Sterile Pyuria

There is no universal standard definition for ‘Sterile pyuria’. Essentially it is the presence of elevated numbers of white cells in a urine (for our laboratory methods >40 WCC x10^6/L), but appears sterile using standard culture techniques. Sterile pyuria is common and has many causes. There are no studies to show the relative prevalence of each of them. The separation into infection and non-infection related is purely arbitrary for classification purposes.

**Causes of sterile pyuria**

**Infection related**

- A recently (within last 2 weeks) treated urinary tract infection (UTI)
- Current antibiotics – even one dose of antibiotic before collection of urine specimen
- Urine dilution by high fluid intake
- Extreme frequency of urine
- Use of an antiseptic to clean urethra prior to collection of MSU (false negative result)
- Vulvo-vaginitis – infectious causes with contamination of sample with vulvo-vaginal leucocytes
- Chlamydial urethritis
- Urethritis – other infectious aetologies e.g. *N. gonorrhoea*
- Prostatitis
- Balanitis
- Appendicitis – if appendix lies close to ureter or bladder
- UTI with ‘fastidious’ or slow growing atypical organism (an organism that grows only in a specially fortified artificial culture media under specific culture conditions)
- Viral infections of the lower genitourinary tract
- Renal tract tuberculosis – consider in patients with fever, weight loss, night sweats, anorexia with no other obvious cause
- Adenovirus – in immunocompromised patients
- Schistosoma haematobium – concurrent eosinophilia is common, history of possible exposure?

**Non infection related**

- Presence of catheter or recent catheter
- Recent cystoscopy and urinary tract surgery
- Urinary tract stones
- Physiological pyuria of pregnancy
- Vulvo-vaginitis – non infectious causes with contamination of sample with vulvo-vaginal leucocytes
- Urethritis – non infectious causes
- Urinary tract neoplasm
- Pelvic irradiation
- Interstitial nephritis: analgesic nephropathy, sarcoidosis (lymphocytes not neutrophils)
- Renal papillary necrosis: diabetes, sickle cell disease, analgesic nephropathy
- Polycystic kidneys
- Interstitial cystitis - similar symptoms to UTI with sterile pyuria; cystoscopy shows inflammation, sometimes with ulceration; may progress to cause contracture of bladder; cause is unknown
- Drugs – NSAIDS, steroids, cyclophosphamide, indinavir,
- Malignant hypertension
- Other reported associations include SLE and other systemic inflammatory diseases, Kawasaki disease
Further Microbiological Investigations

Consider possible causes for sterile pyuria and if no obvious cause consider repeat with an appropriately collected specimen – a mid-stream clean catch can help avoid contamination from vaginal or prostatic secretions. Where indicated:

- Consider possibility of sexually transmitted diseases; take a sexual history and consider sending swabs for chlamydia and *N. gonorrhoea*.
- If tuberculosis considered; culture for AAFBs (3 early morning urines). Note this is also rare and should only be requested on the basis of appropriate clinical history not just as a routine investigation for sterile pyuria.
- If schistosoma haematobium suspected clinically, for example, with appropriate travel/exposure history +/- presence of eosinophilia please contact laboratory for further information as to how to collect sample. A serology sample is a good alternative investigation for travellers to endemic areas.

To help the laboratory interpret results it is always useful to enter in the clinical details including any recent or current antibiotics that the patient may have taken and presence of a catheter.

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Document references