

PREVALENCE AND ANTIBIOTIC SUSCEPTIBILITY OF LACTOSE FERMENTING *ENTEROBACTERIACEAE* FROM HOSPITAL CLINICAL SAMPLES

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ABSTRACT:

The study to investigate the multidrug resistance of lactose fermenting Enterobacteriaceae organisms to conventional pattern of antibiotic drugs are used to determine the susceptibility and resistance. More than 1000 different samples are collected from variety of clinical labs and hospitals and from in these samples lactose fermenting organisms screening for further study. Nearly 40 lactose fermenting strains are used to test different antibiotics like streptomycin, Impenem, Cefaxime, Ceftaxin, Azthrimycin, Ciproflaxin, nalidixic acid and Tetracycline are 60%, 70%, 40%, 50%, 60%, 55%, 65% Resistance to those antibiotics. The present study shows the poor sanitation, improper hygienic maintains and contamination of food and water are main causes.

Key words: Lactose, Enterobacteriaceae, drug resistance, susceptibility, antibiotics, fermenting.

[I] INTRODUCTION:

Gram negative bacilli belonging to the family *Enterobacteriaceae* are the most frequently encountered bacterial isolates recovered from clinical specimens. The members of *Enterobacteriaceae* may be incriminated in

virtually any type of infectious disease and recovered from any specimens received in the laboratory. Immuno compromised patients are highly susceptible environmental strains or following invasive such as catheterization,

bronchoscopy, colposcopy or surgical biopsies [1]. MacConkey agar is a commonly used primary plating medium in many clinical microbiology laboratories.

However, manual and computer literature searches showed only a few past [2,3] and current [2,4,5] references dealing with specific interpretation of growth on this agar. Since this medium is so common, and because it can provide timely clues as to the identification of some Gram-negative bacilli, it behooves microbiologists to be efficient in interpreting colonial growth. Initial conjecture as to the possible identification of an organism can then be compared with the final identification and antimicrobial susceptibility results as part of a quality control process. Our main goal was to develop a means for facilitating accurate preliminary grouping of some common lactose-fermenting Enterobacteriaceae.

Enterobacteriaceae may account for 80% of clinical significant isolates of gram negative bacilli and 50% of clinically significant bacteria in clinical microbiology. They account for nearly 50% of septicemia cases, more than 70% of UTI a significant percentage of intestinal infections[7] and some important pathogens like *Klebsiella pneumonia* are involved in hospital acquired infections[8]. In some studies on critical illness patients in hospitals *Enterobacteriaceae* accounted for 24.6% of blood stream infections, 48% cases of UTI and 14% of tracheal aspirates[9]. Some members of the *enterobacteriaceae* family like *Serratia* & *Citrobacter* are emerging as significant pathogens [10].

In this study isolation and identification of lactose fermenting bacteria by using different types of gram negative bacilli is morphological, biochemical test used to identify. Mainly lactose fermenting organisms including *E-coli*, *Klebsiella pneumoniae*, *Citrobacter freundii*, *Citrobacter koseri* and *enterobacter* species.

In the present study indicates the lactose fermenting Enterobacteriaceae and other many bacteria, which evoke hospital acquired infection, including *E-coli*, *Pseudomonas aerogenosa*, and *Enterococcus*, *Klebsiella* and *Staphylococcus aureus*. The serious problem of hospital acquired infection has become more increase in multiplication of antibiotic resistance bacteria, since the early 1980s. Despite tremendous progress in medical & Pharmaceutical fields, even today hospital acquired infection with *Enterobacteriaceae* has become as troublesome as it is used to in the 2000s one of the reason for this occurrence of multidrug resistance strains of *Enterobacteriaceae*.

[II] MATERIALS AND METHODS:

Isolation and identification of *Enterobacteriaceae* species from different clinical laboratory samples.

2.1. Collection of clinical samples:

Collect the different clinical samples like Urine, pus, sputum, blood, faecal matter, etc from different clinical laboratories and hospitals twice or thrice a week and transport the samples to lab with transport media and kept for incubation.

2.2. Isolation of lactose fermenting Enterobacteriaceae:

Collected samples are incubated and after incubation inoculated in to the separate culture media plates with different media. kept for incubation then observe the colonies on the media some get lactose fermenting colonies and they are very small and pink in color and non lactose fermenting colonies are colourless. further studies are carried out by using other morphological, staining and Biochemical methods are used for identification.

2.3. MacConkey's Agar media:

This media is selective media for the growth of the lactose fermenting organisms in some times contaminating organisms also grows so, further identification is essential.

2.4. Screening of lactose fermenting organisms:

Further screened lactose fermenting organisms by using different biochemical studies like sugar fermentation, IMVIC tests.

