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Urinary Tract Infection (UTI) in a Young Female: A Case Report with Literature Review

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ABSTRACT:

Urinary tract infection (UTI) is a common clinical condition which occurs in individuals across all age groups and sex, with higher prevalence in females. It is defined as the presence of significant bacteriuria along with symptoms such as frequency, dysuria, urgency, suprapubic tenderness and fever. The most common cause of UTI is *Escherichia coli.* In Unani System of Medicine this condition was discussed under the name of Warm-e-Masana Haad (cystitis), Warm-e-Kulliya Haad (nephritis) or possibly Warm-e-Majra-e-Baul by many renowned Unani physicians. This case report describes a 25-year-old female presenting with complaints of fever, increased frequency of micturition with urgency, burning micturition with generalized weakness for about four weeks. The physical examination was unremarkable. In investigations, urinalysis shows the presence of bacteria and pyuria. Urine culture shows a significant growth of *E. coli* $>10^5$ CFU/mL. The patient was treated successfully with Unani formulation including shrabat-e-bazuri (10ml twice daily), hab karanjuwa (2 tablets twice daily) and sharbat-e-alubalu (10ml twice daily) resulting in complete resolution without recurrence. This case supports the efficacy of Unani treatment in the management of uncomplicated UTI.

KEYWORDS: Escherichia coli, Unani medicine, Urinary tract infection (UTI), Urine culture.

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INTRODUCTION:

Urinary Tract Infection (UTI) is one of the most common infection and leading cause of morbidity in human population[1]. UTI is defined as both the presence of microbial pathogens in the urinary tract, including the infection of bladder, urethra and kidney and microbial colonization of the urine, or the presence of more than 100,000 organism per ml of collected mid-stream specimen of urine[2]. UTI affects both genders, but women of the reproductive age group are at higher risk[3] due to short urethra, sexual intercourse, catheterization, and close proximity of external urethral meatus to bacterial contaminated areas[4]. UTI is said to be asymptomatic bacteriuria (ASB) when the bacterial count is over 10^5/ml in midstream urine on two occasions without any symptom. Both ASB and UTI disease show the presence of pathogens in the urinary tract along with white blood cells and cytokines in the urine. Uncomplicated UTI is the infection of bladder called acute cystitis which is the most common form of UTI. When infection involves renal parenchyma then it is termed as Pyelonephritis. If signs and symptoms of systemic illness or fever are present then it suggests that the infection extends beyond the level of the bladder and represents a case of complicated UTI[5,6].

In case of cystitis or lower urinary tract infection symptoms like dysuria (painful urination), polyuria (frequent urination), nocturia (urination during night), hematuria (urine with blood traces), urinary urgency and pain in lower pelvis are present.

Symptoms of Pyelonephritis or upper urinary tract infection include fever and flank pain along with the symptoms of lower urinary tract infection. However, in the initial stages, the infection could be harmless but, as the disease progresses various symptoms manifests and can lead to death in severe cases[7].

UTI in Unani Medicine:

Great Unani Scholars, mentioned in their classical Unani Books, that warm-e-kuliya haad is due to ghaleez khoon (concentrated blood), raqeeq safravi khoon (diluted bilious blood), khalis safra (pure bile) and it may occur due to stone in the urinary tract[8,9]. Hakeem Mohd. Kabir-ud-deen mentioned in his book, Sharah asbab that warm-e-kuliya is of two types namely warm-e-kuliya haad (acute nephritis) and warm-e-kuliya muzmin (chronic nephritis). Further he said that infection in kidney originated due to the ufooni madda migrate in the urinary tract. Sometimes there is pus formation also take place in the urinary tract[10]. Zakaria Razi in his book, Kitabul Havi quoted that when the infection occurred in kidney parenchyma then there will be severe flank pain and warm-e-kuliya sulb is the dangerous form of UTI as it never resolves[11]. Hakeem Mohd. Azam Khan in his book Aksee-re-Azam mentioned the causes of warm-e-masana haar, which includes garm raqeeq khoon (hot diluted blood), mirrah safra (serous bile) or combination of both and trauma to bladder. Warm-e-masana

barid is the inflammation caused by excessive phlegmatic fluid[12]. Unani physician, Kabir-ud-deen described warm-e-masana as warm-e-masana haad (acute cystitis), caused due to haar safra (hot bile) and warm-e-masana muzmin (chronic cystitis) caused due to warm-e-haar (inflammation) or trauma to the urinary bladder. Diabetes, urinary tract stone, anuria, or urinary tract ulcer are the other causative factors for warm-e-masana[10]. Hurqat-ul-Baul is the burning urination which is caused by three main reasons. First is the acidic temperament of urine and excessive bile (ghalba-e-safra), second reduction in the secretions of glands in urinary tract and third is ulcers of bladder, cystitis, or nephritis. Excessive use of hot meals, tea, constipation, or hemorrhoids are causative factors for Hurqat-ul-Baul[8,13].

