



## Pyuria ≠ Urinary Tract Infection

Pyuria is the presence of white blood cells ( $\geq 10$  leukocytes/mm<sup>3</sup>) and/or leukocyte esterases in a urinalysis and suggests inflammation in the urinary tract. Antibiotics are often started in response to pyuria. Is this appropriate? How common is pyuria? Does pyuria always mean infection?

### What do guidelines recommend?

IDSA guidelines define asymptomatic bacteriuria (ASB) as the presence of bacteria in the urine in the absence of urinary tract infection (UTI) symptoms (e.g. frequency, urgency, suprapubic pain, dysuria in cystitis or flank pain, fever, chills, nausea/vomiting in pyelonephritis) **regardless of the presence of pyuria**. Antibiotic treatment for ASB is NOT recommended, except in pregnant patients and those undergoing urological procedures where mucosal bleeding is anticipated.<sup>1</sup>

### How often does pyuria occur? What are non-UTI causes of pyuria?

Pyuria is VERY common in ASB (Table 1) and is therefore not helpful in differentiating infection from ASB. In long term care residents, 90% of patients with ASB will have concomitant pyuria! There are many non-infectious causes of pyuria (Table 2). Pyuria can also be common in the absence of bacteriuria. One surveillance study of asymptomatic women found pyuria without bacteriuria in 23% of urine samples.<sup>3</sup>

**Table 1: Presence of ASB and pyuria**

Population	Prevalence of Pyuria with ASB <sup>2</sup>
Healthy premenopausal women	32%
Women with diabetes	70%
Male long-term care residents	90%
Female long-term care residents	90%
Hemodialysis patients	90%
Indwelling urinary catheter	50-100%

**Table 2. Non-infectious causes of pyuria<sup>4</sup>**

Chronic kidney disease <sup>5</sup>
Foreign body (e.g. mesh, stent)
Inflammatory diseases (e.g. lupus)
Interstitial cystitis
Interstitial nephritis
Papillary necrosis
Pelvic irradiation
Polycystic kidney
Renal-vein thrombosis
Urinary catheters
Urinary fistula
Urinary tract neoplasm
Urinary tract procedures
Urinary tract stones

### Does pyuria always mean infection?

**No!** Pyuria has a low positive predictive value and high negative predictive value for a UTI.<sup>3,6,7</sup> In other words, presence of pyuria does not necessarily mean there is a UTI, but lack of pyuria usually excludes a UTI.

### Key Takeaway:

Presence of pyuria, in the absence of urinary tract infection symptoms, is not diagnostic of a urinary tract infection and does not require antibiotic treatment. Absence of pyuria strongly argues against a UTI.

### References:

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