2.5. Lactose fermenters are divided into two groups on the basis of indole test:

- i. Indole positive group of lactose fermenters
- ii. Indole negative group of lactose fermenters.

i. Indole positive group includes: *E-Coli*, *Citrobacter* species (other than *citrobacter freundii*) *Klebsiella oxytoca*. these further differentiate on the basis of their ability to grow on Simmons citrate medium, Urease and indole test.

ii. Indole Negative group includes: *Citrobacter freundii*, *klebsiella pneumonia* and *enterobacter species*, *enterobacter* are differentiate from other by H₂S production in Kligler iron agar. *Klebsiella* & *enterobacter* are differentiated by growth in Simmons citrate medium and urease test

2.6. Antimicrobial susceptibility pattern:

Totally all isolates are subjected to test antimicrobial susceptibility test. Our objective to study resistance to the commonly used conventional antibiotics in these areas. Penicillin, ampicillin, amoxicillin, gentamycin, tetracycline, erythromycin, methicillin and vancomycin the disc diffusion method for in vitro antibiotics susceptibility test Kirby – Bauer [11] was used in the study.

[III] RESULTS:

Isolation and screening of enterobacteriaceae Species from different clinical samples like blood, urine, sputum, pus, stools and serum samples and predominately we isolated and screened lactose fermenting organisms by using different types of cultural methods and other characterization with different techniques.

Lactose fermenters are isolated from stools, blood, urine etc are contains more number of cells compare to the other samples like pus, sputum, CSF.

In our study we collected more than 500 samples for the isolation more strains from the stool, blood and urine are more contaminated with lactose fermenting microorganisms compare with other samples. In this we observed very important factors i.e. age group and sex of the patients. Most of the cases small children's, adults are more sufferer than the middle age and old age group and sex also more strains are isolated from adult females than males as shown in (Table-1).

Age	Male	Female	Total (%)
Neonates(0-28 days)	02	05	07
Pediatrics(1-10)	25	40	65
Teenage(11-20)	60	80	140
Adults(21-30)	75	98	173
Middle age(31-40)	40	20	60
Late middle(41-50)	20	25	45
Old age (50 onwards)	25	35	60

Table 1. Age and sex distribution of patients suffering from *Enterobacteriaceae* infections

[IV] DISCUSSION:

In this study all the isolates are isolated from the different clinical samples especially Enterobacteriaceae from the intestinal tract

infecting organisms. The isolates majority of them are faecal matter, urine, blood and other samples. *Enterobacteriaceae* species nearly 65% of them are UTI and 30-35% of them Septicemia cases.

Antibogram of the isolated *enterobacteriaceae* from different clinical samples and all the isolates are used for different antibiotics for testing the resistance and susceptibility by disc diffusion method.

Selected antibiotics are used for resistance of *Enterobacteriaceae* as given in the figure-1. some of the strains are highly resistance to most of the antibiotics and some are intermediate few of them susceptible. In this study the most of the strains susceptible and resistance to the drugs like streptomycin, Azithromycin, ciproflaxcin, nalidixic acid, tetracycline, cefaxime, ceftaxime and tetracycline are the most important drug are used as shown in figure-2.

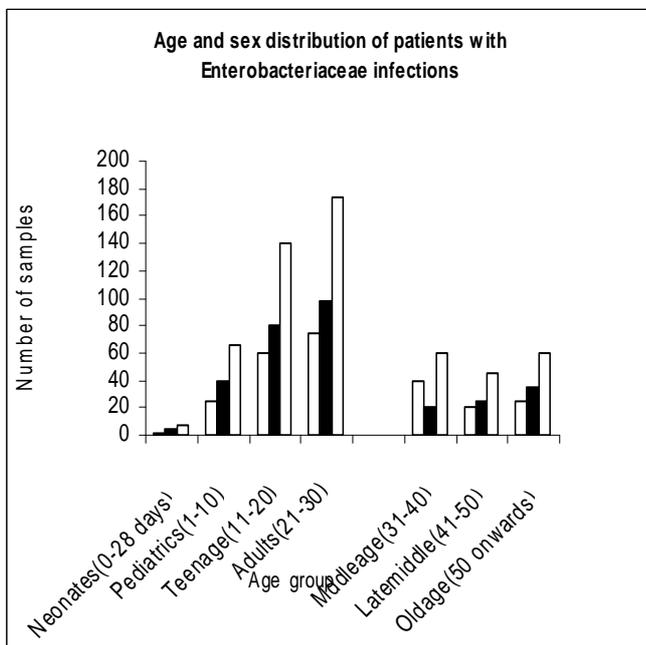


Figure 1. Age and sex distribution of patients suffering from *Enterobacteriaceae* infections

