

Sterile pyuria

What is sterile pyuria?

Sterile pyuria is the presence of elevated numbers of white blood cells (>10 white cells/mm³) in urine which appears sterile using standard culture techniques.

- Sterile pyuria is not an uncommon laboratory finding. In one population study, 13.9% of women and 2.6% of men were affected^[1].
- Sterile pyuria is often found in female patients with symptoms of urinary tract infection (UTI). However, these results may be misleading for various reasons:
 - Standard laboratory culture conditions may not be optimal for growth of atypical organisms.
 - Laboratory may not report significant growth either because it was not a single organism or a recognised urinary pathogen.
 - Fewer than 100,000 colony-forming units (cfu) per mL reported – eg, it may be that urine was diluted by high fluid intake or an organism may be slow-growing. Studies have shown that approximately half of women presenting with symptoms and counts of 100–10,000 cfu/mL have genuine bladder infections.
- The presence of pyuria increases the significance of a low bacterial count in the urine.
- Cell count per high power field is inaccurate and use of a counting chamber or similar gives more accurate results.

Aetiology

- A recently (within preceding two weeks) treated [urinary tract infection \(UTI\)](#) or inadequately treated UTI.
- UTI with 'fastidious' organism (an organism that grows only in specially fortified artificial culture media under specific culture conditions) - eg, *Neisseria gonorrhoeae*.
- [Renal tract tuberculosis](#) [2] .
- [Chlamydial urethritis](#).
- False negative culture due to contamination with antiseptic.
- Contamination of the sample with vaginal leukocytes.
- [Interstitial nephritis](#): sarcoidosis (lymphocytes not neutrophils).
- [Urinary tract stones](#).
- Renal papillary necrosis: diabetes, sickle cell disease, analgesic nephropathy.
- Urinary tract neoplasm, including renal cancer and bladder cancer.
- [Polycystic kidneys](#).
- [Interstitial cystitis](#).
- [Prostatitis](#).
- [Kawasaki disease](#) [3] .
- Other reported associations include appendicitis and systemic lupus erythematosus.

Investigations

- Urinalysis: initial test to identify likely infection but a urine sample needs to be sent to the laboratory. See the separate [Urine Dipstick Analysis](#) article. Positive nitrite test +/- positive leukocyte esterase test. Haematuria and proteinuria occur in UTI but are also present in other conditions.

- Urine microscopy, culture and sensitivities; ask the laboratory to culture under conditions allowing identification of fastidious or slow-growing organisms.
- Consider the possibility of sexually transmitted infection; take a sexual history and consider sending swabs for chlamydia and *N. gonorrhoeae*.
- Polymerase chain reaction (PCR) testing of sterile pyuria has been recommended for the detection of *Chlamydia trachomatis*, mycoplasma and ureaplasma infections^[4]. However, in asymptomatic patients, the usefulness of mycoplasma and ureaplasma detection by this means has been questioned on the grounds that carriage of these bacteria is common, and the majority of individuals do not develop any disease^[5].
- Always consider tuberculosis; culture for AFBs (three early morning urine samples).
- With urine obtained direct from the bladder, any organism grown is significant and should be treated with a prolonged course of appropriate antibiotics.
- Ultrasound of kidneys, ureters and bladder should be considered for evaluation of febrile or otherwise symptomatic patients^[6].
- Cystoscopy may be required to exclude non-infective causes.

Management

Management of any identified underlying cause.

Further reading

- [Shipman SB, Risinger CR, Evans CM, et al](#); High Prevalence of Sterile Pyuria in the Setting of Sexually Transmitted Infection in Women Presenting to an Emergency Department. *West J Emerg Med*. 2018 Mar;19(2):282–286. doi: 10.5811/westjem.2017.12.35605. Epub 2018 Feb 26.
- [Joseph A](#); The Diagnosis and Management of UTI in >65s: To Dipstick or Not? The Argument Against Dipsticks. *Infect Prev Pract*. 2020 May 7;2(3):100063. doi: 10.1016/j.infpip.2020.100063. eCollection 2020 Sep.

References

1. [Wise GJ, Schlegel PN](#); Sterile pyuria. *N Engl J Med*. 2015 Mar 12;372(11):1048–54. doi: 10.1056/NEJMr1410052.
2. [Daher Ede F, da Silva GB Jr, Barros EJ](#); Renal tuberculosis in the modern era. *Am J Trop Med Hyg*. 2013 Jan;88(1):54–64. doi: 10.4269/ajtmh.2013.12-0413.
3. [Singh S, Kansra S](#); Kawasaki disease. *Natl Med J India*. 2005 Jan–Feb;18(1):20–4.
4. [Nassar FA, Abu-Elamreen FH, Shubair ME, et al](#); Detection of Chlamydia trachomatis and Mycoplasma hominis, genitalium and Ureaplasma urealyticum by polymerase chain reaction in patients with sterile pyuria. *Adv Med Sci*. 2008;53(1):80–6.
5. [Horner P, Donders G, Cusini M, et al](#); Should we be testing for urogenital Mycoplasma hominis, Ureaplasma parvum and Ureaplasma urealyticum in men and women? – a position statement from the European STI Guidelines Editorial Board. *J Eur Acad Dermatol Venereol*. 2018 Nov;32(11):1845–1851. doi: 10.1111/jdv.15146. Epub 2018 Jul 6.
6. [Glen P, Prashar A, Hawary A](#); Sterile pyuria: a practical management guide. *Br J Gen Pract*. 2016 Mar;66(644):e225–7. doi: 10.3399/bjgp16X684217.

Disclaimer: This article is for information only and should not be used for the diagnosis or treatment of medical conditions. Egton Medical Information Systems Limited has used all reasonable care in compiling the information but makes no warranty as to its accuracy. Consult a doctor or other healthcare professional for diagnosis and treatment of medical conditions. For details see our [conditions](#).

Last updated by: Dr Laurence Knott 17/09/2021	
Peer reviewed by: Dr Hayley Willacy, FRCGP 17/09/2021	Next review date: 16/09/2026

View this article online at: patient.info/doctor/sterile-pyuria

Discuss Sterile pyuria and find more trusted resources at [Patient](#).



To find out more visit www.patientaccess.com
or download the app



Follow us