Difficulty in urination, pain during urination (dysuria), incontinence of urine and frequency of urine are the clinical symptoms in case of warm-e-majra-e-baul (UTI).

Etiology:

Many different microorganisms can infect the urinary tract and cause infection, but the most common agents are the *Enterobacteriaceae*. *E. coli* accounts for about 80-90% of infections. 5-15% cases are of *Staphylococcus saprophyticus* and 5-10% are *Klebsiella, Proteus*, *Acinetobacter, Citrobacter*, *Enterococcus* and other organisms[14].

In complicated UTI, *E. coli* remains the predominant organism, but other aerobic gram-negative microbes such as *Pseudomonas aeruginosa* and *Proteus, Klebsiella, Citrobacter, Acinetobacter* also frequently isolated. Gram-positive bacteria e.g., *enterococci, Staphylococcus aureus* and yeasts are also significant pathogens in complicated UTI[5].

Pathogenesis:

The pathogenesis of urinary tract infections (UTIs) primarily involves the ascending invasion of uropathogens into the urinary tract, from the urethra to the bladder. These uropathogenic *E. coli* (UPEC) strains possess specialized virulence factors such as adhesins (e.g., type 1 fimbriae, P fimbriae), hemolysins, and siderophores that facilitate adherence to uroepithelial cells, colonization, immune evasion, and subsequent tissue invasion. Once bacteria adhere to the mucosal surface, they may trigger a local inflammatory response mediated by cytokine release, leading to clinical manifestations like dysuria, frequency, and urgency[15,16].

Bacteria can gain access into the urinary tract through the bloodstream. Hematogenous spread of UTI accounts for <2% of documented UTIs and it usually results from bacteremia caused by virulent organisms e.g., *Salmonella* and *S. aureus*[5,15].

In addition to bacterial virulence, several host-related factors contribute to UTI susceptibility and disease progression. These include anatomical and functional abnormalities of the urinary tract, short urethral length in females, sexual activity, use of spermicides, catheterization, and conditions such as diabetes mellitus or immunosuppression. Some uropathogens can form intracellular

bacterial communities (IBCs) or biofilms, which protect them from host defence and antibiotic therapy, thereby contributing to recurrence and chronic infection[17]. Understanding these multifactorial pathogenic mechanisms is essential for guiding effective prevention and treatment strategies.

Clinical features[6]:

- Sudden onset of urinary frequency and urgency.
- Dysuria[18] (scalding pain in urethra during micturition).
- Suprapubic pain during and after micturition.
- Strangury (intense urge to pass more urine after voiding, due the spasm in the inflamed bladder wall).
- Cloudy urine with unpleasant odour.
- Microscopic or visible haematuria[6].
- Systemic symptoms are usually slight or absent e.g., fever, rigors, vomiting, hypotension and loin pain[6,15].

Evaluation:

Diagnosis of UTI starts with the detailed history given by the patient. Uncomplicated UTI can be diagnosed by history alone. However, if a reliable history and specific risk factors are not present then laboratory evaluation including dipstick test or urinalysis with routine and microscopy and urine culture can confirm the diagnosis[19]. Almost all the cases of UTI urine microscopy show pyuria and in approximate 30% of cases reveal hematuria. Significant bacteriuria of $\geq$100000 colony-forming unit per milliliter (CFU/mL) in a midstream clean-catch urine sample is the diagnostic gold for UTI. American Urological Association Core Curriculum now indicate that a patient with symptoms and a urine culture showing more than 1000 CFU/mL should be diagnosed with a UTI[20].

Differential diagnosis:

Several conditions can mimic the symptoms of urinary tract infection (UTI), necessitating careful differential diagnosis such as:

1. Vaginitis, including bacterial vaginosis and candidiasis, often presents with dysuria and irritation but is typically accompanied by vaginal discharge and odour, distinguishing it from UTI[21].
2. Urethritis caused by sexually transmitted infections such as Chlamydia trachomatis and Neisseria gonorrhoeae can also cause dysuria and frequency, though urine cultures are usually negative in such cases[22].
3. Interstitial cystitis, a chronic bladder condition, presents with pelvic pain and urinary urgency in the absence of infection and is frequently misdiagnosed as recurrent UTI[23].

