Volume 2(2): 2024, Page 25-28

Isolation and Identification some of Bacteria Causing Nosocomial Infections in the General of Samarra Hospital

Aqeel Majid Alabbasi

1. Department of Biology, University of Samarra, Iraq.
alabbasi.aqeel2@uosamarra.edu.iq

Abstract: This study was done to isolation and then identification some the bacteria which presented in the General of Samarra hospital which could cause nosocomial infections. Nosocomial infections included any disease caused by the patient under the medical care. In this study collected randomly 80 samples from different sources including (urinary tract infection (UTI), swab of surgical site, bloodstream and swab of wound) during beginning January 2023 to end may 2023 in the General of Samarra Hospital. Isolates bacteria recorded Escherichia coli highest (43.75%), followed by Klebsiella (20.25%) in six types of isolated bacteria include: Escherichia coli, Klebsiella, Acinetobacter, Enterobacter, Proteus spp., and Pseudomonas aeruginosa. this study showed that the urinary tract infection was the most common site (35 %) compared with other nosocomial patients.

keywords: Nosocomial infections, UTI, Surgery site, Bloodstream and Wound.

Copyright: © 2023 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1 Introduction

The nosocomial infections that all infections develop after 48_72 hours in patients during stay in the hospital or during take clinic facilities [1], and it may apparent clinically either during the hospitalization or after discharge [2]. The pathogens cause such those infections are termed nosocomial pathogens [3]. Based on precise biological and clinical criteria, the National Healthcare Safety Network has categorized nosocomial infections into 13 different types and 50 infection sites [4]. Nosocomial infections are one of the main risk factors for significant health problems that might be fatal these days [5]. Approximately 75% of the burden of these illnesses is seen in underdeveloped nations [6]. Pathogens can be detected in bodily fluids such as blood and cerebrospinal fluid, or in sterile body locations [7]. Nosocomial infections are those that are contracted by hospital employees, visitors, and other healthcare personnel [8].

Ninety percent of nosocomial infections are mostly caused by bacteria, with smaller contribution from fungi, protozoa, viruses, and mycobacteria [9]. The wounds are an important consideration to transmitted contaminate to blood stream, post-operative, urinary catheter and others. The most risk factors included immunosuppression, obesity, malnutrition and age. also, the length of the procedure is the most important risk factor since it increases the likelihood of contamination because of the time the tissue is exposed to the environment [10], [11].

2 Methods

Eighty samples were taken for this investigation from patients (aged 20–45) who had spent more than 48 hours in various locations within the General of Samarra Hospital. these samples were collected between January 2023 and May 2023. Random sampling was done on people (patients) from various infections, using samples of their urine, blood, and surgical sites. The patients' age, gender, hospital ward, infection location, and kind of microbiological infection.

After being separated from the pure colonies, the bacteria were cultivated on nutrient agar, blood, McConkey, chocolate, and other types of agars. Each bacterial isolate was then examined to identify its cultural, microscopal, morphological, biochemical, and physiological characteristics [12]. Colonies were characterized using their diameter, color, forms, and other attributes [13].

3 Results

The total 80 samples from different sources included urine, swab of wounds, blood and swab of surgery sites. the result of bacteria isolated from infections caused by nosocomial infections were urine samples 28(35%), surgery sites were 21(26.25%), while the blood stream samples were 18(22.5%), and wound samples were 13(16.25%) as shown in (Table 1). The major goal of collecting samples was to isolation and identification the major types of bacteria that responsible of nosocomial infections in patients. The isolates obtained and identified according to several morphology, physiology and biochemistry tests as shown with (Table 2). In this study found that Escherichia coli isolated from all samples, as well as Klebsiella and Enterobacteriaceae. On the other hand, Pseudomonas aeruginosa was the least present in the isolated bacteria. the urinary tract infection was the most common site (35%), followed by surgical sites (21%), bloodstream (18%) as for the least it was swab of wound (13%) as a common source of pathogenic bacteria.

