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Detection of Shigella species from in and out patient in Baghdad and Waist Provinces/Iraq

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ABSTRACT

Diarrhea caused by Shigella pathogen was responsible for second causative agent of morbidity and mortality between children in middle and low income east and other countries, in this study Shigella species was isolated from 203 stool samples collected from patients suffering from dysentery from both gender in which attending to Baghdad medical city in Baghdad and Alkarma teaching hospital in Al-Kut/Wasit governorates/Iraq in period between January 2020 to the middle of February 2021, these pathogen was isolated by using cultured methods and other biochemical tests in which routinely used to isolated these bacteria from these stool samples S. flexneri was more common species isolated in this research 131(65%), S. sonnei 66(33%), S. boydii 4(2%) and last one was S. dysenteria 2(1%), on other hand 113(55.67%) was the ratio of female infected compared with 90(44.33%) in male among that large infected was seen in age group 2-4 years old and low one infected age group was found in <2 years old. Also antibiotics sensitivity tests was done, the results appeared that first one active was Ceftriaxone followed by Ciprofloxacin them Ceftizoxime and other antibiotics used in this study appeared variable actions against this species, in case of antibiotics resistance S. sonnei appeared highly resistance to ampicillin(95%), S. dysenteriae showed completely resistance to Kanamicin(100%) while large numbers of S. flexneri resistance to ampicillin(99%) and Co-trimoxazole(85%) on other wise most numbers of S. boydii not appeared any resistance to any antibiotics used in this study.

Keywords: *Shigella, Baghdad*

INTRODUCTION

Diarrhea caused by Shigella responsible for most children infections mainly in most middle east countries(1). Shigella bacteria retain to family Enterobacteriaceae in general these genus was Gram's negative rods non motile include four species Shigella dysentrieae, Shigella boydii, Shigella sonnei and Shigella flexneri were considered as highly causing of infections in this genus due to low infectious dose of them 10-200 pathogen/ml.

Shigella in general was highly caused of infections, however low inoculums may caused infections and they are strongly related with dysentery specially in children as the statistical data recorded with world health organization(WHO) also these organization advised for uses of azithromycin or ciprofloxacin for treated of pediatric cases(2). Shigella dysenteriae was only one species of this genus have ability to produce shiga toxin in which

the causative cause of systemic hemolytic uremic syndrome which commonly infected children and may be fatal in some time(3). Quickly diagnosis of dysentery and hemolytic uremic syndrome which lead to early treatment of its and decrease risks of hemolytic uremic syndrome and its complications(4).

The antibiotics used in treatment patients infected with this pathogen change with time also researches show that using of true antimicrobial agents in treatment infections caused by this pathogen may help to decrease period of toxemia, fever, diarrhea and reduce the risks of death complications(5).

MATERIALS AND METHODS

Sample

The study included 450 stool samples were taken randomly in sterilize screw caped bottles from both genders with different age groups attending to Baghdad medical city in Baghdad and Alkarma teaching hospital in Al-Kut/Wasit governorates/ Iraq, all persons don't receive any antimicrobial therapy at least one week before sampling, on other hand Shigella species was detected in 203 from these sample.

Specimen Collection and Processing

Microbiologically, infection was evaluated by cultured samples directly after collected on different media in which is used for isolation and cultivation of Shigella species the samples was firstly cultured on enriched selenite F broth and incubated at 37ºC for 6hrs after that cultured on MacConkey agar and Xylose-lysine desoxycholate(XLD) them on Salmonella-Shigella agar media and incubated at 37ºC for 24 hrs, only those samples that gave significant growth were considered as infection them after that biochemical tests was done to confirm diagnosis with bacteria and to know specie types of Shigella, samples collection was start from beginning of January 2020 to the middle of February 2021.

Identification of the Isolates

Many biochemical tests were done like IMVIC-tests which include (Indole, methyl red, vogus proskawer, simmon citrate) tests, triple sugar iron agar test(TSI).

Serological diagnosis

Done by slid agglutination test using Shigella polyvalent antisera(Denka seiken co, Japan).

Antibiotic Sensitivity Test

It was carried out by using of agar diffusion method (5).

