European Science Methodical Journal
ISSN (E): 2938-3641
Volume 2, Issue 5, May - 2024

BACTERIAL SPECIES THAT CAUSE URINARY TRACT INFECTIONS IN PREGNANT WOMEN

Halala Mohammed Abdulla 1
College of Dentistry/Alkitab University-Iraq
halala.mohamed@uoalkitab.edu.iq

Ibrahim Mohammed Saeed Hussein 2
Kirkuk Technical Institute/ Northern Technical University-Iraq
ibr.aldawdy@ntu.edu.iq

Abstract:

100 samples of urine were collected from pregnant women suffering from urinary tract infections of varying ages. The samples were planted on solid culture media (blood agar, MacConkey agar, and mannitol salt agar), where they incubated at a temperature of 37 Co for 24 hours. After culture, the samples were diagnosed. Direct method by microscope and indirect method using biochemical tests, and the diagnosis was confirmed using the Api 20 E system, where isolate 112 was isolated. The results of the study showed five types of bacteria causing urinary tract infections, which included Escherichia. coli with a percentage of 37%, Staphylococcus. aureus with a percentage of 25%. %, Klebsiella. pneumonia by 19%, Staphylococcus. epidermidis by 11% and pseudomonas. aeruginosa by 8%. Seven types of common antibiotics were used, and the results showed that all samples were 100% resistant to Trimethoprim, Erythromycin, Ampicillin and Tetracycline, and 78% resistant to Augmentin, and the results showed high sensitivity to Meropenem and Amikacin, with rates of 81 and 74, respectively.

Keywords: UTI, pregnant women, Bacterial species.

Introduction

Urinary tract infection: Is one of the health problems that most countries suffer from, as it comes second after respiratory tract infections, where all age groups, males and females, are infected with urinary tract infections [1][2]. Because the female urethra is shorter and considerably closer to the anus than the male urethra, women are generally more prone to urinary tract infections than men [3][4]. Also, females lack the advantage of secreting inhibitors of bacteria secreted from the prostate gland, as well. Among women, pregnant women are more susceptible to urinary tract infection due to weak immunity during pregnancy [5][6]. The main agents cause of UTI is the Uropathogen *E. coli* (UPEC) bacteria, which constitute (80-85%), while Staphylococcus constitutes (5-10) percent of uncomplicated UTI infections [7][8]. The aforementioned Gram-positive bacteria have many factors that contribute to increasing their pathogenicity, directly or indirectly. These factors are called virulence factors, such as urease

production, hemolysis, bacteriocin production, beta-lactamase production, biofilm formation, and others [9]. The world has come to know that the bacterial agents that cause urinary tract infections are becoming more resistant to antibiotics. This is especially true of widely used antibiotics, as this has caused the bacteria to develop defense mechanisms against the antibiotics and increased rates of resistance have been linked to patient use of antibiotics. [10].

Materials and Method

Sampling: 100 samples were collected from the urine of pregnant women who suffer from urinary tract infections, where the samples were collected using sterile collection cups, then samples were placed in sterile tubes and placed in a centrifuge for five minutes, then the sample was poured out and the sediment was kept. From solid media, which are mannitol salt agar, MacConkey agar and blood agar, then incubate the media in the incubator for 24 hours at a temperature of 37 C^{o}.

Diagnosis: After incubation, a direct examination was carried out by microscope using a gram stain to find out the shape of the bacteria, as well as positive and negative for the gram stain, then biochemical tests were conducted to diagnose the types of bacteria, and the diagnosis was confirmed using the API 20E system.

Antibiotic susceptibility test: Antibiotic susceptibility test: Eight commonly used antibiotics were employed, include (Augmentin, Nitrofurantoin, Tetracycline, Trimethoprim, Ampicillin, Erythromycin, and Amikacin).by using (Kirby-Bauer method), where a suspension was prepared from each sample to be tested for antibiotic sensitivity. The density of the bacterial suspension were compared with the McFarland standard turbidity, then suspension was planted by sterile swabs on Mueller-Hinton medium by streaking method, after which antibiotic discs were placed on the surface of the solid media and incubated for 24 hours at 37 ° C. After incubation, the zone around the discs that had no growth was measured and compared with fixed measurements to know the sensitivity of the isolates to the antibiotics used.

