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Enhanced Carbapenemase Producing Enterobacterales (CPE) Screening in a Paediatric Population

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Abstract

Aims
The aim of this period of extended screening (to include those being readmitted to TSCUH if they had been an inpatient in the preceding year) was to determine whether any additional CPE positive patients were identified.

Methods
Education was given to Clinical Nurse Managers regarding those requiring screening and reinforced at daily handover meetings.

Results
917 patients were screened during the four-month period; only two positive patients were identified, who would have been screened under the previous local guidelines.

Conclusion
The screening of an additional 314 patients (34% increase compared with the same period in the previous year) yielded no positive results, showing that patients whose only risk factor was admission to TSCUH within the previous year do not currently require screening.

Introduction

CPE are becoming increasingly widespread in Ireland and screening is essential in preventing spread. Various national and international guidelines have addressed appropriate cohorts for screening, informing national policies.[1,2,3,4,5] Introduction and acquisition of multi-drug resistant organisms is a rising concern in Irish healthcare, with 280 cases of CPE seen in 2016.[6] Screening is an integral part of their control, but requires input from nursing staff, laboratory scientists, the Infection Prevention and Control Team and Information Technology support. HSE guidelines published in March 2018 'Guidelines for the Prevention and Control of Multi-drug resistant organisms (MDRO) excluding MRSA in the healthcare setting' detailed groups recommended to undergo CPE screening; this included screening patients on readmission to the same institution if they had been admitted in the previous year.

Other international guidelines include those from the Australian Committee for Quality and Safety in Healthcare and the CPE toolkit (Public Health England), neither of which recommends screening patients on readmission.

Based on the low incidence of CPE in the CHI@TSCUH population, with no acquisitions since the introduction of screening in July 2017, it was decided to evaluate the additional yield of screening re-admissions in addition to others.

Methods

CPE testing was performed on rectal swabs or stool samples. These were cultured on chromogenic agar (CHROMagar™ mSuperCarba™, manufactured by CHROMagar France) and any suspicious isolates underwent further testing using the Xpert Carba-R PCR (Cepheid, USA) testing to determine the presence of the most common target carbapenem resistance genes. Any concerning isolates were also identified to clarify if carbapenem resistance may be an inherent characteristic of the organism or is mediated via mechanisms other than carbapenemase genes. This was done using the VITEK®2 system. Isolates suspicious for carbapenemase production were beaded, sloped and sent to the National CPE Reference Laboratory for confirmation, with further elucidation of the resistance mechanism if necessary.

Results

During the period from October 2018 to March 2019, 917 screening samples were tested; compared to 603 from October 2017 to March 2018 (34% increase), giving an approximate estimation of the increased testing– i.e. the cohort of patients being readmitted to CHI@TSCUH who were admitted in the previous year. There were no other changes to the CPE screening policy during that time. Testing for the period October 2018- March 2019 detected two carbapenemase producing organisms – both *E.coli* carrying OXA-181, a variant of OXA-48. These patients were related and had a history of healthcare contact in an area of high endemnicity; they would have been tested as per the pre-existing local guidelines and were not solely detected due to the increased screening.

Discussion

This period of enhanced screening did not identify any additional CPE, and the 34% increase in screening had implications in terms of both cost and scientist/nursing time. Information relating to epidemiology and risk factors for CPE in the paediatric population is scarce[7] and knowledge is largely based on case reports, case series and one systematic review. Globally resistance rates to meropenem in paediatric populations are as high as 4.4%.[8] The most recent Irish CPE screening guidelines state: 'More limited screening for CPE may be justified where a documented local risk assessment by the IPC team indicates that the risk of CPE colonisation is very low and there is no evidence of CPE transmission in the hospital. Any such risk assessment should be reviewed at least annually'.[9] Our findings may be replicated in other low-risk settings, e.g. other paediatric and maternity services. However, applicability needs to be assessed in the context of local CPE prevalence and patient complexity. CHI@TSCUH does not have patients with an oncological background, for example, who would often have a large burden of antimicrobial exposure, a known risk factor for CPE acquisition. Screening those whose only risk factor was admission to CHI@TSCUH within the previous year did not yield any positive results and therefore we intend to exclude this group of patients from CPE screening, supported by our local risk assessment and the most recent national guidelines.

Declaration of Conflicts of Interest:

The Authors declare that there is no conflict of interest.

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