

V Edition of the Clinical Cases Contest on
non-surgical clinical management of Kidney Stones
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Title: Innovative Management of Recurrent Urinary Tract Infections in a Neurogenic Bladder Patient Using Metiofitine and Real-Time pH Monitoring

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1. Abstract.

Background: Recurrent UTIs are a significant challenge, particularly in patients with neurogenic bladder and vesicoureteral reflux, often resistant to traditional treatments.

Case Presentation: A 35-year-old female with neurogenic bladder, vesicoureteral reflux, and severe hydronephrosis managed with intermittent catheterization suffered recurrent UTIs (10-15 episodes/year) despite antibiotic prophylaxis, postcoital antibiotics, and immunotherapy. In February 2024, treatment with Metiofitine (L-methionine and phytate) began, combined with urinary pH monitoring using Lit-Control® pH Meter 2.0 and adherence support via myLit-Control® app.

Results: The patient remained asymptomatic during treatment, with stable pH levels conducive to infection prevention. Two months after completing therapy, a febrile episode was managed conservatively with antibiotics; cultures were negative, and symptoms resolved.

Conclusion: Metiofitine, combined with pH monitoring, offers a promising non-antibiotic approach to managing recurrent UTIs, aligning with global efforts to combat antimicrobial resistance.

2. Introduction

Recurrent UTIs are a significant burden in patients with neurogenic bladder, often leading to frequent hospitalizations, reduced quality of life, and increased antibiotic resistance(1,2). Non-antibiotic preventive strategies, such as L-methionine and phytate, have gained interest for their ability to modulate urinary pH and inhibit bacterial growth(3,4). This case highlights the successful management of recurrent UTIs using Metiofitine and innovative pH monitoring technology, Lit-Control® pH Meter 2.0.

3. Clinical Case description

a. Patient information / Medical records

A 35-year-old woman with a history of spina bifida and neurogenic bladder managed with clean intermittent catheterization was referred from internal medicine to our urology clinic for recurrent urinary tract infections (UTIs). Her urological history includes vesicoureteral reflux (surgically treated at age 5), grade IV bilateral hydronephrosis and chronic kidney disease (CKD) stage 4 and is on the waiting list for renal transplantation. She reported 10-15 UTI episodes per year over the last five years, significantly impacting her quality of life.

The patient had undergone multiple treatment strategies for recurrent UTIs, including:

- Behavioral measures, including increased fluid intake and optimized catheterization hygiene (5).
- **Directed antibiotic therapy** based on urine cultures, with temporary relief but frequent recurrences.
- **Prophylactic antibiotics**, both continuous (nitrofurantoin) and postcoital, which were discontinued due to side effects and limited efficacy (6,7).
- **Autovaccines:** She received three different types of bacterial immunotherapy (including OM-89), with no significant improvements in UTI recurrence rates in the short or medium term (1,2).

b. Diagnostic support studies and results

In February 2024, blood tests revealed mild anemia (Hb 10 g/dL), chronic kidney disease stage 4 (eGFR 14.2 mL/min/1.73 m²) with the rest of the parameters within normal limits. Urine test showed acidic urinary pH (8), and persistent leukocyturia (55/microl) without nitrituria. Currently, the urine culture was negative, and the patient did not report any urinary symptoms.

An Ultrasonography Imaging was performed and confirmed bilateral renal atrophy and severe hydronephrosis. A large-capacity bladder was also observed without hyperechoic images inside (Figure 1).

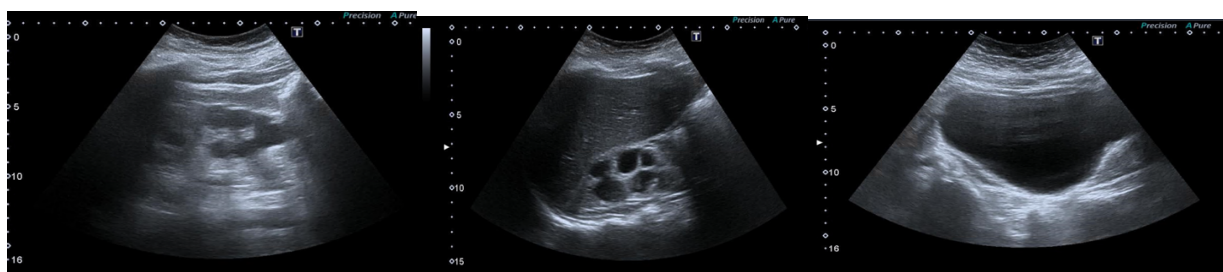


Figure 1: Ultrasonography Image

c. Diagnosis

A 35-year-old woman with recurrent urinary tract infections associated with neurogenic bladder secondary to spina bifida, grade IV bilateral hydronephrosis, chronic kidney disease stage 4, and history of surgically corrected vesicoureteral reflux.

d. Treatment

In February 2024, based on the failure of previous treatments and the persistently elevated urinary pH values, treatment with Metiofitine (L-methionine and phytate) was initiated at a dose of one tablet nightly for six months. To complement the pharmacological approach, the patient was provided with the Lit-Control® pH Meter 2.0 and instructed on its proper use. The device, synchronized with the myLit-Control® app via Bluetooth®, enabled real-time monitoring of urinary pH and included features for recording measurements (Figure 2).

