Are Inactive E. coli Always Commensals?

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Abstract: Diarrheogenic 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 controversival. Inactive E. coli include Enteroinvasive 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 diarrheagenic pathogen. Such as commensals without confirmation & reporting should be considered.

Keywords: Atypical E. coli, Gastroenteritis, Diarrhoea.

INTRODUCTION

Diarrheagenic E. coli is a significant cause of diarrhea 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 agglutinatable 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%), Norflaxacin (78.7%) & Ceftriaxone (76.5%) was observed (Graph 1).
Table 1: Biochemical tests

<table>
<thead>
<tr>
<th>Biochemical</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indole</td>
<td>94.3%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Glucose (acid only)</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Lactose</td>
<td>4.4%</td>
<td>95.5%</td>
</tr>
<tr>
<td>Lysine decarboxylase</td>
<td>80.8%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Ornithine decarboxylase</td>
<td>13.4%</td>
<td>86.5%</td>
</tr>
<tr>
<td>ONPG</td>
<td>76.4%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Motility</td>
<td>1.1%</td>
<td>98.8%</td>
</tr>
</tbody>
</table>

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 specimen as commensals. It has been identified as important cause of diarrhea but incidence is not mentioned widely due to less scientific attention. 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