RESULTS

Shigella was still most public and epidemiological problems in on otherwise S. sonnei and S. flexneri were predominant from Shigella species isolated and distributed in developed countries and peoples in which lived in low economo-scocial conditions (5,6,7), in this study Shigella species was isolated from 203 patients suffered from gastroenteritis from both genders with different age groups in which attending to Baghdad medical city in Baghdad and Alkarma teaching hospital in Al-Kut/Wasit governorates/ Iraq. All persons don't receive any antimicrobial therapy at least one week before sampling, from these S. flexneri was more common species 131(65%), S. sonnei 66(32%), S. boydii 4(2%) and last one was S. dysenteria 2(1%), on other hand 113(55.67%) was the ratio of female infected compared with 90(44.33%) in male figure 1 these results was accepted with results obtained Babak and others in 2009.

The large infected ratio was seen in age group 2-4 year old and low one infected age group was found in <2 years age group as show in table 1.

TABLE 1 : Distribution of Shigella species according to age groups

Age group (years)	Number of infections(%)
< 2	60(28.7)
2-4	76(37.8)
>4	67(33.5)
Total	203

Antibiotic sensitivity test showed that most antibiotics active against all species as follow: Ceftriaxone followed with Ciprofloxacin them Ceftizoxime and other antibiotics used in this study appeared also variable actions against this species as show in table 2 and 3.

TABLE 2: Numbers and percentages of antibiotics sensitivity and resistance to most common antibiotics types used for treatment of Shigella species

Antibiotic name	Sensitive		Resistance	
	No.	%	No.	%
Ceftriaxone	195	97	8	3
Ceftizoxime	180	89	23	11
Amikacin	168	83	35	17
Gentamycin	165	81	38	18
Tobramycin	160	79	43	21
Nalidixic acid	165	81	38	18
Chlormophenicol	121	60	82	40
Ceftazidime	141	70	62	31
Ciprofloxacin	190	94	13	6
Cephlothin	105	52	98	48
Kanamicin	90	44	113	56
Ampicillin	21	10	182	90
Co-trimoxazole	12	6	191	94

on other hand S. sonnei resistance to ampicillin(95%), S. dysenteriae showed completely resistance to Kanamicin(100%) while large numbers of S. flexneri resistance to ampicillin(99%) and Co-trimoxazole(85%) on other wise most numbers of S. boydii not appeared any resistance to any antibiotics in which used in this study table 2.

TABLE 3: Numbers and percentages of antibiotics sensitivity test results for each type of Shigella species

Antibiotic name	S. sonnei %	S. dysenteriae %	S. flexneri %	S. boydii %
Ceftriaxone	100	95	95	100
Ceftizoxime	95	100	92	100
Amikacin	90	40	80	100
Gentamycin	86	30	85	100
Tobramycin	75	82	75	90
Nalidixic acid	82	25	80	80
Chlormophenicol	90	78	37	70
Ceftazidime	80	100	70	100
Ciprofloxacin	94	80	86	97
Cephlothin	58	100	60	27

Kanamicin	52	R	35	25
Ampicillin	5	100	1	33
Co-trimoxazole	20	100	15	28

DISCUSSIONS

Shigella was still big public problem in developing countries and this reflect to high people visit to hospitals and may lead to death also these pathogen remain as intermediate causes of mortality and morbidity in the developing and industrial countries, from these species of Shigella S. sonnei still a major species diagnosed in industrial countries(7,8 and 9) comparing with S. flexneri in which most species isolated in developing countries and low cost socioeconomic patients(6,8,10-14), in my study S. flexneri was the most predominant isolated species in which diagnosed from 65% of samples and these accepted with the study done by (6).

The species of genus Shigella appeared differences in respond to most antibiotics as follows: all isolates was sensitive to ceftriaxone, ceftizoxime, ciprofloxacin, gentamicin, amikacin and nalidixic acid on other hand most S. flexneri was resistance to ampicillin while S. dysenteriae appeared resistance to kanamycin otherwise large numbers of S. sonnei and S. boydii see resistance to ampicillin antibiotics and these same to results obtained by (6), the data obtained by this study appeared high rates of resistance in most species to ampicillin and co-trimoxazole and these results were same to results obtained by the centers of diseases prevention and control(7,8), on other hand chlormophenicol and ampicillin were broad spectrum antibiotics and both of them non expensive in developing countries and these most by related with increase resistance to these antibiotics or may be related to genetic bacterial change such as in case of mutations(9).

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