The patient received detailed guidance on using the app, which also offered notifications and reminders to support adherence to hygienic and dietary recommendations, such as adequate fluid intake. These additional measures together with proper catheterization techniques and personalized adherence support were tailored to enhance treatment effectiveness and prevent recurrences.



Figure 2 Interface of the myLit-Control® Mobile App

e. Evolution and progress

The follow-up was conducted bimonthly, during which urinary pH graphs were reviewed to confirm proper adherence to the pharmacological and non-pharmacological measures. The patient performed an average of one measurement per week, and each evaluation showed stable pH levels within the therapeutic target, confirming compliance and reinforcing the importance of sustained efforts.

The patient initiated treatment with Metiofitine in February 2024 at a dose of one tablet nightly, prescribed for an initial six-month period, with the aim of stabilizing urinary pH and reducing recurrent UTIs. During this period, she remained asymptomatic, with bimonthly follow-ups confirming adherence and therapeutic pH stability through graphs provided by the Lit-Control® pH Meter 2.0 (Figure 3).

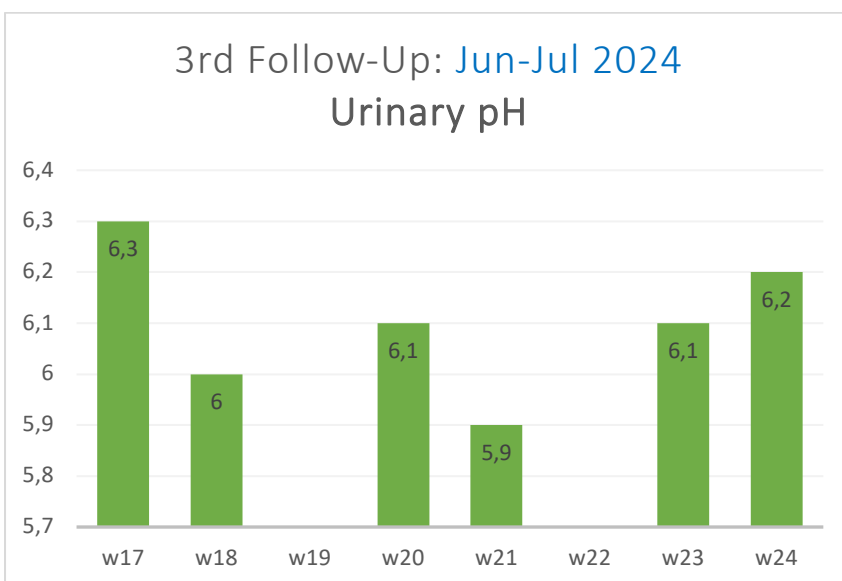
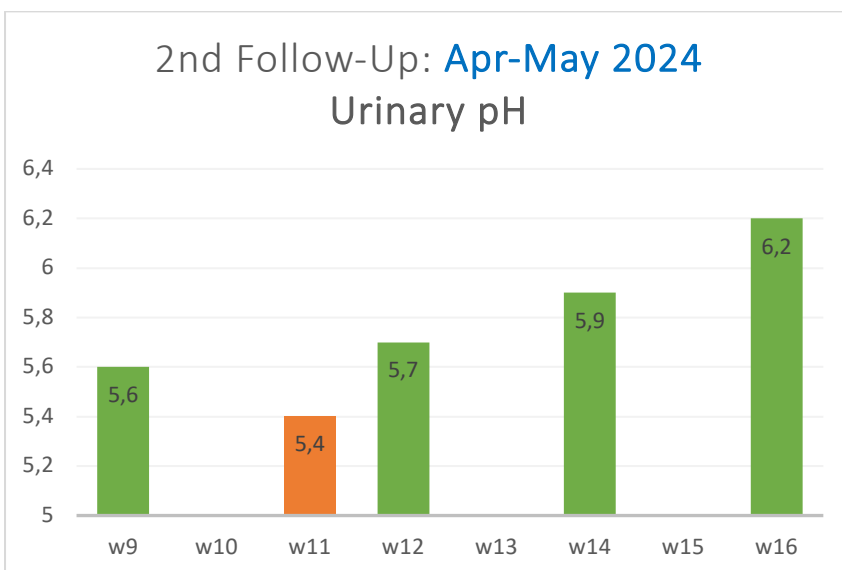
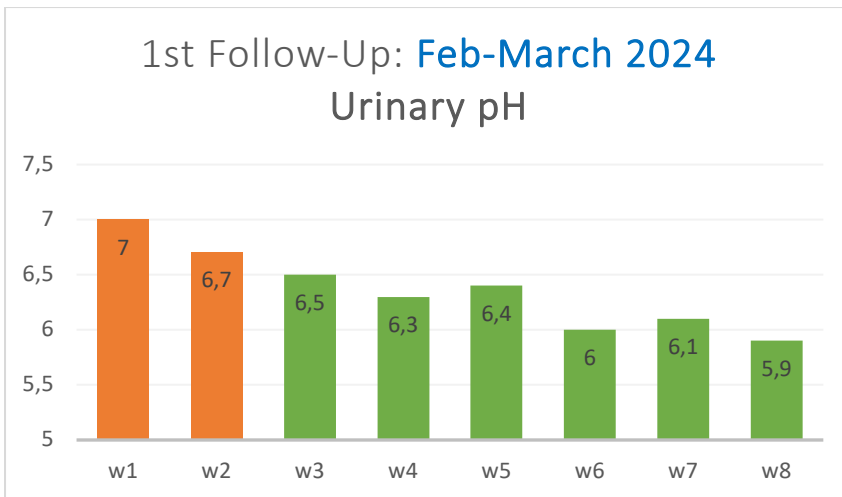


