Epidemiological study of Enteropathogenic *E. coli* causing diarrhea in children

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Abstract

Isolation and identification of Enteropathogenic *Escherichia coli* (EPEC) causing diarrhea in children less than five years, 100 stool samples were collected from children (2 months-2 years) from obstetric and children hospital in al samawa city, during period from October to the end of December in year of 2013. 41 isolates were positive for *E.coli* (41%) when diagnosed with specific antiserum. EPEC isolates,11 isolates were positive for EPEC (26.82%),6 isolates were from female and 5 from male (45.4% and 54.54%) and 6-12 months age groups were high level in EPEC infection 8 cases (72 %) than 2-3 years 3 cases (27%).All isolates were resistant to sulfa trimethoprin and streptomycin, while all isolates were sensitive for furoltidone 100%.Plasmid DNA content, results shows all strains contained plasmid bands rang.

Keywords:-Escherichia coli,EPEC,Diarrhea,Children,Epidemiology.
Diarrhea remains the second leading cause of death in children younger than 5 years globally, accounting for 1.3 million deaths annually. Enteropathogenic *Escherichia coli* (EPEC), one of the diarrheagenic *E. coli* pathotypes, are among the most important pathogens infecting children worldwide because of their high prevalence in both the community and hospital setting, and because they are one of the main causes of persistent diarrhea. Since the diagnosis of these pathogens is now based mainly on molecular diagnosis, there has been an important change in the prevalence and distribution of these pathogens. The purpose of this paper is to review the current epidemiology of EPEC infection in children and the new insights into its physiopathology.

*E. coli* is usually considered as an indicator organism for faecal contamination and is important parameter in food and water hygiene. These organisms transmitted by direct contact or through contaminated food and water. While generic *E. coli* is considered as an intestinal pathogen, many strains of these species can be pathogenic leading to diarrhoeal diseases. EPEC most commonly causes acute diarrhea and may also cause persistent diarrhea. The clinical characteristics of EPEC infection have not been optimally described, since few studies have searched for all common pathogens in order to rule out mixed infections, which are very common in endemic areas. Among single pathogen infections in the community setting we found that EPEC had the second highest severity score and ORS usage, only after rotavirus, and followed by ETEC. For diagnosis, PCR should be used for the proper identification of EPEC. However, molecular methods are still not easily available in clinical laboratories worldwide. It is unrealistic and unnecessary for every diarrheal
specimen to be screened by molecular methods, since most infection resolve spontaneously. Nevertheless, for clinical purposes it would be ideal if severe cases, bloody diarrhea cases, hospital-acquired or suspected outbreaks were investigated for all the diarrheagenic *E. coli*, including EPEC. O-serogroup identification should not be used in clinical laboratories, except as part of outbreak investigations (6).

### Materials and methods

#### Samples collection

Hindered stool samples were collected in container from children (2 months-2 years) from obstetric and children hospital in al samawa city, during period from October to the end of December.

#### Culture

Stools cultured directly on macConky agar and incubated for 24 hrs for 37°C. *E. coli* was appeared as small, smooth, pink colour non hemolytic on blood agar, give greenish metallic sheen on eosin methylen blue and diagnose with biochemical test (VPMR, Indol, Catalase, Simmon citrate, TSI, Motility test, Oxidase) then serotyping with specific antiserum.

#### Serotyping:—

Serotyping was preformed according to manufactured by difico/USA

1-polyvalent antisera  
2-monovalent antisera

#### Sensitivity test:—

Susceptibility test was carried out as described by Baure et al (7)

#### Extraction of plasmid DNA:—

Choose 5 isolates to detect the content of plasmid, By using lysis by alkali according to (8) then detection of plasmid DNA according to (9)

### Results

From 100 samples 41 were positive for *E. coli* (figure 1) 41% when diagnosed with specific antiserum EPEC isolates 11 were positive for EPEC 26.82% 6 isolates were isolated from female and 5 from male (45.4% and 54.54% respectively) and 6-12 months age groups were high level in EPEC infection 8 cases 72% than 13-2 years 3 cases 27%.
Sensitivity to antibiotic
All isolates were resistant to sulfa trimethoprin and streptomycin, 9 isolates were resistant for chloramphenicol and tetracycline 81.8%, 7 isolates were resistant for gentamycin and cefoxitin 63.6%, 5 isolates were resistant for cefixim 45.4% 1 isolates were resistant for amikacin 18% , while all isolates were sensitive for furoltidone 100%.

Plasmid DNA content, results shows all strains contained plasmid bands rang from 1-5 as figure-2
Figure -1show E.coli on EMB

M; marker

Lane 1 plasmid content of isolates 1
Discussion

From results showed the percentage of isolation of EPEC was higher than other types of *E. coli*, EPEC (typical and atypical) and ETEC. EPEC infection is primarily an illness concerning children less than 2 years of age (10). Atypical EPEC are now predominant in industrial countries, while typical EPEC are more frequently isolated in developing areas. In our study, enteropathogenic *E. coli* were more often isolated in 13-21 months-old infants than in 0-12 month-old babies. Our data do not explain the reason for such difference, but we can hypothesize that it could be related to the different type of feeding among the two groups or more probably by attendance at nursery and infant school with the consequent infection risk(11). According to the sensitivity test most isolates sulfa trimethoprin and streptomycin chloramphenicol and tetracycline due to multiple using of these antibiotics in such infections, in addition to the increase use of these antibiotics the plasmid content may be the cause behind the highly resistant and the ability of these plasmid to transfer among the bacterial strains and transfer the resistant character with them(12).

References