Results and Discussion

Samples were taken from pregnant women who suffering from UTI, where the study showed that all samples were positive for bacterial culture and 112 bacterial isolates were isolated for five types out of 100 samples, and they were as follows: 41 isolates from *E. coli* with a percentage of 37%, 29 isolates from bacteria *S. aureus* by 25%, 21 isolates from *K. pneumonia* by 19%, 12 isolates from *S. epidermidis* by 11% and 9 isolates from *P. aeruginosa* by 8%. The reason for the high percentage of *E. coli* isolates that cause inflammation is due to their large presence in the human intestine, and the vaginal opening in women is close to the anus, which causes easy transmission from the anus to the vagina[11].As in Tables (1).

European Science Methodical Journal
ISSN (E): 2938-3641
Volume 2, Issue 5, May - 2024

Table No. (1) Shows the percentage of isolates causing UTI pregnant

No	Species	Isolates	percentage
1	*Escherichia. coli*	41	37%
2	*Staphylococcus. aureus*	29	25%
3	*Klebsiella. pneumonia*	21	19%
4	*Staphylococcus. epidermidis*	12	11%
5	*pseudomonas. aeruginosa*	9	8%
Total		112	100%

Antibiotic resistance: In this study, seven types of commonly used antibiotics were used, as the study showed multiple resistance of the isolates towards the used antibiotics, where all the isolates showed a high resistance of 100% to the following antibiotics Trimethoprim, Erythromycin, Ampicillin and Tetracycline, and a resistance of 78% to an antibiotic. Augmentin showed high sensitivity to meropenem and amikacin, with rates of 81 and 74, respectively. The high resistance of the isolates is due to the irregular and indiscriminate use of antibiotics randomly, as the results showed that 68% of the samples showed multiple resistance to more than one antibiotic. As in Figure (1**).**

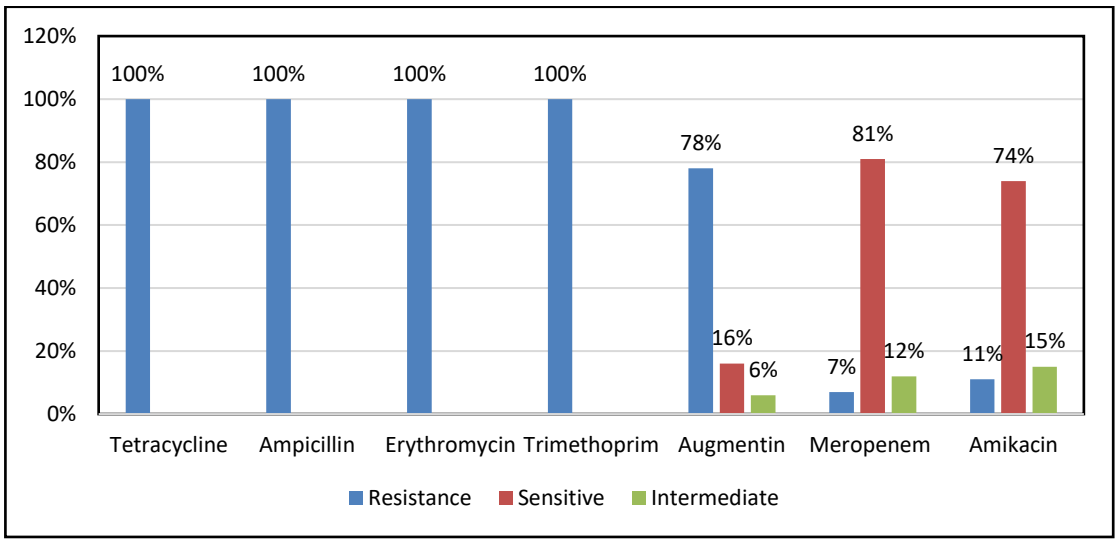

Figure (1) Shows sensitivity of isolates to the antibiotics

Conclusion

It was concluded that the following five bacterial species (*Pseudomonas. aeruginosa*, Staphylococcus. epidermidis, Klebsiella. pneumonia, Staphylococcus. aureus and Escherichia. coli) mainly cause bacterial urinary tract infections, and that Escherichia. coli are more likely

