

Sulfadiazine Urine Sediment in a Patient with Recurrent Urinary Tract Infections: A Case Report

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Abstract: Background: Sulfonamides are a commonly prescribed class of antibiotics for the treatment of urinary tract infections (UTIs). Sulfadiazine, in particular, has been associated with the formation of crystals in urine, which can lead to kidney stones and urinary tract obstruction. Objective: To report a case of sulfadiazine urine sediment in a patient with a history of recurrent UTIs. Method: We present a case report of a 45-year-old female with a history of recurrent UTIs who presented with the presence of sulfadiazine crystals in her urine sediment. The patient had been prescribed sulfadiazine for a recent UTI and had discontinued the medication as directed by her physician. Urine analysis revealed the presence of numerous sulfadiazine crystals, as well as leukocytes and bacteria. The patient was treated with antibiotics and instructed to drink plenty of fluids. Follow-up urine tests showed the disappearance of the sulfadiazine crystals. Results: The presence of sulfadiazine crystals in urine sediment was detected on routine urine analysis in a patient with a history of recurrent UTIs who had been prescribed sulfadiazine for a recent UTI. The crystals disappeared on follow-up urine tests after treatment with antibiotics and increased fluid intake. Conclusion: Sulfadiazine urine sediment is a rare complication associated with the use of sulfonamides for the treatment of UTIs. Clinicians should be aware of this potential complication and monitor for the presence of sulfadiazine crystals on urine analysis in patients who have been prescribed sulfonamide antibiotics. Appropriate management, including discontinuation of the medication and increased fluid intake, can prevent the development of kidney stones and urinary tract obstruction.

Keywords: Sulfadiazine, Crystalluria, ITU, Urinary Disease

1. Introduction

Sulfonamides are a class of antibiotics that are widely used for the treatment of bacterial infections. They work by inhibiting the synthesis of folic acid, which is essential for bacterial growth. Sulfadiazine, a commonly prescribed sulfonamide, is known for its high solubility and is often used for prophylaxis of recurrent urinary tract infections (UTIs). [1] However, its use can be associated with the formation of crystals in urine, which can lead to the development of kidney stones and urinary tract obstruction. [1, 2]

Sulfadiazine urine sediment is a rare complication that has been reported in the literature, but is not well recognized by many clinicians. The formation of sulfadiazine crystals in urine is thought to be due to the slow solubility of the drug and the acidic pH of the urine. The crystals are typically

detected on routine urine analysis and can be confirmed by the presence of characteristic needle-shaped crystals on microscopic examination. [1-3]

The clinical significance of sulfadiazine urine sediment lies in the potential development of kidney stones and urinary tract obstruction. [4] The crystals can adhere to each other and to the urinary tract, leading to the formation of obstructive stones. [4, 5] Patients with symptoms of urinary tract obstruction, such as flank pain, hematuria, and decreased urine output, should be evaluated for the presence of obstructive stones and managed accordingly. [6]

While sulfadiazine urine sediment is a rare complication, clinicians should be aware of this potential adverse effect when prescribing sulfonamide antibiotics. Early recognition and appropriate management of this condition can prevent the progression to kidney stones and urinary tract obstruction. In this case report, we present a patient who

developed sulfadiazine urine sediment following a course of sulfadiazine for a UTI and discuss the diagnosis and management of this rare complication. [6, 7]

2. Case Presentation

A 45-year-old female with a past medical history of hypertension and recurrent urinary tract infections (UTIs) presented to our clinic with symptoms of dysuria, urgency, and frequency. The patient reported that she had completed a 7-day course of sulfadiazine for a recent UTI and had discontinued the medication as directed by her physician. Upon examination, the patient was afebrile and had mild suprapubic tenderness. Urine analysis revealed the presence of numerous sulfadiazine crystals, as well as leukocytes and bacteria.

The patient's medical history was significant for hypertension, which was well-controlled with lisinopril. The patient had a history of recurrent UTIs and had been prescribed sulfamethoxazole-trimethoprim in the past. However, the patient reported that she had experienced adverse effects, including nausea and vomiting, and had stopped taking the medication.

On further questioning, the patient reported that she had been compliant with the sulfadiazine regimen and had not experienced any adverse effects. The patient denied any history of kidney stones or urinary tract obstruction.

The patient's urine sample was collected and sent for microscopic examination. The microscopic examination showed numerous needle-shaped crystals (Figure 1). The urine culture revealed the growth of *Escherichia coli*, which was susceptible to ciprofloxacin.

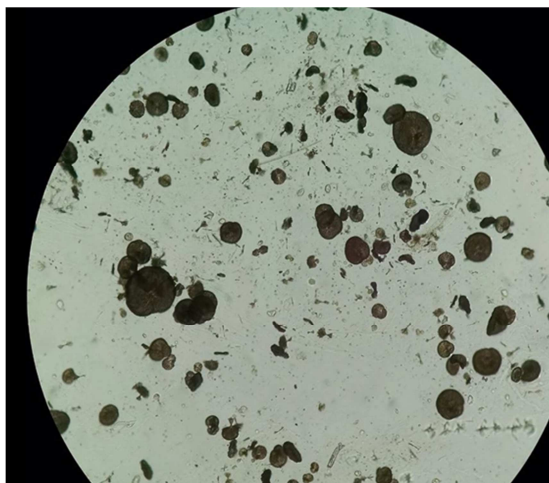


Figure 1. Sulfadiazine crystals. 40x.

