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URINARY TRACT INFECTION IN A POSTMENOPAUSAL DIABETIC WOMAN: A CONTROVERSIAL CASE OF ANTIMICROBIAL SUSCEPTIBILITY

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ABSTRACT

Urinary tract infections (UTIs), which damage the kidneys, bladder, ureters, and urethra, are brought on by bacteria that grow in urine. Urinary tract infections are more likely to occur in women with diabetes. The patient in this case is a 58-year-old postmenopausal lady who had abrupt onset dysuria with burning when she urinated and increasing frequency, along with uncontrolled type 1 diabetes and hypertension. This case highlights shortcomings in the initial management strategy for conducting required clinical laboratory procedures, including urine collection, detailed report (DR), and culture and sensitivity (C/S), and testing for plasma glucose to start antimicrobial therapy. Diabetic individuals who experience dysuria, frequent urination, or pelvic pain should receive specific treatment for urinary tract infections. When a patient first develops symptoms, antibiotic treatment for UTIs should always start with a culture and sensitivity analysis. In order to obtain the intended therapeutic effects, comorbidities must be adequately treated during treatment.

KEYWORDS: Diabetes mellitus, menopause, urinary tract infection, and cultural sensitivity

BACKGROUND

Women are more likely to get UTIs as they get older; 10% to 15% of those between the ages of 65 and 70 and 15% to 20% of those over the age of 80 had bacteriuria.[1]

Among the many risk factors in postmenopausal women, a lower estrogenic hormone level appears to alter the microbiota and urogenital epithelium, which are primarily responsible for recurrent urinary tract infections.[2]

It has also been shown that postmenopausal women with diabetes experience urinary tract infections (UTIs) more frequently than women without diabetes. Increased urine glucose levels provide an environment for bacteria to grow and colonize by giving an abundance of micronutrients, which can lead to a moderate to severe urinary infection. Urinary tract infections brought on by diabetes may have negative effects on the kidneys, including septic shock, bloodstream infection, prolonged hospital stays, and relapses.[3]

Under certain circumstances, diabetes can also have an impact on the urogenital system, harming the corresponding organs and eventually resulting in pyelonephritis. Diabetes patients have a roughly 15-fold increased risk of developing this type of infection, underscoring the importance of prompt UTI diagnosis and treatment.[4]

CASE REPORT

A 58-year-old woman with renal symptoms arrived at the Al-Zahrawi Hospital's outpatient clinics from Daraa, Syria. The patient informed the primary gynecologist during her review that she had been experiencing heartburn, tenesmus, and pain when peeing for a week, in addition to a very high fever. The patient did not have any symptoms and her health was good. She was even managing her housework with ease, although she was experiencing some minor lower abdominal pain and a fever that persisted for a week before other symptoms started to show. She eventually started having burning in her pee and had urinary diarrhea before visiting the hospital. The patient is diabetic and has high blood pressure. In terms of type 2 diabetes, she was taking Glimepiride 2 mg, sitagliptin 500/50 mg, and metformin, and for high blood pressure (lotid), she was taking losartan potassium 50 mg and hydrochlorothiazide 12.5 mg.

Evaluation of Diagnosis and Treatment

The gynecologist ordered an ultrasound of the bladder, ureters, and kidneys before and after the patient experienced these symptoms. The ultrasonography results indicated that the bladder walls were within normal limits and were normal. The bladder's volume was 674 milliliters prior to urinating and 146 milliliters following. The bladder did not contain any masses. or stones in the urine.

The left kidney measured 10.2 cm in length and 2 cm in thickness at the cortex. A tiny cyst measuring 1.8 * 1.9 cm was observed in the lower pole. Though it can lead to the formation of this cyst, a small cyst of this size rarely results in issues like obstruction of the urethra and does not require treatment. Renal edema was identified, and after noticing a modest improvement in the symptoms, the doctor decided to prescribe Vaxinium Macrocarbon 475 mg for a month along with estrogen cream for three weeks.

