# Information leaflet and decision aid for antibiotic treatment in the case of a simple urinary tract infection

This document, made for physicians, contains a summary of key research data for shared decision-making together with the patient.

### **Classification**:

An urinary tract infection (UTI) is classified as simple if the infection occurs in a non-pregnant patient at the age of < 65, if the urinary tract does not show anatomical anomalies, no relevant reduction in the kidney function and no comorbidities, which can negatively influence the UTI.<sup>1,2</sup>

## Epidemiology

Epidemiology

- 30% of all women get a UTI by the age of 24 and 50% of all women sometime during their lifetime.<sup>3</sup> 25% of young, healthy women experience a recurrence of UTI.<sup>4</sup>
- The frequency of UTIs is difficult to measure, as only a fraction of women suffering from UTI seek medical help. If they choose to seek help, they consult a variety of different medical experts with various specialties (family medicine, gynecology, urology and emergency medicine).<sup>2</sup>
- In a representative survey in the UK 2,424 women ≥ 16 years were interviewed, 37% had had at least one UTI in their lifetime, 78% of those had already experienced multiple UTIs. The yearly incidence rate in 2014 was 11%.<sup>5</sup> The claims data analysis of ambulatory consultations in Germany showed that, in 2012, 8.7% of all women in consultation over the age of 12 were diagnosed with cystitis / UTI. In the USA a yearly incidence rate of 12.6% was measured.

### Pathogenesis & frequency of bacterial cause in UTI:

- The cause of a UTI is often a bacterial infection, rarely viral or through mycosis.
- Potential UTI bacteria originate in the digestive tract and colonize the periurethral tissue. They travel through the urinary tract into the bladder. In 80% of cases E. coli bacteria causes the UTI.

Findings in clinical examination:

cloudy urine

haematuria

Other bacterial UTIs are caused by enterobacter, klebsiella, proteus and staphylococcus.<sup>6</sup>

## **Clinical presentation**<sup>1</sup>

#### Symptoms:

- dysuria, pollakiuria, urge to urinate
- suprapubic pain
- newly developed nocturia

### Differential diagnosis

- gynecological infection (colpitis, adnexitis, salpingitis; sometimes indicated through vaginal itch / discharge)<sup>2</sup>
- 2. pyelonephritis (additional fever, flank pain, kidney pain on percussion)
- 3. asymptomatic bacteriuria (no treatment necessary)

# Red Flags

- fever, chills
- flank pain
- nausea, vomiting
- strong feeling of illness
- UTI relapse
- immunosuppression
- pregnancy

# **Diagnostics**

### A simple UTI can be diagnosed when ≥ 2 symptoms in the urinary tract are present and no vaginal symptoms are found.

A simple UTI can be assumed with high probability, if the women show the following signs<sup>2</sup>:

1. Typical symptoms: in a systematic review, 3,711 patients were included and 5 symptoms Urinary tract symptoms relevant for diagnosing UTI were identified: (dysuria, pollakiuria, urinary urgency, haematuria, nocturia) dysuria, pollakiuria, urge to urinate, haematuria, nocturia. With two or more 1 symptom ≥2 symptoms Urinary tract symptoms + additional vaginal symptoms relevant symptoms a UTI is very likely. If only one symptom is present, you should Re-evaluation on worsening Urine dip-stick analysis in case of of symptoms not diagnose an UTI.<sup>8</sup> uncertainity of diagnosis (nitrite Exclude STDs, urethritis and and leukocyturia) other possivle causes of 2. No vaginal symptoms (itching, vaginal symptoms negative positive discharge): The presence of vaginal symptoms decreases Mild symptoms: NSAID as firstthe chance of a UTI and points rather to an STD Actively offer NSAID. Re line treatment evaluation on worsening Medium to severe symptoms: (sexually transmitted disease) or urethritis. symptoms discussion with the patient about advantage and 3. No risk factors for a complicated UTI disadvantage of antibiotics; (pregnancy, comorbidities, anatomical consider NSAID as an alternative to antibiotics anomalies of the urethra, ...)

