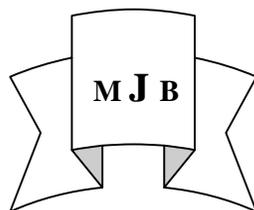


A Study of Enteroaggregative *Escherichia Coli* Isolated from Stool Samples

Maysa Salih

Dept. of Microbiology, College of Medicine, Babylon University



Abstract

Thirty-one isolates of diarrheagenic *Escherichia Coli* have been isolated and detected from patients with or without diarrhea. Haemagglutination has been used to detect 18 out of a total of 31 isolates, and it has been found that 18 isolates were belonging to the enteroaggregative *E.coli*. The effect of such antibiotics as (Azithromycin, Ciprofloxacin and Trimethprim) has also been studied and it has been found that these antibiotics have a negative effect on the Colonization Factor Antigen I (CFA I) though they have no effect on the growth of this bacteria.

دراسة عن بكتريا القولون المسببة للتلزن المعزولة من عينات الخروج

الخلاصة

تم عزل وتشخيص (31) عذلة عائدة لبكتريا *Escherichia Coli* من المرضى المصابين وغير المصابين بالاسهال. كما استخدمت طريقة التلزن لكريات الدم لتشخيص (18) عذلة من مجموع (31) حيث وجد ان (18) عذلة كانت تعود لنوع بكتريا القولون المسببة للتلزن، كما درس تأثير بعض المضادات الحياتية على مستضدات عوامل الاستعمار (CFA/I) حيث وجد ان لها تأثير سلبي ومثبط لهذه العوامل على الرغم بان ليس لهذه المضادات تأثير على نمو البكتريا.

Introduction

Diarrheagenic *Escherichia coli* comprise an important group of pathogens associated with enteric diseases. Seven pathogenic types (pathogens) of *E.coli* associated with diarrhea are currently recognized: one of them is the enteroaggregative *E.coli* (EggEc). [1]

The EggEc pathotype has been defined by its aggregative pattern of adherence to tissue culture cells.[2]. Besides, EggEc strains are characterized by their distinct patterns of adherence to cultured epithelial cells in vitro. Typical EggEc strains bind in an aggregative adherence pattern characterized by a stacked brick-like

arrangement on the surface of cell as well as of the glass or plastic. [3]

The pathogenesis of EggEc is not fully understood. EggEc can bind to human colonic mucosa with the formation of a thick mucus layer and the production of an intestinal inflammation.[4]

EggEc are among the most important causes of acute interstice and subsequent morbidity and mortality in children in developing countries.[3,5]

Adherence is an initial prerequisite for some strains of *E.coli* in successful colonization of a specific host mucosal tissue. [6]. Type I fimbriae which are found on the majority of clinical isolates of *E.coli*

bind to mannose containing receptors on epithelial cells and leukocytes.[7,8]

Type I fimbriae may be important in the pathogenesis of urinary tract infections; they play an important role in enterobacterial communicability, but the role of type I fimriae in enteric infections remains unclear. [9] On the other hand, the role of type I fimriae accounts either for the susceptibility to phagocytosis or for pathogenicity. Type I fimbriae may be disadvantageous for *E.coli* strains colonizing the mucosa by attaching and effacing lesion because they induce an immune response. [6]

Many researchers have pointed out the EggEc strains show a high level of resistance to ampicillin, tetracycline, co-trimoxazole and chloramphenicol, but they are highly susceptible to trimethoprim, quinolones, Azithromycin, and ciprofloxacin.[10-12]

As research works on EggEc are either few or even rare, this study aims at detecting EggEc strains among *E.coli* bacteria isolated from patients: the study likewise aims at showing the effect of some antibiotics on the colonization factor produced by isolated strains.

Results

Table 1 Prevalence of (EggEc) strains among *E.Coli* isolates

Isolation No. of <i>E.Coli</i>	EggEc strains %	Atheir type %
31	18 (58%)	13 (42%)

Material and Methods

Specimens and Strains

(31)*E.coli* strains were isolated from fecal specimens from children and adults with or without diarrhea who either attended out patient clinics or were admitted to hospital.

Haemagglutination Test

(EggEc) were detected by haemagglutination assay by using 2%(wt/vol) suspension of erythrocytes group A [7] with or without 1%(wt/vol) D-mannose. Twenty micro litters of the erythrocytes suspension with or without D-mannose were placed on a glass slide and an equal volume of a bacterial suspension was added. The slide was gently rotated for 2 min. visible haemagglutination was produced .

The haemagglutination assay is done in the presence of an equal volume of antibiotics. The antibiotics used are Azithromycin, Ciprofloxacin, and Trimethoprim in 2mg/ml, 2mg/ml, and 2.5mg/ml concentrations respectively. The haemagglutination assay in the presence of antibiotics is done only to EggEc strains.

Table 2 Agglutination technique results in the present and a bsess of some antibiotics

Isolated No.	Ciprofloxacin		Azithromycin		Trimethprim	
	Without	With	Without	With	Without	with
1	+	-	+	-	+	-
5	+	-	+	-	+	-
9	+	-	+	-	+	-
20	+	-	+	-	+	-
23	+	-	+	-	+	-
27	+	-	+	-	+	-
28	+	-	+	-	+	-
30	+	-	+	-	+	-

Discussion

In this study, 31 isolates of *Escherichia coli* were isolated from stools of patients with or without diarrhea. A haemagglutination test is used to detect (EggEC) pathotype among these isolates. Only 18 (58.08%) strains were found to have a colonization factor antigen as shown in Table (1) .

This factor has spread among pathogenic and non pathogenic *E.coli* ; however, its presence will promote the ability of bacteria to adhere various tissues. [13]

This result agrees with those of some researchers as [14] who has found that the isolation rates of EggEc is 19% in India and 26% in Jamaica. [2] have also indicated that the isolation rate of EggEc is 42% .[15] have found that the percentage of EggEc isolated is 52.4% and this result agrees with that obtained in this study.

It has been found that 13 isolates has no ability to produce such factors; this might be attributed to the fact that either these isolates are lacking in the gene encoding this factor [11] bp sequence or these isolates belong to other types of *E.coli* particularly those related to verotoxin-producing *E. coli*. [16]

The effect of some antibiotics on the colonization factor antigen I has

also been studied. It has been observed that when the haemagglutination test is carried out in the presence of an equal volume of antibiotic added to the agglutination produced (See: Material and Methods above), the antibiotic causes a complete inhibition to this factor (as shown in Table 2).

This explains the fact that antibiotics can influence the adhesive factors in addition to their bacteriocidal effect. [10]

The results of this study explains why some antibiotics are effective although the rate of resistance to bacteria is high. This is most probably related to our findings which confirm that antibiotics have a double effect on bacteria.

It is, however, recommended that a further study should be conducted to confirm the mechanism of how the antibiotics can inhibit a colonization factor antigen in bacteria without effecting their growth.

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