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**Original Article**

# Complications and Outcomes of Septicemia in Urinary Tract Infection

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## ABSTRACT

Urinary tract infection (UTI) is a common bacterial infection that can progress to septicemia, a serious and potentially life-threatening condition. Septicemia occurs when bacteria from an infection in one part of the body spread to the bloodstream and cause a systemic inflammatory response. Early recognition and treatment of septicemia in UTI is crucial to prevent serious complications and improve outcomes. **Objective:** To explore the complications and outcomes of septicemia in UTI. **Methods:** The cross-sectional, descriptive, and observational. 101 patients with septicemia due to UTI were enrolled from the medical wards and Accident and Emergency Department of Mayo Hospital Lahore. Liver function tests, renal function tests, and full blood counts were performed on each patient. Data were entered into a Performa created for this study, and the latest SPSS version was used for data analysis. **Results:** Majority of males and females had normal bilirubin and $Na^+$ and $K^+$ levels. WBCs were high in 13/16 males and14/16 females. Platelets were low in 9/16 males but normal in 9/16 females. Hemoglobin. **Conclusions:** Septicemia in UTI is a serious and potentially life-threatening complication. Early recognition and treatment of septicemia is crucial to prevent serious complications and improve outcomes.

## INTRODUCTION

UTI is a common bacterial infection that affects millions of people worldwide. While most cases of UTI are uncomplicated and can be easily treated with antibiotics, sometimes the infection can progress and lead to septicemia, a potentially life-threatening condition [1, 2]. Septicemia, also known as sepsis, occurs when bacteria from an infection in one part of the body spread to the bloodstream and cause a systemic inflammatory response. Septicemia in UTI is a serious and often preventable complication that can lead to septic shock and multiple organ failure if left untreated [3, 4]. It is more common in older adults, pregnant women, and people with weakened immune systems, but can occur in anyone with a UTI. Early recognition and treatment of septicemia in UTI is critical to prevent serious complications and improve outcomes [5-7]. The signs and symptoms of septicemia in UTI can be subtle and nonspecific at first but can progress rapidly and become severe. Fever, chills, rapid heartbeat, low blood pressure, confusion, and difficulty breathing are all potential signs of septicemia. It is important to seek medical attention right away if you experience any of these symptoms, especially if you have a history of UTIs or other underlying medical conditions [9, 10]. Septicemia in UTI can result in a range of complications and outcomes, depending on the severity and timing of treatment. If left untreated, septicemia can progress to septic shock, a life-threatening condition that occurs when blood pressure drops dramatically, and organs fail to function properly. Septicemia in UTI can also lead to acute kidney injury, which can result in permanent damage to the kidneys and

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the need for long-term dialysis. In addition, septicemia in UTI can increase the risk of developing secondary infections, such as pneumonia or meningitis [11-13]. Even with prompt and appropriate treatment, septicemia in UTI can result in long-term complications, including chronic kidney disease, cognitive impairment, and reduced quality of life. Therefore, early recognition and treatment of septicemia in UTI is crucial to minimize the risk of complications and improve outcomes.

## METHODS

This study was cross-sectional, descriptive, and observational. From the medical wards and Accident and Emergency Department of Mayo Hospital Lahore, 101 patients with septicemia were removed. Children, pregnant women, and women nursing infants were not allowed to participate in the research. Individuals above the age of 30 were enrolled. These individuals have had in-depth examinations to identify the origin and aetiology of the illness at the time of presentation. The patients' or their guardians' permission was obtained. During the data gathering procedure, every other ethical concern was taken into account. Also, the KEMU Ethical Consideration board gave their approval. Data were entered into a Performa created specifically for this use. Liver function tests, renal function tests, and full blood counts were performed on each patient. Latest SPSS version was used for data analysis.

## RESULTS

Septicemia due to UTI was caused in 32 patients out of which 16 were males and 16 were females. Bilirubin was normal in majority of males and females. B. glucose was normal in 9/16 males but elevated in 9/16 females. B. urea was high in 10/16 males and 12/16 females. Creatinine was also elevated in 9/16 males and10/16 females. Na+ and K+ were normal in majority of males and females (Table 1).