But two months later, the patient experienced an abrupt and severe relapse that included excruciating pelvic and lower abdominal discomfort as well as excruciating dysuria. When the patient returned for a second session, the gynecologist decided to order a number of laboratory tests (kidney function, blood cell count, urine, sediment, etc.). Sugar and hemoglobin made of glucose The test results revealed the following: creatinine 1.48 mg/dl in the serum, 96 mg/dl in fasting blood sugar, 7.98% glucose concentration, 6.07 mg/dl uric acid, and an analysis of 0.1 mucus cells, 6-8 epithelial cells, and a small number of bacteria in urine, the bladder was examined both prior to and following voiding. There are no lumps or polyps inside the bladder, and its walls are normal. There was no discernible urine stasis, and the pre-void volume was 494 ml and the post-void volume was 48.4 ml. The doctor prescribed Baclofen based on the previous results. After taking tamsulosin 0.4 mg, vitamin D 50,000, and candesartan 16 mg for a month, the overflow and urgency incontinence symptoms subsided. However, two months after therapy was stopped, a high temperature recurrence of about 38.4 occurred. The physician determined that a urine culture would be necessary in order to identify antibiotic-resistant bacteria and conduct a susceptibility test.

More than 100,000 colonies of Flavobacterium bacteria per milliliter were identified in the urine culture report. These bacteria were sensitive to ciprofloxacin, cotrimoxazole, piperacillin, and tazobactam, but resistant to gentamicin. In order to start antibiotic treatment with piperacillin + tazobactam (Tazosin 4.5) via intravenous infusion for five days, the patient was admitted to the department for a five-day stay.

Recommended resuming the medication. Following this, the bladder's size was measured and it was discovered to have a considerable amount of urine present. The bladder's volume was 498 ml before voiding and 316 ml after. Urinary incontinence, bladder hypermobility, and recurrent dysuria all required a cystoscopy to diagnosis, but the patient refused to get one.

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The patient saw the physician again and evaluated him a third time. After the initial urine culture a few months later, he asked for another one. The therapeutic and diagnostic approaches were taken into account. More than 100 colonies of enterococci per milliliter were detected in the fresh urine culture, and these bacteria are susceptible to ampicillin, fosfomycin, and nitrofurantoin. The therapy produced total relief in the results. of all the indications and symptoms, and there was never another occurrence.

Antibacterial susceptibility testing was conducted using the Clinical and Laboratory Standards Institute (CLSI) recommendations, which were formulated by the US Food and Drug Administration. The multiplex PCR (Bio_RAD) method was used to detect pathogens, the disc diffusion method was used to determine antibiotic sensitivity, the Gram staining method was used to identify the causative species on the bacterial culture, and the colony forming unit (CFU) method was used to estimate the amount of bacteria.

DISCUSSION

The patient is a postmenopausal housewife who experiences urgency and overflow urine incontinence, along with a high fever and severe dysuria. Her symptoms in the outpatient clinic were consistent with a simple urinary tract infection, as evidenced by the results of the urinalysis and bacterial culture. Additionally, there is a higher chance of diabetes-related complications due to the existence of high hemoglobin, and the blood creatinine level is elevated (the normal range is 0.2-1.2), Urinary tract infections are more common when opportunistic invasive bacteria replace the normal bacterial flora in the area surrounding the urethra.

These bacteria can ascend to the upper urinary tract and, as the infection becomes more severe, can cause bacterial cystitis and glomerulonephritis. This suggests the presence of a sign of chronic renal insufficiency. caused by the pathogenicity of the causing bacteria, which enter the host's cells, evade the immune system, and feed off of them.[5]

Klebsiella pneumoniae, Proteus mirabilis, Staphylococcus, and Escherichia coli are a few frequent urinary pathogens. The initial step in making a diagnosis is to note and record the symptoms, the primary complaint, and the outcomes of any tests. To rule out any structural or functional anomalies in the urinary tract, a thorough pelvic examination is necessary, as their presence indicates the possibility of a urinary tract infection. urinary tract infection that is mixed. Urinary tract tests are often not required for postmenopausal women. On the other hand, a mixed urinary tract infection is present based on the clinical signs linked to urinary tract abnormalities. In our instance, the patient's urinary tract was repeatedly ultrasonography to find out the residual volume both before and after. evacuation due to the substantial volume (316 ml) following voiding, the patient declined to have a cystoscopy, despite the gynecologist's recommendation, and the structural inspection seems normal. Previous studies have not demonstrated that treating recurring urinary tract infections requires a single cystoscopy because of this low rate. A urinary tract infection is positively indicated by the growth of bacteria in culture media and the regular incidence of structural abnormalities (0–15%). In our instance, the selection of an appropriate antibiotic involved five months between the results of two urine culture tests.[6.7]