Accurate diagnosis requires clinical evaluation, relevant laboratory tests, and sometimes imaging or cystoscopy to rule out other causes such as renal calculi or bladder tumors.

CASE HISTORY:

A married female of age 25 years visited in the OPD of State Takmeel ut Tib College and Hospital, Lucknow with the complaints of fever, increased frequency of micturition with urgency, burning micturition with generalized weakness for about four weeks. There was no history of hypertension, Diabetes mellitus, thyroidism or any other disease. Previous history of UTI was present. On examination vitals were as: BP 110/70mmHg, pulse 105/min, body temperature 102^{o} F. There was no abnormality except mild suprapubic tenderness. There is no history of any drug intake.

Urinalysis showed leucocytes trace, bacteria present, pus cells 10-15/HPF and many epithelial cells. Urine Culture shows significant growth of $>10^{5}$CFU/ml.

The patient was treated with Unani formulations constituting Sharbat-e-Bazoori 10ml twice daily, Hab karanjuwa two tablets twice daily and Sharbat-e- Alubalu 10ml twice daily after meals.

In follow up after one week of treatment, the fever reduced, the burning sensation and urgency lessened, and frequency of urination returned to normal. A follow-up urinalysis after 2 weeks showed a marked reduction in pus cells from 10-15 to 2-5/ HPF, indicating the effectiveness of the treatment that was given. The same treatment was continued for another two weeks, and by the end of four weeks, all symptoms had resolved with the improvement of overall health of the patient.

DISCUSSION:

The presented case highlights a typical episode of an uncomplicated lower urinary tract infection (UTI) in a young adult female, which was effectively managed through traditional Unani medical interventions.

The patient's presenting complaints of dysuria, increased frequency and urgency of urination, fever, and generalized weakness are consistent with the classical clinical features of cystitis as outlined in both contemporary and Unani medical texts[6,10,15]. The presence of mild suprapubic tenderness further corroborates the diagnosis of lower urinary tract involvement without systemic complications.

The laboratory findings in this case, including pyuria (10–15 pus cells/HPF), presence of bacteria, and significant bacteriuria ($>10^{5}$ CFU/mL), support the diagnosis of acute uncomplicated UTI. The elevated body temperature (102°F) and raised pulse rate indicate a mild systemic inflammatory response but without signs of upper tract involvement, such as flank pain or costovertebral angle tenderness, ruling out pyelonephritis.

From the perspective of Unani medicine, the condition was diagnosed as Warm-e-Masana Haad (acute cystitis) or possibly Warm-e-Majra-e-Baul, based on the symptoms of burning urination, frequency, and suprapubic pain.

The treatment approach using Sharbat-e-Bazoori, Hab-e-Karanjuwa, and Sharbat-e-Alubalu aligns with Unani principles of *Tahleel-e-auram*

(resolution of inflammation), *Tanqiya* (detoxification), and *Taskeen-e-alam* (pain relief). Sharbat-e-Bazoori is known for its diuretic and anti-inflammatory actions, which help in flushing out the infective agents, while Hab-e-Karanjuwa provides anti-microbial and tissue healing support. Sharbat-e-Alubalu, due to its cooling and soothing properties, helps in relieving the burning sensation and restores balance in the *haar* temperament.

The marked symptomatic improvement and the decline in pus cells from 10–15 to 2–5/HPF after two weeks reflect the therapeutic efficacy of this treatment protocol. Continued medication led to complete resolution by the end of four weeks, without recurrence or need for allopathic antibiotics—suggesting a potentially significant role of traditional Unani formulations in the management of uncomplicated UTIs.

This case further underlines the importance of proper diagnosis and individualized treatment. While uncomplicated UTIs can often be managed with standard protocols, the role of traditional systems like Unani medicine can be complementary or alternative, especially in the context of increasing antibiotic resistance. However, rigorous clinical validation and controlled studies are essential to establish standardized protocols.

CONCLUSION:

In conclusion, this case demonstrates that an evidence-based Unani approach, rooted in centuries-old wisdom, can offer effective therapeutic options for uncomplicated UTI cases. Integration of such approaches with modern diagnostic tools can enhance patient outcomes, especially in regions where traditional medicine is well accepted and widely practiced.

Limitation of this study:

This single case study limits the generalizability of findings, as individual factors and responses may not reflect broader patient populations. The absence of comparative data also restricts the ability to draw definitive conclusions. So further studies with large sample size are required to validate its efficacy.

Consent of patient:

Consent was taken from patient before starting the treatment as well as prior to publication of the case report and data.

Conflict of interest: The author declares that there is no conflict of interest.

Guarantor*:* The corresponding author is the guarantor of this article and its contents.

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