

Should you test for urinary tract infection in children with respiratory symptoms?

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Abstract

Question An 8-month-old boy presented to our clinic with a 3-day history of fever. He has had a cough and rhinorrhea since the onset of the fever, and his 4-year-old sibling has recently had cough and cold symptoms. I have heard that the presence of respiratory symptoms means that urinary tract infection (UTI) is less likely. In infants with fever and respiratory symptoms, who should have a sample collected for urinalysis for UTI?

Answer The approach to diagnosing febrile infants who have respiratory symptoms varies by age. Urinalysis should be done for all febrile infants younger than 2 months of age, regardless of whether they have respiratory symptoms. Clinicians should assess risk factors for UTI in every infant between 2 and 24 months of age and should not exclude the diagnosis of UTI based on respiratory symptoms alone. Use of a predictive tool to estimate the pretest probability of UTI would aid decision making about patients in this population.

Febrile urinary tract infection (UTI) is one of the most common bacterial infections in children, accounting for 7% of emergency department visits.¹ A delay in antibiotic treatment of more than 48 hours increases the risk of renal scarring, making prompt diagnosis essential.² Most UTIs are ascending infections caused by uropathogenic bacteria colonizing the external genitalia,³ making female and uncircumcised male infants particularly susceptible to UTI.⁴ Unlike older children with UTI who present with specific symptoms such as dysuria or back pain, the presentation of UTI in infants is often nonspecific.⁵ Urethral catheterization is frequently required to obtain a urine sample in infants younger than 2 years of age,⁴ further complicating the diagnosis of UTI in the family practice setting.

Respiratory viral infections are the most common cause of fever in infants, occurring on average 6 to 7 times a year in the first few years of life.⁶ Clinical practice guidelines on pediatric UTIs from the Canadian Paediatric Society and from the National Institute for Health and Care Excellence discourage routine urine testing in febrile children with respiratory symptoms who are older than 2 months and 3 months, respectively, explaining that most of these fevers are caused by viral infections, not UTIs.^{7,8} However, some previous studies have shown that the presence of respiratory symptoms does not completely exclude the possibility of UTI.

Infants younger than 2 months of age

Febrile infants younger than 2 months are at high risk of serious bacterial infections due to their immature immune systems.⁹ Although the incidence of UTI is lower in people with respiratory infections than in those without, previous studies have shown that the incidence of UTI in this population is not negligible. In a multicentre, prospective cohort study of 844 febrile infants tested for influenza virus, UTI was diagnosed in

3 of 123 (2.4%) infants with positive test results for influenza and 77 of 712 (10.8%) infants with negative test results.¹⁰ A prospective observational study from the Pediatric Emergency Care Applied Research Network in the United States reported that the incidence of UTI in febrile infants younger than 60 days old was lower in infants with positive viral test results than in infants with negative test results (33 of 1200 [2.8%] vs 186 of 1745 [10.7%]), although the incidence of UTI was still not negligible in the group with positive viral test results.¹¹ In a prospective cohort study of 931 infants younger than 60 days old conducted in the midst of the COVID-19 pandemic in Montréal, Que, the incidence of UTI was 16.3%, 6.7%, and 3.1% in infants whose test results were negative for viruses, positive for a non-SARS-CoV-2 virus, and positive for SARS-CoV-2 infection, respectively.¹² In a 2021 guideline the American Academy of Pediatrics recommended all febrile infants younger than 2 months of age should have urinalysis done regardless of coexisting upper respiratory tract symptoms.⁹ (The Canadian Paediatric Society guideline does not cover infants younger than 2 months and notes that febrile illness in such children requires consideration of bacterial sepsis and different investigative and management approaches.⁷ The National Institute for Health and Care Excellence guideline recommends referring infants younger than 3 months with a suspected UTI to a pediatric specialist and having urinalysis done.⁸)

Infants 2 to 24 months of age

For infants 2 to 24 months of age, much lower rates of bacterial infections and UTIs are seen in febrile infants with respiratory symptoms. In a retrospective study from the United States of 359 febrile infants admitted for respiratory syncytial virus infection, only 4 (1.1%) were diagnosed with UTI.¹³ Similarly, of 1626 infants aged 2 to 12 months who had positive test results for influenza virus

or respiratory syncytial virus, only 8 (0.49%) patients met the American Academy of Pediatrics diagnostic criteria for UTI.¹⁴ All 8 had other risk factors such as prolonged fever, high temperature, or uncircumcised status.¹⁴

Nonetheless, a prospective cohort study from Spain of 439 infants (male, <12 months; female, <24 months) with upper respiratory tract symptoms found 19 (4.3%) were diagnosed with UTI.¹⁵ In a single-centre study from the United States of 90 febrile infants (2 to 12 months of age) with clinically diagnosed bronchiolitis, 4 (4.4%) were diagnosed with UTI.¹⁶ This study was subsequently expanded to a prospective, multicentre cohort study of 442 patients with clinically diagnosed bronchiolitis and found that 33 (7.5%) had a concomitant UTI.¹⁷ In this multicentre study, none of the 55 circumcised male infants were diagnosed with UTI, while 11 (7.6%) of 144 uncircumcised male infants were diagnosed with UTI,¹⁷ making uncircumcised status a statistically significant risk factor for UTI in this population as well ($P=.03$).

The heterogeneity in the results of these studies may be due to differences in how they defined respiratory infections, with some studies including patients with positive viral test results and others including patients with clinically diagnosed respiratory infections. Considering that studies with more robust designs have shown the nonnegligible high incidence of UTI in infants with fever and respiratory infections, physicians should not exclude UTI in febrile infants based on findings of respiratory symptoms alone, especially in those with other risk factors for UTI.

To help physicians in family practice settings or emergency departments, a predictive tool for estimating the probability of UTI is available and includes risk factors such as age younger than 12 months, maximum temperature of 39°C or higher, history of UTI, being female or being male and uncircumcised, another source of fever, and duration of fever of 48 hours or longer.^{18,19} The tool suggests collecting urine if the pretest probability of UTI exceeds 2%, regardless of upper respiratory tract symptoms.^{18,19}

Conclusion

Urinary tract infection is a common bacterial infection in infants that needs to be treated and presents a diagnostic challenge to clinicians when concerns or physical findings include respiratory symptoms. Urinalysis should be part of an investigation in all febrile infants younger than 2 months of age regardless of respiratory infection

status. Clinicians should evaluate the risk factors for UTI in every infant between 2 and 24 months of age regardless of the presence of respiratory symptoms.

Competing interests

None declared

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Can Fam Physician 2024;70:169-70 (Eng), e44-6 (Fr).

DOI: 10.46747/cfp.7003169

La traduction en français de cet article se trouve à <https://www.cfp.ca> dans la table des matières du numéro de mars 2024 à la page e44.



Child Health Update is produced by the Pediatric Research in Emergency Therapeutics (PRETx) program (<http://www.pretx.org>) at the BC Children's Hospital in Vancouver. Dr Kazuki Iio is a member and Dr Ran D. Goldman is Director of the PRETx program. The mission of the PRETx program is to promote child health through evidence-based research in therapeutics in pediatric emergency medicine.

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