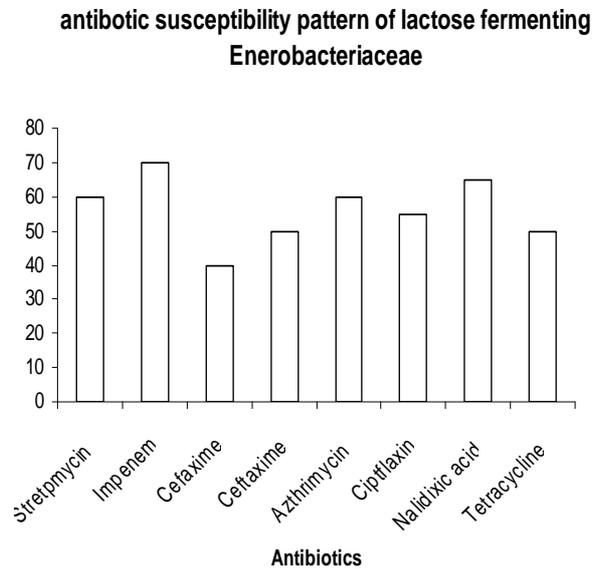


Figure-2 Antibiotic Susceptibility pattern: CONCLUSION:

Enterobacteriaceae especially gram negative bacilli mainly *E-coli*, *klebsiella*, *Shigella*, and *citrobacter* are very important Enterobacteriaceae species (7,8). Among these very common pathogenic organisms are *E-coli*, *Proteus*, and *klebsiella* are causes infections in the urinary tract and other species of organisms are highly pathogenic and are not easily contaminate (10). They are causes severe infections and are very specific type of organisms like *Shigella*, *E-coli*, *citrobacter* etc.

The present study indicates that the antibiotic susceptibility of lactose fermenting Enterobacteriaceae form the different clinical samples as shown in figure 2 the most of the strains are resistance, some of them are susceptible. It shows poor sanitation and hygienic maintenance and figure 1 as compare with the different age groups of patients, most of the isolates from adults or middle age and children's is more sufferer than the other age

groups. One more observation we observed in this study males are more sufferer than the females.

REFERENCES:

- [1] Winn W.Jr.Allen et al., [2006] *Enterobacteriaceae* Koneman's Atlas and text book of Diagnostic Microbiology Lippincott Williams and Wilkins, USA, 212-289.
- [2] A. MacConkey, [1985] J. Hygiene 5: 333-378
- [3] E.W. Koneman, S.D. Allen, V.R. Dowell, Jr. and H.M. Sommers (Eds.), [1983]*Color Atlas and Textbook of Diagnostic Microbiology*, 2d ed., J.B. Lippincott Co., Philadelphia, PA, pp. 57-124.
- [4] E.W. Taylor, in J.C. Clough, J.F. Beale and E.V. Suckling, [1949]*The Examination of Waters and Water Supplies*, 6th ed., The Blakiston Co., Philadelphia, PA,.
- [5] H.D. Isenberg, J.A. Washington, III, A. Balows and A.C. Sonnenwirth, in H. Lennette, A. Balows, W.J.Hausler, Jr. and H.J. Shadomy (Eds.), [1985] *Manual of Clinical Microbiology*, 4th ed., American Society for Microbiology, Washington, DC, pp. 73-98.
- [6] A.C. Sonnenwirth, in A.C. Sonnenwirth and L. Jarett (Eds.), [1980] *Gradwohl's Clinical Laboratory Methods and Diagnosis*, 8th ed., C.V. Mosby Co., St. Louis, MO, Vol. 2, pp. 1554-1628.
- [7]. Murray PR, et.al.[2009]extended spectrum Amp C and metallo-beta-lactamases in *Serratia & citrobacter Spp.* In a disc Approximation assay.Journal of Infection in developing Countries. 3(4) 285-294.
- [8]. Shukla I.et al.,[2004] prevalence of extended spectrum Beta-lactamase producing *Klebsiella pneumonia* in a tertiary care hospital. Indian journal of medical Microbiology, 22(2):87-91.
- [9]. Carvallo RH, Fillo PPG,[2008] Epidemiologically relevant antimicrobial resistance phenotypes in pathogens isolated from critically ill patients in a Brazillian University Hospital, Brazillian Journal of Microbiology, 39:623-630.
- [10]. Rizvi M.etal., [2009]Extented spectrum AmpC and Metallo-beta Lactamases in *serratia & citrobacter Spp.* In a disc approximation assay.Journal of infection in developing Countries,3(9) 285-294.
- [11]. Kirby-Bauer, J.C.Sherris&M.Turcle.[1996] Antibiotic sensitivity testing by a standard single disk method. American Journal of clinical Pathology, 45:493 -496.