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Risk Factors for Complicated Urinary Tract Infection and their Association with Bacterial Pathogens

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Objectives : To be able to classify and characterize risk factors of patients with complicated UTI and its associated bacterial pathogens in patients admitted at SJDH January 2021- January 2022

Methods : This retrospective study included patients diagnosed with complicated UTI admitted from 2021 – 2022 at San Juan de Dios Hospital. The diagnosis of complicated UTI was confirmed in any individual who had significant urinalysis findings and associated risk factors that define cUTI. Patients were categorized based on the risk factors and the isolated pathogen was also categorized. Categorical variables were presented in percentages and analyzed using Fisher's exact test.

Results : A sample of 68 patient records were collected for this study and their information were analyzed according to the objectives of this study. This chapter is divided into four (4) sections which will answer the following objectives. For those with isolated pathogens, E. coli remains to be the most common isolated pathogen. For the following risk factors, all had no significant associated with bacterial pathogen at 5% level of significance: structural abnormalities ($p=0.28$) functional abnormalities ($p=1$), conditions that interfere with host defense mechanisms ($p=0.925$), iatrogenic conditions ($p=0.21$) and others such as males ($p=0.63$).

Conclusions : Several risk factors comprise the diagnosis of complicated UTI. In the advent of evolving pathogens, it is imperative in the diagnosis to be able to identify the specific etiology of the infection to guide the clinician in the management of these patients. This will also help clinicians to be able to categorize specific risk factors and individualize the treatment to these patients

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Table 2

Summary of the Presence of the Risk Factors of the Patients with Complicated Urinary Tract Infection

Risk Factors	Frequency	Percentage (%)
Structural Abnormalities	12	17.65
Functional Abnormalities	1	1.47
Host Defense Mechanism	47	69.12
Iatrogenic Conditions	4	5.88
Others	30	44.12

Table 2 presents the risk factors that were identified on the sampled patients with Complicated UTI. From the table, it can be seen that about 7 out of the 10 patients have been diagnosed with conditions that interfere with host defense mechanisms. Examples of these conditions are *Diabetes mellitus* and immunosuppressive conditions such as febrile neutropenia and chemotherapy. Meanwhile, about 18% of the patients were detected to have a presence of structural abnormality such as polycystic kidney disease, urethral problems, or carcinoma. For the Others category, the conditions that were considered to be part of the group is whether the patient is a male, or/and he has radiation injuries of the uroepithelium and urosepsis.

B. Bacterial Pathogens Isolated in Patients with Complicated UTI

Table 3

Summary of the Presence of Pathogens of the Patients with Complicated Urinary Tract Infection

Pathogens	Frequency	Percentage (%)
With Pathogen	31	45.59
<i>Escherichia coli</i>	11	16.18
<i>Klebsiella pneumoniae</i>	4	5.88
Gram-negative bacteria	10	14.71
Gram-positive bacteria	3	4.41
Yeast/Fungal	3	4.41
Without Pathogen	37	54.41

As seen in Table 3, there are more patients who have complicated UTI that do not have the presence of pathogens (54.41%) than those who have (45.59%). Furthermore, out of the 31 patients who have pathogen-related risk factors, about 2 out of 3 of these patients were detected to have either *Escherichia coli* (*E. coli*) or Gram-negative Bacteria.

D. Association of Bacterial Pathogens and Risk Factors

Table 5

Two-way Analysis of the Presence of Structural Abnormalities Risk Factor of Complicated UTI Patients at San Juan De Dios Hospital and Their Bacterial Pathogen

Risk Factor	Count	Bacterial Pathogen					No Pathogen
		Escherichia coli	Klebsiella pneumoniae	Gram-negative Bacteria	Gram-positive Bacteria	Yeast/Fungal	
<i>Structural Abnormalities</i>							
Not Present	56 (82.3)	8 (14.29)	2 (3.57)	9 (16.07)	2 (3.57)	3 (5.36)	32 (57.14)
Present	12 (17.7)	3 (25.00G)	2 (2.94)	1 (8.33)	1 (8.33)	0 (0.00)	5 (41.67)
Total		11 (16.18)	4 (5.88)	10 (14.71)	3 (4.41)	3 (4.41)	37 (54.41)
Fisher's exact test					p-value = 0.2889		

Table 5 shows that only 17.7% of the recorded patients have been diagnosed with a risk factor that is related to structural abnormalities. Out of these patients, 41.67% of them do not have a bacterial pathogen while 25% of them have been found to contain *Escherichia coli*.

To associate the presence of these bacterial pathogens to the presence of structural abnormalities on their body systems, a Fisher's Exact Test was utilized in the study which returned a p-value of 0.2889. Hence, we can conclude that at a 5% level of significance, the presence of structural abnormalities is not significantly associated with the presence of bacterial pathogens.

Table 6

Two-way Analysis of the Presence of Functional Abnormalities Risk Factor of Complicated UTI Patients at San Juan De Dios Hospital and Their Bacterial Pathogen

Risk Factor	Count	Bacterial Pathogen					No Pathogen
		Escherichia coli	Klebsiella pneumoniae	Gram-negative Bacteria	Gram-positive Bacteria	Yeast/Fungal	
<i>Functional Abnormalities</i>							
Not Present	67 (98.5)	11 (16.42)	4 (5.97)	10 (14.93)	3 (4.48)	3 (4.48)	36 (53.73)
Present	1 (1.5)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (100.00)
Total		11 (16.18)	4 (5.88)	10 (14.71)	3 (4.41)	3 (4.41)	37 (54.41)
Fisher's exact test					p-value ≈ 1.0000		