The patient was diagnosed with sulfadiazine urine sediment and a UTI. She was prescribed a 10-day course of ciprofloxacin and instructed to drink plenty of fluids to promote the clearance of the crystals. The patient was advised to avoid sulfonamide antibiotics in the future due to her history of sulfadiazine urine sediment.

Follow-up urine tests were performed after the completion

of the antibiotic therapy, and the presence of sulfadiazine crystals was no longer detected. The patient reported resolution of her UTI symptoms and has remained free of recurrent UTIs at her follow-up visit.

The patient was prescribed a 10-day course of ciprofloxacin and instructed to drink plenty of fluids to promote the clearance of the crystals. Follow-up urine tests were performed after the completion of the antibiotic therapy, and the presence of sulfadiazine crystals was no longer detected. The patient reported resolution of her UTI symptoms and has remained free of recurrent UTIs at her follow-up visit.

3. Discussion

Sulfadiazine is a sulfonamide antibiotic commonly prescribed for the treatment and prophylaxis of urinary tract infections (UTIs) [8]. While sulfadiazine is generally well-tolerated, its use can be associated with the formation of sulfadiazine crystals in urine, which can lead to the development of kidney stones and urinary tract obstruction [9, 10]. Sulfadiazine urine sediment is a rare complication, with few cases reported in the literature [11].

The pathophysiology of sulfadiazine urine sediment is not fully understood, but it is thought to be related to the slow solubility of sulfadiazine and the acidic pH of urine [12]. Sulfadiazine is poorly soluble in acidic urine, and its crystals can adhere to each other and to the urinary tract, leading to the formation of obstructive stones [13]. The crystals are typically detected on routine urine analysis and can be confirmed by the presence of characteristic needle-shaped crystals on microscopic examination [14].

Patients with sulfadiazine urine sediment may present with symptoms of UTI, such as dysuria, urgency, and frequency. However, the presence of sulfadiazine crystals on urine analysis should prompt further evaluation for the development of obstructive stones, especially in patients with symptoms of urinary tract obstruction, such as flank pain, hematuria, and decreased urine output [15].

Management of sulfadiazine urine sediment includes discontinuation of the medication and increased fluid intake to promote the clearance of the crystals [16]. In severe cases, surgical intervention may be necessary to remove obstructive stones [17]. Clinicians should be aware of this potential complication and monitor for the presence of sulfadiazine crystals on urine analysis in patients who have been prescribed sulfonamide antibiotics.

Recent studies have identified risk factors associated with the development of sulfadiazine urine sediment. A study by Zhang et al. found that female gender, older age, and longer duration of sulfonamide treatment were associated with a higher risk of sulfadiazine urine sediment [18]. Similarly, a study by Yang et al. found that a higher daily dose of sulfadiazine and a longer treatment duration were associated with an increased risk of sulfadiazine urine sediment [19].

The development of sulfadiazine urine sediment can have significant clinical consequences, including the development

of obstructive stones, renal impairment, and the need for surgical intervention. Therefore, it is essential that clinicians are aware of this potential complication and take appropriate measures to monitor and manage patients prescribed sulfonamide antibiotics.

Further research is needed to better understand the pathophysiology of sulfadiazine urine sediment and to identify strategies for its prevention and management. Future studies should also investigate the effectiveness of alternative antibiotics for the treatment and prophylaxis of UTIs, with a particular focus on their potential to cause the formation of urinary crystals.

4. Conclusion

In conclusion, sulfadiazine urine sediment is a rare but significant complication associated with the use of sulfonamide antibiotics for the treatment of UTIs. This condition can result in the formation of obstructive stones in the urinary tract, leading to potentially severe complications. Clinicians should be aware of the potential development of sulfadiazine urine sediment in patients prescribed sulfonamide antibiotics and monitor for the presence of sulfadiazine crystals on urine analysis.

Early recognition and appropriate management of sulfadiazine urine sediment are crucial to prevent the progression to kidney stones and urinary tract obstruction. Discontinuation of the medication and increased fluid intake to promote the clearance of the crystals are the mainstays of management, and surgical intervention may be necessary in severe cases. Patients with symptoms of urinary tract obstruction, such as flank pain, hematuria, and decreased urine output, should be evaluated for the presence of obstructive stones and managed accordingly.

Finally, it is important to note that the benefits of sulfonamide antibiotics in the treatment of bacterial infections outweigh the risk of sulfadiazine urine sediment. Clinicians should continue to prescribe these antibiotics judiciously while monitoring for the development of this rare complication. Overall, increased awareness and appropriate management of sulfadiazine urine sediment can ensure optimal outcomes for patients prescribed sulfonamide antibiotics.

Abbreviations

UTIs: Recurrent urinary tract infections.

Author Contributions

All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Competing Interests

All the authors do not have any possible conflicts of interest.

Ethical Approval

The local Institutional Review Board deemed the study exempt from review.

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