to be infected, and multiple antibiotic resistance was also concluded, as resistance appeared in all samples by 100% for Trimethoprim, Erythromycin, Ampicillin and Tetracycline antibiotics, and the best antibiotics are Meropenem and Amikacin for the treatment of UTI.

References

1- Najar M.S , Saldanha C.L. and Banday K.A . (2009). Approach to urinary tract infections. Indihar Journal of Nephro log y . Oct ; 19 (4): 128- 139 .

2- Ibrahim Mohammed Saeed Hussein; Sameerah Hasan Abdullah; Sameen Fadel Mohammed (June 2019) "Effects of Infrared Radiation on *Escherichia coli* Isolated from Appendectomy". Indian Journal of Public Health Research & Development, June 2019, Vol.10, No. 6.

3- HPA. UK Standards for Microbiology Investigations: Investigation of Urine. London: Health Protection Agency, 2012. [cited 2012]; Available from: Jacob, J. (2015). Antibiotics approved for use in conventional poultry production. Availableat: pages/66981/antibiotics-approved-foruse-in-conventional-poultry-production#.ViZ 2Z9LhBdg accessed on 29/09/2015.

4- Burhan A. Mohammed ; Siham Sh. Al-salihi ; Ibrahim Mohammed Saeed Hussein (2018) "Tuberculosis Correlation with Age and Gender in Kirkuk City-Iraq". Journal of Global Pharma Technology, 2018, Vol.10, issue. 11: 599-602

5-Naber, K.G., M.C. Bishop, T.E. Bjerklund-Johansen,H. Botto, M. Çek, M. Grabe, B. Lobel, J. Palou and P. Tenke .(2006). Guidelines on The Management of Urinary and Male Genital Tract Infections.European Association of Urology 2006.

6- Ibrahim Mohammed Saeed Hussein ; Jalank Hameed Mahmoud; Halala Mohammed Abdulla (2020) " MIC of some plant extracts against E.coli isolated from UTI". Systematic Reviews in Pharmacy, 2020, Vol.11, No. 11: 790-792 .

7- Kumar, A , Kamal C M ,Dermurari D, Singh S N. (Aag . 2015) . Ofloxacin and Nitro furantion sensitivity pattern In patient of Urinary Tract infection (U T I) at atertiary care teaching hospital (LABCR) International Archives of Bio Medical and clinical Research. July – Sept 2015 . vol 1 ; Issue I; p : 17 .

8- Karlsson S, Varpula M, Ruokonen E, Pettila V, Parviainen I, Ala- Kokko TI, Kolho E & Rintala EM (2007) Incidence, treatment, and outcome of severe sepsis in ICU-treated adults in Finland: the Finnsepsis study. Intensive Care Med 33: in press.

9- Hassan, A. ; Usman, J. ; Kaleem, F. ; Omair, M. ; Khalid, A. and Iqbal, M. (2011) Evaluation of different detection methods of biofilm formation in the clinical isolates .The Brazilian Journal of Infectious Diseases . 15(4): 305-311.

10- Lalitha, M. K., 2004. Manual on Antimicrobial Susceptibility Testing.http://www.scribd.com/doc/47234185/Antimicrobial.Retrived:12/1/2011.time:8:10 PM.

11- Hussein IMS, Mahmoud JH, Hassan IS. Bacterialspecies causing secondary pneumonia infection in pregnant women with COVID-19. J Pharm Bioall Sci 2023;15(2):182-184.