

Approach to managing acute pyelonephritis in the emergency department

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Community-acquired urinary tract infections (UTI) are, together with respiratory infections, the most common type of bacterial infection. It is estimated that each year in U.S.A. UTIs cause 1 million visits to the emergency department (ED) and about 100,000 hospital admissions¹, mostly due to acute pyelonephritis (APN).

UTI is divided into complicated or uncomplicated, according to the presence of anatomical or functional abnormalities of the urinary tract, recent history of instrumental intervention or urinary tract infection in the preceding weeks, all of which circumstances may influence the distribution of the causal microorganisms, the response to treatment and the final evolution of the infection². Complicated UTI is usually caused by microorganisms with a higher rate of antibiotic resistance, particularly to quinolones, and are generally less virulent strains than those causing uncomplicated UTI³. UTI is also classified according to the site of infection within the urinary tract, and APN is that which affects the upper urinary tract.

Escherichia coli (*E. coli*) is the microorganism responsible for the majority (> 80%) of uncomplicated UTI. Although *E. coli* is also the most common causal agent of complicated UTI, the strains involved are frequently more resilient and less virulent than the strains responsible for uncomplicated UTI. Complicated UTI may also be caused by other organisms such as *Pseudomonas aeruginosa* and *Enterococcus spp*^{2,4}.

Although mortality associated with the APN is low, 7.3 cases per 1,000 women hospitalized with APN⁵, this is somewhat higher in certain subgroups such as diabetics, pregnant women and in elderly and/or bedridden patients, in which it also constitutes the most frequent cause of septic

shock⁶. In the current issue of EMERGENCIAS, Lluís et al publish the results of an observational study on the evolution of women with uncomplicated APN discharged from the ED⁷. With the results of this study as a backdrop, we discuss different aspects of APN which may be useful for ED physicians responsible for these patients.

The first consideration in relation to the study by Lluís et al refers to the type of patients included: women with uncomplicated ANP. As noted, complicated UTI may be caused by resistant organisms. So, when faced with a patient with signs of APN, we should systematically seek out risk factors associated with complicated UTI, as our approach in the ED will be completely different to that referred to in the study cited.

As for the medical history collected in the study, notably 28.8% of these women had a history of previous UTI. We must remember that about 25% of women with a first episode of acute cystitis develop recurrent UTI⁸. Most of these cases were healthy premenopausal women without anatomic or functional urinary tract alterations⁹.

Regarding the clinical findings, the absence of voiding syndrome in 31% of patients was striking. ED physicians attending patients with suspected APN know that a considerable number of them do not present voiding symptoms but now, after the study by Lluís et al, we know that this happens in about a third of the cases.

Another important finding of this study is that concerning renal ultrasound, which was performed in 14% of cases, a percentage that seems very reasonable. Often, especially if this test is at our disposal, it is hard to resist the temptation not to urgently request it. In principle, faced with a case of uncomplicated APN, renal ultrasound is

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not urgently indicated unless there are data that make us suspect the presence of obstructive APN or renal abscess, such as the presence of septic shock, acute renal failure, abdominal pain, hematuria, a renal mass or persistent fever the third day of active treatment against the isolated organism¹⁰.

Continuing with diagnostic methods, we must emphasize the importance of urine cultures in APN, which are fundamental for therapeutic adjustments when resistant organisms are isolated. The microorganisms isolated by Lluís et al were as expected, with over 80% of APN caused by *E. coli*.

The assessment of the resolution of the symptoms is another interesting issue provided by the Lluís et al study. A frequent question asked by APN patients on ED discharge is the precisely the expected duration of their symptoms. Again Lluís et al confirm what experience has taught us regarding longer duration of low back pain than voiding syndrome and fever. The study also suggests a slower clinical resolution in those patients who presented temperatures above 38°C.

Regarding the treatment of APN, the antibiotic selected must meet the following conditions: 1) be active against more than 95% of the strains of *E. coli*, 2) reach and maintain high concentrations in the urinary tract and in serum, given the possibility of bacteremia, and 3) respect vaginal rectal flora⁴. Anaerobic antibiotics, particularly beta-lactams, may facilitate recurrence due to their effect on vaginal microflora, which promotes vaginal colonization by enterobacteria¹¹. The fluoroquinolones and cotrimoxazole antibiotics best meet the above-mentioned conditions, although rates of *E. coli* resistance in our setting (40% for cotrimoxazole and 20% for fluoroquinolones) limit their use in the empirical treatment of ANP. There has been recent progress in understanding the pathogenesis of UTI. An example is the demonstration of biofilm production by uropathogenic strains of *E. coli*^{12,13}. Demonstration of biofilm

production by strains of *E. coli* could influence decision making regarding the choice and duration of antibiotic treatment in APN.

But the most important conclusion of the study by Lluís et al is that direct ED discharge of patients with uncomplicated ANP is a safe option when the right circumstances prevail:

1) administration of a first dose of parenteral antibiotic, 2) preservation of the general state after a period of observation, 3) possibility of ambulatory monitoring. In fact, only 2.8% of patients in the study of Lluís et al required hospitalization *a posteriori*.

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