

**Cardiac Implantable Electronic Device Lead Infection - Microbiology Summary Clinical Guideline**

Reference number: CG-ANTI/2019/061

Background includes CIED; and

- Symptoms/Signs of infective endocarditis; or
- Pyrexia of unknown origin

Investigate

Radiology:

- CXR

Cardiology/Clinical measurements:

- Echocardiogram:
  - TTE ± TOE

AND

Microbiology:

- Blood cultures x 3
- If purulent discharge, fluid MC&S

Blood sciences:

- FBC, CRP, lactate, U&Es, and LFTs

Treatment

Medical or surgical intervention:

- Step 1: explantation of the CIED:
  - Collaborate with the cardiology consultant regarding removal versus retention of the CIED
  - If there is no 'definite' CIED/IE, consider further investigation with nuclear medicine
  - If returned to the cath lab or taken to theatre, pocket swab, tissue sample, and/or lead tip for MC&S
- Step 2: ± temporary pacing
- Step 3: ± reimplantation of the CIED

AND

Antibiotics:

- Step 1: empiric
  - Microbiology summary clinical guideline, page 2
- Step 2: directed
  - Microbiology full clinical guideline, pages 7-10

**Empiric antibiotics: no clinical concerns regarding sepsis**

First line	Vancomycin or teicoplanin intravenously, <a href="#">dose as per hospital guidelines</a> , vancomycin target pre dose level 15-20 mg/l, teicoplanin target pre dose level 30-40 mg/l, <b>and</b> <a href="#">Gentamicin</a> 1 mg/kg intravenously 12 hourly, target pre dose trough < 1 mg/l and target post dose peak 3-5 mg/l, <b>and</b> Rifampicin 300-600* mg per oral 12 hourly
Second line	Daptomycin 8-10 mg/kg intravenously 24 hourly <b>and</b> <a href="#">Gentamicin</a> 1 mg/kg intravenously 12 hourly, target pre dose trough < 1 mg/l and target post dose peak 3-5 mg/l, <b>and</b> Rifampicin 300-600* mg per oral 12 hourly
* Rifampicin 300 mg if creatinine clearance < 30 ml/min, 600 mg if creatinine clearance ≥ 30 ml/min	

**Empiric antibiotics: clinical concerns regarding **sepsis** (life threatening organ dysfunction caused by a dysregulated host immune response to infection) secondary to lead infection**

First line	Piperacillin tazobactam 4.5 g intravenously 6 hourly <b>and</b> Vancomycin or teicoplanin intravenously, <a href="#">dose as per hospital guidelines</a> , vancomycin target pre dose level 15-20 mg/l, teicoplanin target pre dose level 30-40 mg/l
Second line, <a href="#">if non-immediate without systemic involvement penicillin allergy</a>	Ceftazidime 2 g intravenously 8 hourly <b>and</b> Vancomycin or teicoplanin intravenously, <a href="#">dose as per hospital guidelines</a> , vancomycin target pre dose level 15-20 mg/l, teicoplanin target pre dose level 30-40 mg/l
Third line, <a href="#">if immediate rapidly evolving or non-immediate with systemic involvement penicillin allergy</a>	<a href="#">Ciprofloxacin</a> 400 mg intravenously 8 hourly <b>and</b> Vancomycin or teicoplanin intravenously, <a href="#">dose as per hospital guidelines</a> , vancomycin target pre dose level 15-20 mg/l, teicoplanin target pre dose level 30-40 mg/l

## References

- Bennett, J. E., et al.** 2015. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 8<sup>th</sup> Edition. Elsevier.
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- Gould, F. K., et al.** 2012. Guidelines for the diagnosis and antibiotic treatment of endocarditis in adults: a report of the Working Party of the British Society for Antimicrobial Chemotherapy. Journal of Antimicrobial Chemotherapy.
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- Karchmer, A. W. et al.** 2021. Infections involving cardiac implantable electronic devices: Treatment and prevention. Available at: [Infections involving cardiac implantable electronic devices: Treatment and prevention - UpToDate.](#)
- Sandoe, J. A. T., et al.** 2015. Guidelines for the diagnosis, prevention and management of implantable cardiac electronic device infection. Report of a joint Working Party project on behalf of the British Society for Antimicrobial Chemotherapy (BSAC, host organization), British Heart Rhythm Society (BHRS), British Cardiovascular Society (BCS), British Heart Valve Society (BHVS) and British Society for Echocardiography (BSE). Journal of Antimicrobial Chemotherapy.

## Document control

<b>Development of guidelines:</b>	Kayleigh Lehal, Dr Peter Slovak
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<b>Changes from previous version:</b>	Introduction: reworded (minor) and reformatted (minor). Differential diagnosis: reworded (minor) and reformatted (minor). Investigation: reworded (minor), reformatted (minor), and expanded (Echocardiogram, provided by cardiology and clinical measurements; Radiology and nuclear medicine). Criteria for diagnosis of CIED lead infection and/or infective endocarditis. Treatment: reworded (minor) and reformatted (minor). Management: reworded (minor), reformatted (minor). Appendix 1: Gentamicin. References: expanded (minor).
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