

Table 8: Suggested regimens for antimicrobial therapy for urosepsis.

Antimicrobials	Daily dose	Duration of therapy
Cefotaxime	2 g t.i.d	7-10 days Longer courses are appropriate in patients who have a slow clinical response
Ceftazidime	1-2 g t.i.d	
Ceftriaxone	Standard dosage: 2 g q.d High dosage: 2 g iv b.i.d	
Cefepime	Standard dosage: 1 g iv t.i.d or 2 g iv bid High dosage: 2 g iv t.i.d	
Piperacillin/tazobactam	Standard dosage: 4 g piperacillin + 0.5 g tazobactam x 4 iv 30-minute infusion or x 3 iv by extended 4-hour infusion High dosage: 4 g piperacillin + 0.5 g tazobactam x 4 iv by extended 3-hour infusion	
Ceftolozane/tazobactam	1.5 g t.i.d	
Ceftazidime/avibactam	2.5 g t.i.d	
Gentamicin*	6-7 mg/kg q.d	
Amikacin*	25 - 30 mg/kg q.d	
Ertapenem	1 g q.d	
Imipenem/cilastatin	0.5 g q.i.d	
Meropenem	Standard dosage: 1 g t.i.d High dosage: 2 g iv t.i.d	

* Not studied as monotherapy in urosepsis

b.i.d = twice daily; t.i.d = three times daily; q.d = every day; iv = intravenously.

3.10 Urethritis

3.10.1 Introduction

Urethritis can be of either infectious or non-infectious origin. Inflammation of the urethra presents usually with subjective symptoms (dysuria, alguria, burning, itching and pain around the distal urethra and external urethral meatus) and clinical signs (urethral discharge, erythema around the external urethral meatus and inguinal lymphadenopathy). These symptoms and signs must be distinguished from other infections of the lower urinary tract. Urethral infection is typically spread by sexual contact. The following recommendations are based on the consultation draft of the S3 guideline on urethritis "Management of Urethritis in Male Adolescents and Adults" (AWMF registry number 013-099) [329].

3.10.2 Epidemiology, aetiology and pathogenesis

In most cases, urethritis is caused by sexually transmitted bacterial infections, the most common of which are *C. trachomatis*, *N. gonorrhoeae* and *M. genitalium*. It should be noted that pathogens whose relevance as a cause of urethritis symptoms is questionable or must be determined on a case-by-case basis, such as *U. urealyticum*, *U. parvum* and *M. hominis*, are also frequently detected. Urethral infections with more than one pathogen are common. Empirical antibiotic treatment must therefore take into account the potential effects of targeting the primary pathogen on any coexisting infections. From a therapeutic and clinical point of view, gonorrhoeal urethritis (GU) caused by *Neisseria gonorrhoeae* must be differentiated from non-gonococcal urethritis (NGU). Non-gonococcal urethritis is a non-specific diagnosis that can have many infectious aetiologies. Causative pathogens include *Chlamydia trachomatis*, *Mycoplasma genitalium*, *Ureaplasma urealyticum* and *Trichomonas vaginalis*. The role of *Ureaplasma* spp. as urethritis causative pathogens is controversial. Recent data suggests that *U. urealyticum*, but not *U. parvum* is an aetiological agent in NGU [330]. The prevalence of isolated causative pathogens are: *C. trachomatis* 11-50%; *M. genitalium* 6-50%; *Ureaplasmas* 5-26%; *T. vaginalis* 1-20%; and adenoviruses 2-4% [331].

The causative microorganisms either remain extracellularly on the epithelial layer or penetrate into the epithelium (*N. gonorrhoeae* and *C. trachomatis*) and cause pyogenic infection. Although arising from urethritis, chlamydiae and gonococci can spread further through the urogenital tract to cause epididymitis in men or cervicitis, endometritis and salpingitis in women [332].