

Enterococcus

Enterococcus is fast emerging as a major pathogen causing serious and life threatening bacteremia and endocarditis.

see [Enterococcus faecalis](#).

It is also increasingly being implicated in spine infections.

In 2004, Tarr et al. reviewed 12 cases of enterococcal [vertebral osteomyelitis](#) and they noted 9 cases were reported since 1995, which may reflect the emergence of the enterococcus as a clinically important pathogen in the recent decades. In a recently published large series of SEA, the incidence of enterococcal infection was about 2.6%(2 out of 77 cases) and 4% (3 out of 82 cases).

This emergence may be the result of the increased clinical application of broad-spectrum antimicrobial therapy without significant activity against enterococci, such as cephalosporins, quinolones, and macrolides.

Exposure to such antibiotics has been identified as a risk factor for colonization and infection by enterococci.

[Cerebrospinal fluid shunts](#) used to treat [hydrocephalus](#) have an overall infection rate of about 10% of operations. The commonest causative bacteria are [Staphylococcus epidermidis](#), followed by [Staphylococcus aureus](#) and enterococci. Major difficulties are encountered with nonsurgical treatment due to biofilm development in the shunt tubing and inability to achieve sufficiently high CSF drug levels by intravenous administration. Recently, three cases of *S. epidermidis* CSF shunt infection have been treated by intravenous linezolid without surgical shunt removal, and we therefore investigated vancomycin and linezolid against biofilms of these bacteria in vitro. A continuous-perfusion model of shunt catheter biofilms was used to establish mature (1-week) biofilms of *Staphylococcus aureus*, *Staphylococcus epidermidis* (both methicillin resistant [MRSA and MRSE]), *Enterococcus faecalis*, and *Enterococcus faecium*. They were then “treated” with either vancomycin or linezolid in concentrations achievable in CSF for 14 days. The biofilms were then monitored for 1 week for eradication and for regrowth. Enterococcal biofilms were not eradicated by either vancomycin or linezolid. Staphylococcal biofilms were eradicated by both antibiotics after 2 days and did not regrow. No resistance was seen. Linezolid at concentrations achievable by intravenous or oral administration was able to eradicate biofilms of both *S. epidermidis* (MRSE) and *S. aureus* (MRSA). Neither vancomycin at concentrations achievable by intrathecal administration nor linezolid was able to eradicate enterococcal biofilms. It is hoped that these in vitro results will stimulate further clinical trials with linezolid, avoiding surgical shunt removal ¹⁾.

¹⁾

Bayston R, Ullas G, Ashraf W. Action of linezolid or vancomycin on biofilms in ventriculoperitoneal shunts in vitro. *Antimicrob Agents Chemother*. 2012 Jun;56(6):2842-5. doi: 10.1128/AAC.06326-11. Epub 2012 Mar 19. PubMed PMID: 22430965; PubMed Central PMCID: PMC3370720.

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Last update: **2025/05/13 02:16**