Figure 3: Graphs with weekly records of urinary pH values (green: values within the therapeutic target, orange: out of range)

Two months after completing the initial six-month course of Metiofitine, the patient presented to the emergency department with left flank pain and fever up to 39°C. She was admitted for further evaluation and intravenous antibiotic treatment. Laboratory investigations revealed normal leukocyte count and C-reactive protein levels, **Urine analysis with** pH of 7,3 and no other significant findings indicative of infection. Urine and blood cultures were both negatives.

Given the absence of significant findings suggestive of complications, the episode was managed conservatively with antibiotics, and her symptoms resolved completely by the end of the treatment course.

f. Clinical results

At subsequent visits, the patient resumed Metiofitine treatment as a preventive measure. Monitoring with the Lit-Control® pH Meter 2.0 confirmed sustained pH stability, and no further clinical episodes have been reported to date although only one month has passed since the medication was restarted.

4. Discussion

Recurrent urinary tract infections (UTIs) are a significant clinical challenge, particularly in patients with neurogenic bladder and complex urological conditions such as vesicoureteral reflux and hydronephrosis. This case illustrates the potential of non-antibiotic strategies, such as Metiofitine, in reducing the burden of recurrent UTIs and improving patient outcomes.

Metiofitine combines L-methionine and phytate, which work synergistically to acidify the urine and inhibit bacterial adhesion and growth. Acidification promotes an environment unfavorable for uropathogenic bacteria, aligning with evidence supporting urinary acidification in the prevention of UTIs(2). Additionally, phytate prevents crystallization of calcium salts, reducing the risk of urinary calculi, which are common in patients with neurogenic bladder(4).

Clinical trials and systematic reviews have highlighted the efficacy of L-methionine and methenamine hippurate in reducing UTI recurrence rates, particularly in patients with normal renal anatomy (6,3). This case supports these findings, demonstrating symptomatic relief during the initial six-month course and sustained urinary pH stability as monitored through the Lit-Control® pH Meter 2.0.

The introduction of the Lit-Control® pH Meter 2.0 and its synchronization with the myLit-Control® app was pivotal in ensuring adherence to treatment and lifestyle recommendations. Real-time monitoring empowered the patient to actively participate in her care, aligning with modern approaches that emphasize patient engagement and personalized medicine (4).

The app's functionality, including notifications for hygienic and dietary measures, likely contributed to the patient's high compliance rates. This feature underscores the importance of incorporating digital health solutions into chronic disease management.

The successful use of Metiofitine in this case aligns with European guidelines that recommend non-antibiotic prophylaxis for managing recurrent UTIs (6). Moreover, reducing reliance on antibiotics is crucial in combating antimicrobial resistance, a growing global health threat (6,2).

While the outcomes in this case are encouraging, the single-patient nature limits generalizability. Larger, multicenter studies are needed to further validate the efficacy of Metiofitine and urinary pH monitoring in diverse populations. Additionally, exploring the utility of this approach in patients with varying levels of renal function and urological complexity could provide valuable insights.

5. Conclusions and recommendations

This case demonstrates the efficacy of Metiofitine in managing recurrent urinary tract infections (UTIs) in a patient with neurogenic bladder, achieving sustained symptomatic relief and pH stabilization. The integration of real-time pH monitoring through Lit-Control® pH Meter 2.0 enhanced adherence and personalized care, highlighting the potential of digital tools in chronic disease management.

This approach aligns with international efforts to minimize antimicrobial resistance and promotes innovative, patient-centered management for high-risk populations. Larger studies are warranted to further validate these findings.

6. Bibliographic references (* of special interest, ** of extraordinary interest)

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