Today, the genus Flavobacterium has experienced significant taxonomic changes. Tazosin, a gram-positive enteric bacterial species that is typically found in the intestine but causes antibiotic-resistant urinary tract infections, is used to treat Flavobacterium because it is a low-virulence opportunistic pathogen that occasionally contributes to severe infections. An infection that occurs more than twice in a six-month period or more than three times in a year is referred to as recurrent urinary tract infection, a urine culture must be done if the patient has incontinence in order to rule out an infection, identify the proper medication, and stop the administration of unsuitable drugs without a prescription.[8.9]

A study found that the incidence rate of asymptomatic bacteriuria in diabetes women was two to three times greater than that of non-diabetic women, ranging from 8% to 26%. According to a prospective study involving over 6,000 diabetic individuals, urinary tract infections were most common in The urinary tract has a cumulative risk of 1.1% for men and 3.5% for

women during a six-month period. For women, the urinary tract is 91.5/1000 and for men it is 28.2/1000. Urinary tract infections and diabetes are strongly correlated. Change-related considerations have received more attention. The patient's metabolism was determined to be characterized by insulin resistance, glycosuria, hyper- or hypoglycemia, and a HbA1c level of 7.98%. This was discussed during the patient's third visit with the physician.[10.11]

Following her gynecologist's recommendation, our patient took Vaxinium Macrocarbon for a month and experienced a minor improvement in her symptoms. It is counterintuitive to utilize Vaxinium Macrocarbon as the first line of treatment for UTI prophylaxis, and it is impossible to determine if it works or not. Cranberry has been suggested as a possible candidate lately. preventive to stop women from getting repeated UTIs. This substance is thought to have anti-adhesive properties that stop infections from adhering to the receptors on urine epithelial cells, hence lowering the disease's occurrence. The association between cranberries and UTIs is unclear despite the paucity of research on the subject, since insignificant answers have been noted, as in addition, our patient was recommended topical estrogen therapy to address burning, irritation, and dryness in the vagina. It has been demonstrated that postmenopausal women can effectively treat UTIs by using vaginal estrogen prophylactically. Topical estrogen cream with 0.5 mg of estriol is meant to be applied vaginally once a night for two weeks, and then twice a week for the next eight months. Urine culture results should be used to guide antibiotic selection in patients of recurrent UTIs.[12.13]

The best medications for treating simple acute cystitis empirically are pefmecillinam, trimethoprim/ sulfamethoxazole, nitrofurantoin, and fosfomycin. Oral beta-lactam antibiotics are recommended in cases of allergy and resistance to first-line antibiotics; beta-lactams are used if this is not feasible. One option is to utilize a fluoroquinolone (levofloxacin, ciprofloxacin, etc.). Based on culture report II, 500 mg of fosfomycin was administered every eight hours for three months following the recurrence.[14.15]

After receiving treatment with fosfomycin and insulin to maintain good glycemic control for three months, our patient recovered well from repeated episodes of urinary tract infection. It has been discovered that women with diabetes have a higher risk of developing urinary tract infections. Because of the potential consequences, urinary tract infections need to be treated carefully.[16]

Declarations

Ethical approval and consent to participate

The study procedure was authorized by the relevant Al-Sham Private University's ethical committee as well as the university's Scientific Research Ethics Committee. It was verbally agreed upon by the participant. All methods used in research involving human subjects and volunteers were compliant with comparable ethical norms, the 1964 Helsinki Declaration and its subsequent revisions, and the institutional and/or national research committee's ethical requirements.

Availability of data and materials

All data relevant to the conclusion of this paper are available and stored by the authors. All data are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare that they have no conflicts of interest

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Authors' contributions

The study was designed by A.S. and A.S., who also created the study protocol, conducted the literature search, participated in it, authored the main article, and interviewed the patient to gather clinical and narrative information, the researchers gave the draft a once-over before sending it out for publication.

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