#### 4. No fever and no flank pain present

# For the diagnosis and management of a simple UTI, a urine sample analysis is not recommended.

- The chance of bacteriuria is > 90% in women with ≥ 2 typical symptoms. Even if the nitrite and leucocytes in the urine analysis are negative, the chance of still suffering from UTI is around 50%.<sup>9-11</sup>
- The urine analysis by dipstick can increase the diagnostic accuracy, if unsure of the diagnosis.<sup>1,8</sup> A positive nitrite result helps with diagnosing a UTI: LR+ 4.42; this means that the presence of a UTI is 4.5-times more likely; a negative test result does not exclude the possibility of a UTI (LR- 0.53).<sup>8</sup>

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Diagnostics

- The nitrite can be detected if it holds enough nutritional nitrates and has been lying in the bladder for more than 4h.
- Enterococcus and staphylococcus are always nitrite negative.
- The presence of leukocyte-esterase suggests possible inflammation in the bladder.
- Leukocyturia is not specific for an UTI and can be present in other types of infection.<sup>1,8</sup>

A urine culture is recommended in a UTI recurrence ( $\geq$  2 UTIs in 6 months /  $\geq$  3 in 12 months), if antibiotic treatment was taken in the past 6 months, if empirical antibiotic treatment did not lead to improvement of symptoms and there is strong suspicion of pyelonephritis or complicated UTI (Cut off: > 10<sup>3</sup> CFU/mI; same pathogen in at least 2 midstream urine specimens).<sup>1,8</sup>

# Treatment options:

## 1. Symptomatic treatment

- The rate of UTIs healing spontaneously is high. Without antibiotic treatment 70% of women are symptom free after 7-9 days.<sup>12-16</sup>
- There is no research showing any positive treatment effect of cranberry products on the treatment of simple UTI.<sup>17-19</sup>
- There is no evidence for a positive treatment effect of plant-based medication.
- Symptomatic treatment can be with NSAID or Paracetamol.<sup>2,13,17</sup> Adverse effects of the medication like headache, stomach ache and eczema occur in 1 of 1000 patients taking ibuprofen.<sup>20</sup>

### Duration of symptoms:

According to different randomized controlled trials:<sup>12,13,15,16,21</sup>

- after 3-4 days 65% vs. 45% of patients with and without (only symptomatic treatment) antibiotic treatment were symptom free.
- after 7-9 days 90% vs. 70% of patients with and without (only symptomatic treatment) antibiotic treatment were symptom free.

## 2. Antibiotic treatment

- Advantages: during antibiotic treatment 2 out of 10 patients were symptom free after 3-4 days (65% vs. 45%).
- Disadvantages / risks: adverse effects like vulvovaginitis, headache, vertigo, diarrhea, vomiting and/or stomach ache occur in 19% with and 13% without antibiotic treatment.<sup>22</sup>

In a patient with mild to intermediate discomfort, treatment without antibiotics can be considered and discussed with the patient.<sup>2,13,17</sup>

## Influence of antibiotic treatment on complications:

- **Pyelonephritis**: the incidence rate of pyelonephritis with antibiotic treatment is 3/1000 vs. 33/1000 people with symptomatic treatment (NSAR). This gives us a 'number needed to treat' of 33. Antibiotic treatment therefore shows a slight benefit in prevention of pyelonephritis, but this is not statistically significant.<sup>12-16</sup>
- **Recurrence**: there is no evidence for antibiotic treatment reducing the risk of recurrence of UTI. In a randomized controlled trial with 487 participants the number of recurrences was similar in both groups (antibiotics vs. placebo) (14% vs. 11% after 28 days).<sup>13</sup>

## **Dosage of antibiotics**<sup>1,8,17</sup>

1. choice: Nitrofurantoin 100mg every 12h for 5d (eGFR > 45/min)

TMP / SMX forte every 12h for 3d (consider regional antibiotic resistances in E.coli)

2. choice: Fosfomycin 3g one time dosage in the evening, Norfloxacin 400mg every 12h for 3d, Cefuroxim 500mg every 12h for 3d, Co-Amoxicillin 500/125mg every 8h for 3d

## Advantage of a reduced prescription rate of antibiotics

- No further promotion of antibiotic resistance in bacteria and no adverse effects through antibiotic prescription.
- Immediate antibiotic treatment promotes the expectation in patients that they will receive another antibiotic treatment should they fall ill again.<sup>23</sup>

References: see https://www.biham.unibe.ch/research/tools to facilitate shared decision making/index eng.html



Symptomatic treatment