

What it takes to manage Carbapenemase Producing Enterobacteriaceae (CPE) organisms

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1 Introduction

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- Notification from VICNISS (Victoria Nosocomial Infection Surveillance System) of CPE in two patient samples
- Enterobacter cloacae CPE identified in two separate patients at Knox Private Hospital
- Contact tracing commenced – to identify CPE contacts and any potential transmission
- Both patients identified as being inpatients in the same room in ICU

2 Background

CPE are Gram-negative bacteria that are resistant to the carbapenem class of antibiotics, considered the drugs of last resort for such infections. They are resistant, as they produce an enzyme called a carbapenemase that disables the drug molecule.

Types of CPE

- Escherichia coli
- Enterobacter aerogenes
- Enterobacter cloacae complex
- Klebsiella oxytoca
- Klebsiella pneumonia

Types of Carbapenem Antibiotics

- Imipenem
- Meropenem
- Ertapenem
- Doripenem

4 Challenges

- Pathology – Conflicting results – initially reported as incorrect organisms/sensitivities, delay in precautions, delay in sending to Melbourne Diagnostic Unit (MDU)
- Introducing and providing education about a new organism to staff
- Changing terminology & staff understanding – significance of CPE organism
- Environment in the ICU – open bays, no ant-room on isolation room
- Limited resources
 - ICP allocation – 0.9 EFT & 359 Beds, HICMR
 - Cost of testing, no assistance from Victoria Department of Health and Human Services (DHHS)

5 Interventions

- Following Victorian DHHS CPE guidelines
- Preventing spread by instigating strict management of contact precautions for staff and visitors, including:
 - isolation for identified CPE patients
 - isolation of all CPE contacts until screened as clear
 - isolation of cases in single room – with bathroom
- Introduction of Actichlor – chlorine disinfectant product for all aspects of surface and environmental disinfection
- Utilisation of Asepti Active Wipes – one step cleaning and disinfection of hard non-porous surfaces

3 Patients

Case 1	Case 2
94 YO Male	63 YO Female
Admitted 16/6/2017 for TURBT & urethral dilatation – Complicated by urethral rupture	Admitted 3/5/17 with small bowel obstruction – identified as small bowel cancer, formation of colostomy.
Past Medical History: <ul style="list-style-type: none"> • PPM, • Cardiomyopathy, • COPD, • Bowel cancer 	Past Medical History: <ul style="list-style-type: none"> • T2DM, • Osteomyelitis, • Ongoing bowel obstructions, • Abdominoperineal resection, • Left TKR, Right hip pain
Born – Greece	Born – Australia
10/7/2018 Sputum – Enterobacter cloacae (CPE)	14/7/2018 Blood culture – Enterobacter cloacae (CPE)
Deceased – 23/7/2018	Discharged home – 12/8/17

Links between cases 1 & 2

- Same CPE organism isolated – Enterobacter cloacae
- Both patients stayed in ICU Room 10, consecutively
- Multiple long stay hospitalisations
- Frequent antibiotic usage

6 Results

- Contact tracing initiated for both cases, from date of identified positive CPE result to one month prior to identification.
- Victorian DHHS CPE screening requires any patient that had shared patient area/bathroom within the month prior to identification of organism be screened via two faecal specimens
 - **Case 1** – 11 patients screened, nil positive results
 - **Case 2** – 5 patients screened, nil positive results
- Genome sequencing results from MDU
 - **Case 1** – Enterobacter cloacae complex 45 IMP-4
 - **Case 2** – Enterobacter cloacae complex 108 IMP-4

7 Conclusion

Given both patients were positive for Enterobacter cloacae complex, but had different genes identified via genome testing performed at Melbourne Diagnostic Unit, Knox Private Hospital ICU was not classified as a Transmission Risk Area (TRA) and did not transmit this infection between these patients.

As a consequence, the ICU department was not identified as a TRA, therefore did not have to test every patient who presented to the department weekly, until there was four weeks of negative samples as required by the Victorian guideline on CPE.

If the genome testing had identified local transmission, the implication to the hospital would have been financial and had potential to damage reputation. All staff managed these patients without issue and with no cross infection.