Table 1: Number and percentage of patients with nosocomial infection isolates according to sample source

Source of Sample	No. of Sample (%)
Urine (urinary tract infection)	28 (35%)
Surgical site	21 (26.25%)
Bloodstream	18 (22.5%)
Swab of wound	13 (16.25%)
Total	80

Table 2: The types with sources of bacterial isolates obtained from the different samples

Type of bacteria	Urine	Surgical Site	Blood	Wounds	Total Infection
Escherichia coli	13(16.25%)	9(11.25%)	8(10%)	5(6.25%)	35(43.75%)
Klebsiella	5(6.25%)	7(8.75%)	5(6.25%)	3(3.75%)	20(25%)
Acinetobacter	4(5%)	-	-	2(2.5%)	6(7.5%)
Enterobacter	2(2.5%)	2(2.5%)	3(3.75%)	1(1.25%)	8(10%)
Staphylococuus aurues	2(2.5%)	1(1.25%)	2(2.5%)	-	5(6.25%)
Proteus spp	-	2(2.5%)	-	2(2.5%)	4(5%)
Pseudomonas aeruginosa	2(2.5%)	-	-	-	2(2.5%)
Total	28(35%)	21(26.25%)	18(22.5%)	13(16.255)	62(100)

4 Discussion

According to the study's findings, E. coli was the most common infection (43.75%), While in the other study to Javanbakht et al. [14] Klebsiella was the most continual pathogen. while, Sohrabi et al. [15] showed that Klebsiella and E. coli were the most widespread bacteria in their study about nosocomial infections. in the other hands, Taj et al., [16] in their results on their hospital in Jammu and Kashmir which found that Pseudomonas spp. had the largest proportion of the ten different species of bacteria that were identified, followed by Klebsiella spp. and E. coli. Proteus spp. had the lowest percentage. while in our study Pseudomonas aeruginosa was the least present among isolated bacteria.

The study's findings indicated that the urinary tract infection was the most typical location (35%) compared with other nosocomial patients. this result similar to found in Italy by Pellizzer et al. [17], [18] the most common locations of infections were the urinary tract (28.4%), surgical sites (20.3%), and bloodstream (19.3%), in that frequency [19]. Urinary catheterization was the most causes of urinary tract infections between the hospitalized patients [20], [21-22].

Differences may be due to patient numbers, study site, and genetic susceptibility. and the environmental and genetic condition of the study sample.

5. Conclusion

The most notable and significant ways to reduce nosocomial infections and their negative effects include cleanliness, hand washing, the use of sterile gloves by health-related professionals, careful wound care, and a nutritious diet.

