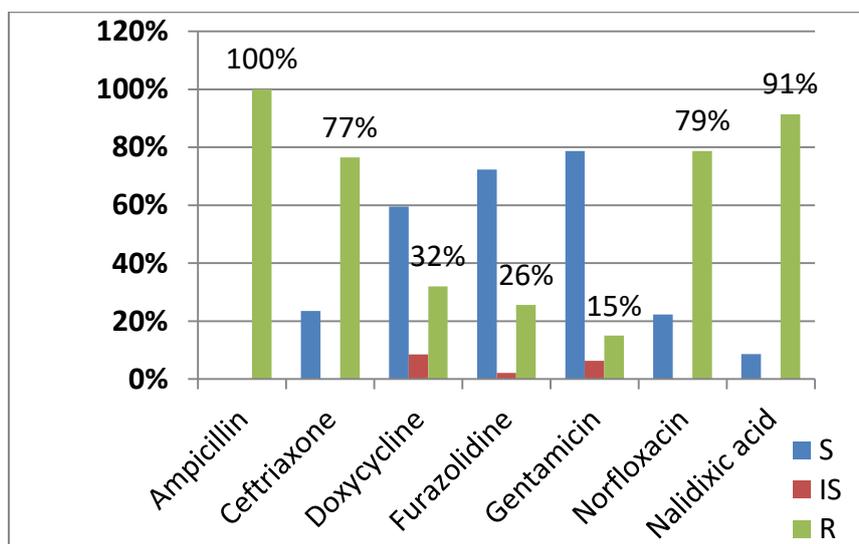
RESULTS

Total 234 stool samples were submitted amongst which inactive *E. coli* were isolated from 89 (38%) samples as a single isolate in the absence of another enteric pathogen. Amongst the total sample 147 stool sample (63%) showed pus cells alone or in combination with RBC on microscopy. The non lactose fermenting colonies, non motile organisms identified as *E. coli* with biochemical reactions (Table 1). Amongst which 97.7% of these were obtained as a single isolate in absence of another bacterial diarrheal pathogen. Isolates were not agglutinable with Shigella antisera.

Antibiotic sensitivity of these isolats showed sensitivity to Gentamicin (78%), Furazolidone (72%) & Doxycycline (59.5%) while resistance to Nalidixic acid (91.4%), Norfloxacin (78.7%) & Ceftriaxone (76.5%) was observed (Graph 1).

Table 1: Biochemical tests

Biochemical	Positive	Negative
Indole	94.3%	5.6%
Glucose (acid only)	100%	0%
Lactose	4.4%	95.5%
Lysine decarboxylase	80.8%	19.1%
Ornithine decarboxylase	13.4%	86.5%
ONPG	76.4%	23.5%
Motility	1.1%	98.8%



Graph 1: Sensitivity pattern of the isolated inactive E.coli

DISCUSSION

Enteroinvasive *Escherichia coli* (EIEC) were first shown in 1971 as a cause of diarrheal disease. It is known to cause shigellosis like symptoms in both adults and children. Despite its acknowledged status as a human pathogen very little research has been conducted to identify individual risk factor for infection. It is regarded as inactive *E. coli* from stool specimens as commensals. Subset of inactive *E. coli* is EIEC which are established pathogens causing diarrhea. A review of DEC in Iran by Jafari *et al.* [4] reports the prevalence of EIEC to be 19.4% among DEC [2]. A study by Nadia Vieira *et al.* [3] reports EIEC to be predominant pathotype among DEC from coastal Ecuador [3]. A study by I Sorescu *et al.* [5] reported non-invasive inactive *E. coli* causing diarrhoea in suckling pigs. In our study, inactive *E. coli* were isolated from symptomatic patients in the absence of another diarrheal pathogen.

CONCLUSIONS

Most of enteroinvasive *E. coli* are biochemically inactive. These strains are confirmed either by serotyping or more definitively by detecting ipaH gene by PCR. 38% of stool specimens from symptomatic patients showed bacterial infection on

microscopy & isolation of inactive *E. coli* in absence of any other diarrheagenic pathogen. Such isolates should not be disregarded as commensals without confirmation & reporting should be considered.

REFERENCES

- Zvizdic A; Frequency and distribution of diarrhoeagenic *Escherichia coli* strains isolated from pediatric patients with diarrhea in bosnia and herzegovina. Bosn J Basic Med Sci., 2009; 9:149-155.
- Brenner DJ, Krieg NR, Staley JT; The Proteobacteria. In Garrity GM; Baergey's Manual of Systematic Bacteriology. Volume 2, 2nd edition, Williams & Wilkins, 2005.
- Vieira N1, Bates SJ, Solberg OD, Ponce K, Howsmon R, Cevallos W *et al.*; High prevalence of Enteroinvasive *E. coli* isolated in a remote region of Northern coastal Ecuador, Am J Trop Med Hyg., 2007; 76(3): 528-533.
- Jafari A, Aslani MM, Bouzari S; Escherichia coli-A brief review of diarrheagenic pathotypes and their role in diarrheal diseases in Iran. Iran J Microbiol., 2012; 4(3): 102-117.
- Sorescu I, Caraivan I, Popa V *et al.*; Characterisation of inactive Escherichia coli isolates from suckling pigs with diarrhoeaic syndrome, Stud Res Vet Med (Bucharest), 200, 8: 63-68.