ETIOLOGY AND MANAGEMENT OF DIARRHOFAL DISEASES IN KARACHI

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ABSTRACT

The incidence of diarrhoeal disease are very high in our population and bacterial etiology amounts to 43.55% of all cases. Pathogen such as Aeromonas hydrophila, Plesiomonas shigelloides, Yersinia enterocolitica and Campylobacter are also present in significant numbers, they make up 50% of bacterial causes. All enteric pathogens can be easily isolated on commonly used media and could be precisely identified by simple biochemical tests. (JPMA 41: 211, 1991).

INTRODUCTION

Most diarrhoeal states are self-limiting and pose no special problem; they are often due to dietary indiscretions or mild gastro-intestinal infections. In Pakistan diarrhoeal disease is the commonest ailment which is encountered almost by every individual atleast once a year. Many infections of the gastrointestinal tract are spread by faecally contaminated water which is used for drinking, washing or cleaning teeth. The part of the gastrointestinal tract that invariably harbours microorganisms[1] is the large intestine, although faecal organisms can be recovered. It seems almost superfluous to list the organisms which can be encountered, many of them are ignored in search of enteric pathogens specially salmonellae and shigellae, which certainly donot represent the only microbes endowed with the potential of disease production. All members of the genus salmonella are capable of evoking the various clinical symptoms of salmonellosis and its complications. The various shigella can cause diarrhoea or the syndrome known as bacillary dysentry. Vibrio cholerae and related disease are encountered increasingly in many parts of the world. Enterotoxigenic and enteroinvasive E. coli are known to cause damage to the human intestine. Localized pathology of the large intestine may involve, Aeromonas spp., Plesiomonas species or Yersinia enterocolitica, the latter causing not only occasional gastroenteritis but also the symptoms of appendicitis. Haemorrhagic colitis is a recently recognized enteric infection due to E . coli strains of a specific serotype, 0157-H7. These strains cause a severe diarrhoea characterized by grossly bloody stools[2]. Over the past 20 years, Y. enterocolitica has been clearly demonstrated to he a significant cause of gastroenteritis[3]. Campylobacter jejuni (Helicobacter jejuni) one of the recent additions to the list of enteric pathogen, appears to be by far the most important species from the standpoint of human disease. In humans the disease usually occurs as diarrhoea sometimes with blood in the stool; abdominal pain, fever, nausea and sometimes vomiting. Aeromonas spp. are widely distributed in stagnant and flowing fresh water, in salt waters which interface with fresh water and in sewage[4,5]. Aeromonas spp. cause acute diarrhoeal disease of short duration, sometimes bloody or choleriform, occurring worldwicV and affecting any age[6]. Plesiomonas Shigelloides strains have been isolated from stool of diarrhoeic patients[6].

It is a common practice in our local laboratories to culture stool of diarrhoeic patient and only look for Salmonella, Shigella and rarely enteropathogenic E.coli, hence, a great majority of diarrhoeal cases go undiagnosed. We embarked upon a study to workout simple practicable methods which would give a true spectrum of pathogens causing diarrhoea.

MATERIAL AND METHODS

Specimens

2000 stools samples received in the laboratory from patients of gastrointestinal symptoms were cultured for the presence of enteric pathogens including Salmonella sp., Shigella sp., enteropathogenic E.coli, Aeromonas species, Plesiomonas, Yersinia sp., Campylobacter and Vibrio cholerae.

Culture

Stool samples were cultured on to MacConkey's medium (OXOID) T.C.B.S. Cholera medium and Skirrow's7. Campylobacter medium. The inoculated plates were incubated as follows;

MacConkeys

Plates were incubated aerobically at 35-37°C for 24 hours, colonies were examined and processed to that given in Figure.