References

1- PRAKASH SK. Nosocomial infection an overview. In: Maulana Azad Medical College, New Delhi: 2001; 6: 1-13.
2- HÄUBLER S. Sociomicrobiology: New approaches to understand chronic infectious diseases. Helmholtz Centre Infect Res 2007; 4: 301-305.
3- Kadhim, N. M., & Hamad, A. A. (2024). Mathematical Foundations and Principles Behind These Methods. In Coding Dimensions and the Power of Finite Element, Volume, and Difference Methods (pp. 116-133). IGI Global..
4- Raka, L., Zoutman, D., Mulliqi, G., Krasniqi, S., Dedushaj, I., Raka, N., . . . Elezi, Y. (2006). Prevalence of Nosocomial Infections in High-Risk Units in the University Clinical Center of Kosova. Infection Control & Hospital Epidemiology, 27(4), 421-423. doi:10.1086/503387 .
5- Brusaferro S, Arnoldo L, Cattani G, Fabbro E, Cookson B, Gallagher R, et al. Harmonizing and supporting infection control training in Europe. J Hosp Infect 2015; 89(4): 351-6.
6- Obiero CW, Seale AC, Berkley JA. Empiric treatment of neonatal sepsis in developing countries. Pediatr Infect Dis J 2015; 34(6): 659-61.
7- Kadhim, N. M., & Meenakshi, R. (2022). The Effectiveness of Role Play Method in technical Learning English among Fifth Grade Pupils in Iraq. LARK JOURNAL FOR PHILOSOPHY, LINGUISTICS AND SOCIAL SCIENCES, 14(3 1ج).
8- Murray PR, Rosenthal KS, Pfaller MA. Medical microbiology. 5th ed. Missouri: Mosby Inc; 2005.
9- Lolekha S, Ratanaubol B, Manu P. Nosocomial infectionin a teaching hospital in Thailand. Phil J Microbiol Infect Dis 1981; 10: 103-14.
10- Gatermann S, Funfst ¨ uck R, Handrick W, Leitritz L, Naber KG, ¨ Podbielski A, et al. [MIQ 02: Urinary Tract Infections: Quality standards for microbiological infections]. Munchen: Urban & ¨ Fischer; 2005, p. 8-21. German
11- Mukagendaneza MJ, Munyaneza E, Muhawenayo E, Nyirasebura D, Abahuje E, Nyirigira J, Harelimana JD, Muvunyi TZ, Masaisa F, Byiringiro JC, Hategekimana T, Muvunyi CM. Incidence, root causes, and outcomes of surgical site infections in a tertiary care hospital in Rwanda: a prospective observational cohort study. Patient Saf Surg. 2019;13:10 .
12- Gibbons C, Bruce J, Carpenter J, Wilson AP, Wilson J, Pearson A, Lamping DL, Krukowski ZH, Reeves BC. Identification of risk factors by systematic review and development of risk-adjusted models for surgical site infection. Health Technol Assess. 2011 Sep;15(30):1-156, iii-iv .
13- Hamad, A. A., Khalil, M. M., Al-Obeidi, A. S., Al-Azzawi, S. F., & Thivagar, L. (2024). Complex networks applied to the analysis of the dynamics of social systems. International Journal of Grid and Utility Computing, 15(1), 97-103.
14- Macfaddin, J. (2000). Biochemical Tests of Medical Bacteria. (3rd ed.). Lippincott Williams and Wilkins, U.S.A.

15- Javanbakht A, Askari E, Danesh L, Moghadas N, Mostafavi I, Naderinasab M. The incidence of cross infections in Imam Reza hospital, Mashhad, Iran. Iran J Microbiol. 2012;4(4):177–9.
16- Sohrabi MB, Khosravi A, Zolfaghari P, Sarrafha J. Evaluation of nosocomial infections in Imam Hossein (as) Hospital of Shahrood, 2005. J Birjand Univ Med Sci. 2009.
17- Hamad, A. A., Abdulhameed Hussein, H., Raad Ibrahim, H., & Ahmed Shawkat, S. (2024). Minimization of Gaussian Noise in Voice Signals Using Wavelets and Dynamics Transform. Fluctuation and Noise Letters.
18- Pellizzer G, Mantoan P, Timillero L, Allegranzi B, Fedeli U, Schievano E, et al. Prevalence and risk factors for nosocomial infections in hospitals of the Veneto region, north-eastern Italy. Infection. 2008;36(2):112–9.
19- Hamad, A. A., Khalf, M. F., Abdoon, F. M., & Thivagar, M. L. (2024). Analysis of Dynamic Systems Through Artificial Neural Networks. Tikrit Journal of Engineering Sciences, 31(2), 148-158.
20- Kalsi J, Arya M, Wilson P, Mundy A. Hospital-acquired urinary tract infection. Int J Clin Pract. 2003;57(5):388-91. PMid:12846343
21- Anaz, S. S., Alabbasi, A. M., & Tayyeh, A. M. (2023). Characteristics of trauma patients with multidrug-resistant bacteria from an epidemiological, clinical, and microbiological perspective. Tamjeed Journal of Healthcare Engineering and Science Technology, 1(2), 1-19.
22- Abdoon, F., Bichan, M. J., Mohamed Ibrahim, A., Mundher Tayyeh, A., Kishore, M., & Abdelhakeem Khalid, A. (2022). [Retracted] Ternary Complexation Process for New Spectrophotometric Assay of Levodopa using Ni (II) and 2, 3-Diaminopyridine. Advances in Materials Science and Engineering, 2022(1), 4915162.