| Gender | Bilirubin | | | Glucose | | | Urea | | | Creatinine | | | Na+ | | | K+ | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | N | H | L | N | H | L | N | H | L | N | H | L | N | H | L | N | H | |
| Males | 0 | 14 | 2 | 1 | 9 | 6 | 0 | 6 | 10 | 3 | 4 | 9 | 6 | 10 | 0 | 0 | 16 | 0 | 16 |
| Females | 0 | 14 | 2 | 2 | 5 | 9 | 0 | 4 | 12 | 2 | 4 | 10 | 6 | 10 | 0 | 0 | 16 | 0 | 16 |
| Total | 0 | 28 | 4 | 3 | 14 | 15 | 0 | 10 | 22 | 5 | 8 | 19 | 12 | 20 | 0 | 0 | 32 | 0 | 32 |

**Table 1:** Gender wise variations in RFTs in patients having Septicemia due to UTI

In UTI patients variations in LFTs were same in both genders. ALT was normal in majority of males and females. AST was high in majority of patients. 32/32 UTI patients had elevated ALP. Total protein was normal in all males and females and albumin was low in 14/32 patients (Table 2).

| Gender | ALT | | | AST | | | ALP | | | T. Protein | | | Albumin | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | N | H | L | N | H | L | N | H | L | N | H | L | N | H | |
| Males | 0 | 14 | 2 | 0 | 7 | 9 | 0 | 0 | 16 | 0 | 16 | 0 | 7 | 9 | 0 | 16 |
| Females | 0 | 10 | 6 | 0 | 7 | 9 | 0 | 0 | 16 | 0 | 16 | 0 | 7 | 9 | 0 | 16 |
| Total | 0 | 24 | 8 | 0 | 14 | 18 | 0 | 0 | 32 | 0 | 32 | 0 | 14 | 18 | 0 | 32 |

**Table 2:** Gender wise variations in LFTs in patients having septicemia due to UTI

WBCs were high in 13/16 males and14/16 females. Platelets were low in 9/16 males but normal in 9/16 females. Hemoglobin was low in 13/16 males and 12/16 females (Table 3).

| Gender | WBC | | | Platelets | | | Hemoglobin | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | L | N | H | L | N | H | L | N | H | |
| Males | 0 | 3 | 13 | 9 | 7 | 0 | 13 | 3 | 0 | 16 |
| Females | 0 | 2 | 14 | 6 | 9 | 1 | 12 | 1 | 3 | 16 |
| Total | 0 | 5 | 27 | 15 | 16 | 1 | 25 | 4 | 3 | 32 |

**Table 3:** Gender wise variations in CBC in patients having septicemia due to UTI

## DISCUSSION

UTI is a common bacterial infection that affects millions of people worldwide. While most cases of UTI are uncomplicated and can be easily treated with antibiotics, sometimes the infection can progress and lead to septicemia, a potentially life-threatening condition. Septicemia in UTI is a serious and often preventable complication that can lead to septic shock and multiple organ failure if left untreated. In a study by Kuchler *et al.*, explore the risk factors and prevention strategies for septicemia in UTI and compare them with other studies [14]. Risk factors for septicemia in UTI can include advanced age, female gender, pregnancy, diabetes, weakened immune systems, urinary catheterization, and a history of recurrent UTIs. In a study by Baine *et al.*, the risk factors for septicemia in UTI were found to be similar, with the additional risk factors of hospitalization and antibiotic resistance [15, 16]. The study found that patients with septicemia in UTI had a higher mortality rate than those with UTI alone. To prevent UTIs and reduce the risk of septicemia, it is recommended to practice good hygiene, drink plenty of fluids, urinate frequently, and avoid certain foods and behaviors that can irritate the urinary tract [17,

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18]. In a study by Kreydin and Eisner *et al.*, the authors recommended the use of antimicrobial stewardship programs to reduce the incidence of antibiotic-resistant UTIs and prevent the development of septicemia. Other prevention strategies for septicemia in UTI include the use of urinary catheters only when necessary, ensuring proper insertion and maintenance of catheters, and promptly removing them when they are no longer needed. In a study by Peach *et al.*, the authors found that using a closed urinary catheter system can significantly reduce the risk of UTI and septicemia [20]. In conclusion, septicemia in UTI is a serious and potentially life-threatening complication that can be prevented with good hygiene practices, proper catheter use and maintenance, and antimicrobial stewardship programs. The risk factors for septicemia in UTI are similar to those for UTI in general, with the additional risk factors of hospitalization and antibiotic resistance. While more research is needed to explore the most effective prevention strategies for septicemia in UTI, the current recommendations can be effective in reducing the incidence of this serious complication.

## CONCLUSIONS

Septicemia in UTI is a serious and potentially life-threatening complication. Early recognition and treatment of septicemia is crucial to prevent serious complications and improve outcomes.

### Conflicts of Interest

The authors declare no conflict of interest.

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