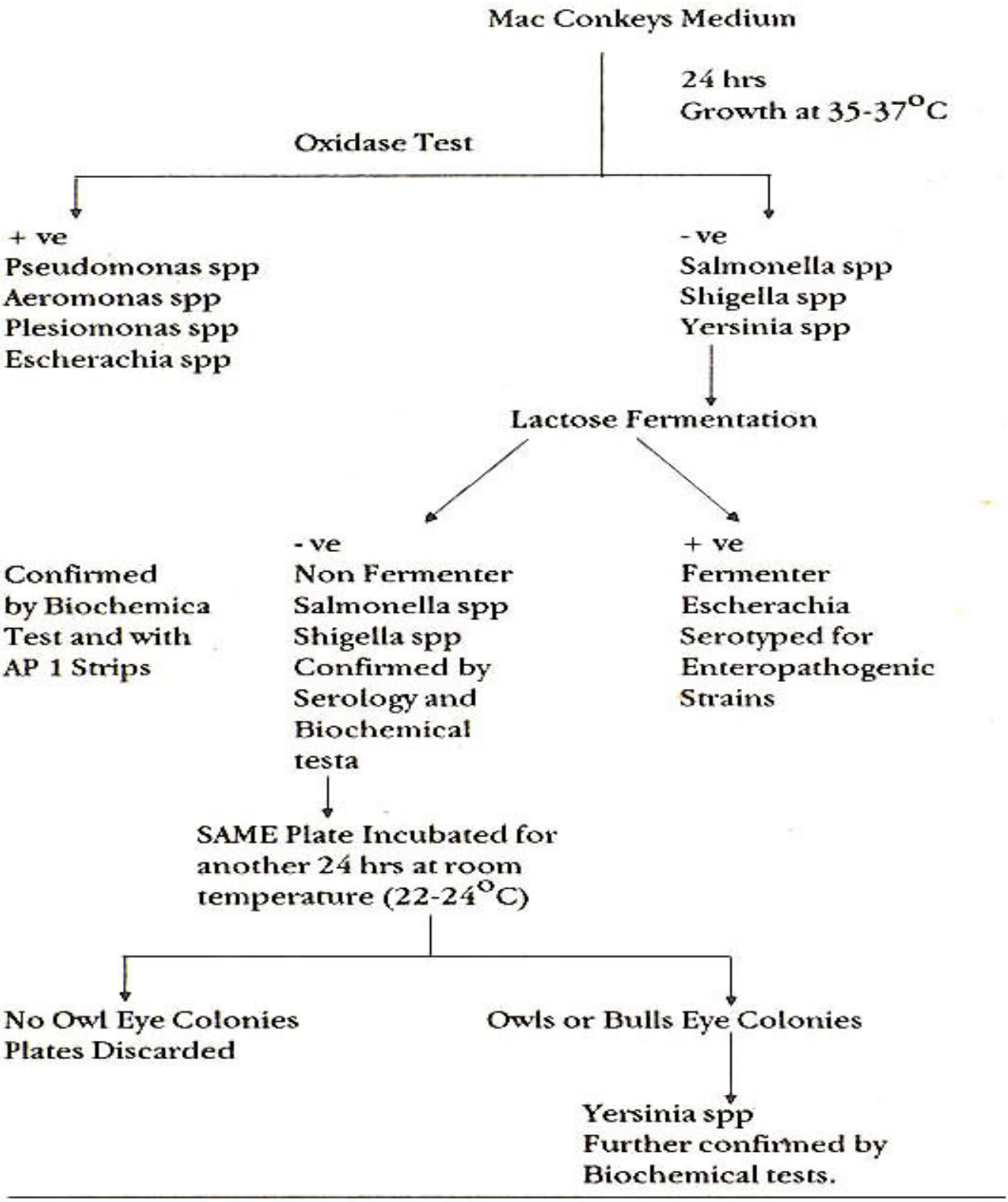

Figure. Processing growth on Macconkeys medium.

T.C.B.S. Plates:

Incubated aerobically at 35-37°C looked for the presence of typical vibrio colonies. Suspected colonies confirmed by biochemical and serological tests.

Campylobacter Medium Plates

Plates incubated at 42° to 43°C in a candle jar (5-10%C02) and plates examined after 24, 48 and 72 hours. Suspected colonies were confirmed by Gram stain, oxidase and biochemical tests.

Sensitivity test:

Sensitivity test was carried out by disc diffusion methods on oxoid sensitest agar.

Biochemical identification:

The isolates were inoculated in API enterobacteriaceae strips and the results compared with biochemical tests carried out in Triple Sugar Iron medium (T.S.I), Lysine Indole Motility (LIM) medium, citrate and urease medium alongwith catalase and oxidase test.

Results

TABLE I. Biochemical reactions the reactions of enterobacteriaceae & vibrio after 18-24 hours of incubaton at 35 °C.

Organisms	T.S.I. Slant	-AGAR Butt	Gas	H_2S	Lim-Medium Lysine	Indole	Motility	Citrate	Urease	Catalase	Oxidase
Escherichia	A(K)	A	+(-)	-	+(-)	+	+(-)	-	-	+	-
Shigella	K	A	-	-	-	d	-	-	-	Few(+)	-
Edwardsiella	K	A	+	+	+	+	+	-	-	+	-
Salmonella Typhi	K	A	-	+(-)	+	-	+	-	-	+	-
Salmonella Paratyphi (A)	K	A	+	-	+	-	+	-	-	+	-
Other Salmonella (sal.para(B)	K	A	+	+(-)	+(-)	-	+(-)	d	-	+	-
Citrobacter	K(A)	A	+	d	-	d	+	+	d	+	-
Klebsiella	A	A	+	-	+	-	-	+	+	+	-
Enterobacter	A	A	+	-	d	-	+	+	-	+	-
Hafnia	K	A	+	-	+	-	+	-	-	+	-
Serratia	K/A	a	d	-	+	-	+	+	d	+	-
Proteus	K/A	A	d	+(-)	-	d	+	d	+	+	-
Morganella	K	A	d	-	-	+	+	-	+	+	-
Vibrio Parahaemolyticus	A	A	-	-	+	+	+	+	-	+	+
Pseudomonas Aeruginosa	K	A	-	-	+	+	+	-	-	+	+
Aeromonas Hydrophila	A	A	d		-	+	+	+	-	+	+
Plesiomonas Shigelloides	A	A	-		+	+	+	-	-	+	+
Campylobacter							+	-	+	d	+
Acinetobacter	A	A	-	-	-	-	-	-	-	+	-
Yersinia Enterocolitica	A	A	-	-	-	d	+*	-	(+)- Late	+	-

Symbols
A = Acidic
K = Alkaline
+ Positive
(()) Occasional reactions
* Positive at 25°C

Table 1 summarizes the biochemical reactions of the total of 871 culturcs which included Salmonella typhi (86) Salmonella paratyphi A (102), Sal. paratyphi B(48), enteropathogenic E,coli (207), Shigella sp (40), Aeromonas hydrophila (154), Plesiomonas shigcllloides (175), Yersinia enterocolitica (43), Vibrio cholerae (4) and Campylobacter jejuni (12). Other bacteria normally isolated from faeces such as Citrohacter sp, Klebsiella sp, Edwardsiella, enterobacter hafnia, Serratia sp, Proteus sp, Morganella, vibrio para haemolyticus. A cinetobacter and pseudomonas aeruginosa were obtained as standard cultures from National type collection (NCTC) England and inoculated in the locally made TSI, LIM,citrate, and urease medium all of OXOID, The clinical isolates were also confirmed by Apl and serological tests. The reactions summarized in the table werefound to be reliable and reproducible and in agreement with the APJ and serological tests.

TABLE II. Breakdown of 200 Stool samples.

Species Isolated	Total Isolates	% Isolates
Salmonella spp	236	11.8
Salmonella typhi	86	
Paratyphi A	102	
Paratyphi B	48	
Enteropathogenic E. coli	207	10.58
Shigella spp	40	2.0
(Sh. Sonnei, Sh. dysenteriae and Sh. flexanari)		
Aeromonas hydrophila	154	7.7
Plesiomonas shigelloides	175	8.75
Yersinia enterocolitica	43	2.15
Vibrio chlorae	4	0.2
Campylobacter jejuni	12	0.6
Total isolates	871	43.55

Table II lists the isolates from 2000 stool samples yield of positive culture being 43.55%, of these only 24% of total were conventional pathogens i.e., Salmonella, shigella and Enteropathogenic E,coli. While almost equal number (20%) were found to be other bacterial enteric pathogens which are normally not reported and which includes Aeromonas hydrophila, Plesiomonas shigelbides and Yersinia enterocolitica.

TABLE III. Sensitivity pattern of enteric Isolates in %.

Species	Ampicilin	Augmentin	Septran	Chloramphenicol	Ofloxacin	Ceftrioxone	Velosef	Carbenicilin	Tetracycline	Fosfomycin	Cefotaxime
Salmonella	60	73	53	80	99	98	96	90	87	92	92
E.P.E.C.	93	97	87	91	100	100	98	95	82	97	96
Shigella	68	73	54	83	100	100	83	83	78	80	92
Aeromonas	Nil	33	60	93	100	100	78	Nil	86	96	85
Plesiomonas	50	70	70	95	100	100	58	90	70	76	80
Yersinia	40	48	20	80	100	100	80	92	67	80	80
Other	50	72	45	80	100	100	80	92	80	96	88
Total	51.57	66.57	55.57	86	99.85	99.7	81.85	77.42	78.57	88.14	87.57

Table III gives the sensitivity pattern of all the enteric pathogens and it appears that the sensitivity varies with individual pathogen. On one hand enteropathogenic E.coli arc sensitive to the eommonlyused antibiotics while there is increasing resistance among other enteric pathogen to the commonly used antibiotics.

DISCUSSION

The study clearly illustrates that diarrhoeal illnesses are very common in Karachi and bacterial etiology amounts to 43% of the total cases, apart from the conventional pathogens such as Salmonella, Shigella and Enteropathogenic E. coli. There is also the existance of other recently established pathogen such as Aeromonas hydrophila, Plesiomonas shigelloides, Yersinia enterocolitica, Vibrio cholerae and Campylobacter jejuni. The isolation of the pathogen is not difficult and certainly not a very costly affair, it can be achieved easily and is reproducible, simpler methods can be used. The antibiotic sensitivity pattern is quite alarming as the commonly used antibiotics seem to be losing their effectiveness while the recently introduced antibiotics are atleast for the present very effective although these antibiotics have certain limitations and it is better to be cautious in using them, their usage should be controlled.

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