Risk management for the emergence of CRE in SA.

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Context and Problem

Carbapenemases are a major public health threat:

- unprecedented international spread in communities,
- drastically reduced options for treatment and
- complicated laboratory detection.

2011- Brought increased reports of CRE in South Africa.

- A risk-management program for multiple hospitals was undertaken.
- International multifaceted risk-management strategies[1,2] that successfully contained the spread of these highly transmissible pathogens and enzymes over several years, were reviewed.

1) Schwaber MJ, Lev B, Israeli A, et al; Israel Carbapenem-Resistant Enterobacteriaceae Working Group. Containment of a country-wide outbreak of carbapenem-resistant Klebsiella pneumoniae in Israeli hospitals via a nationally implemented intervention. Clin Infect Dis. 2011;52(7):848–855.

2) Centers for Disease Control and Prevention. CRE toolkit–guidance for control of carbapenem-resistant Enterobacteriaceae (CRE). 2012. Available at: http://www.cdc.gov/hai/organisms/cre/cre-toolkit/index.html. Accessed 22 March 2013

Intervention

Based on international literature and consultation with national experts[4,5,6], an active CRE screening protocol was initiated across 54 hospitals.

- 1st May 2011 screened for KPC and NDM
- 1st March 2012, OXA-48-like, IMP, VIM and GES screens were added.

- A first set of criteria for the initial risk assessment, was agreed on.

Criteria for rectal screening on admission included:

- Transfers from another hospital or any other long term care facility
- Hospital or ICU admission within the last year for 7 days or longer
- Recent travel to another country
- Patients who received any antibiotics in the last 3 months
- Any indwelling devices present on admission
- Renal dialysis treatment.

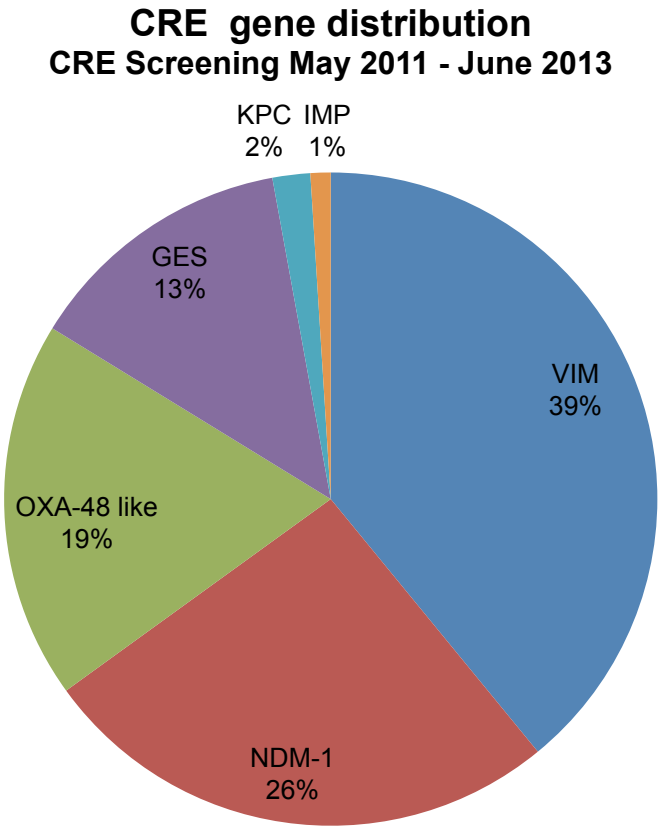
Intervention continued

- All patients fitting one or more of the criteria were screened with a dry rectal swab.
- All screened were isolated and/or cohorted **on** admission.
- A validated multiplex PCR that detects 6 major carbapenemase genes was performed according to Monteiro et al[3] (Molecular laboratory, Ampath National Reference Laboratory, Centurion, Pretoria).
- Patients with a positive PCR, remained isolated, for the remainder of hospitalization and on any readmission.
- If negative, the rectal screen was repeated twice, at 72 hour intervals.
- Once positive, screens were stopped.
- Patients with 3 negative rectal swabs were removed from isolation “holding areas”.
- Demographic and clinical data including prior hospital exposure and co-morbidities of all positive cases were documented.

3) Monteiro J, Widen RH, Pignatari Kubasek ACCC, Silbert S. Rapid detection of carbapenemase genes by multiplex real-time PCR. J Antimicrob Chemother 2012; 67:906 –909.

Results of CRE gene distribution

- 1st May 2011 until the 01st June 2013, **5.12%** of all the rectal screens performed were positive.



Challenges

- 1st screen was positive in 85.82% of patients.
- 2nd screen was positive in 10.07 % of patients with a
- 3rd screen, positive in only 4.10% of patients respectively
- 1.83% of patients had a positive CRE **clinical isolate** and was subsequently confirmed positive on rectal swabs.
- NB- not all patients with a PCR confirmed CRE clinical isolate, had a rectal screen.
- In addition, the following was documented:
- 5.12% of patients showed multiple GIT colonization with > 1 CRE genotype
- After discharge, CRE/CPE positive patients were re-screened on admission - 14.65% of cases remained positive with the same genotype.
- 6 suspected outbreaks occurred during the study period.
- Positive cases were predominantly seen amongst the following patients:
- Mechanical ventilation, burns, trauma injuries, pregnancy, cancer and
- prior hospitalization particularly in African countries (Egypt, Morocco, Nigeria, Benin, Chad, and Angola. Mali, Ghana, Mozambique and Tanzania).

Lessons learnt

- Active rectal screening, using the initial risk criteria and process detected CRE in 5.12% at-risk patients.
- The impact of early pre-emptive isolation of suspected cases (“search and contain” strategy) reduced exposure to other hospitalized patients and therefore reduced risk.
- Ongoing data collected, showed majority of patients screened positive on the 1st screen.
- Duration of colonization post discharge continued to show high variation some remaining positive as long as 18 months, to as short as 5 months post discharge.
- The risk of multidrug-resistant organisms remains a global challenge in healthcare.
- Combating the risks and detecting the organisms and enzymes requires proactive rather than reactive strategies.
- Continuous review and updating of strategy and / or process is imperative.

Going Forward

- Following the outcomes of the initial process , and after further consultation with national and international experts[4,5,6] ,the CRE risk management strategy was reviewed in early 2014, and documented as a *standard operating practice* (SOP) for use across all 54 hospitals.
- This included additional recommendations that had become available in the medical literature as more countries considered their CRE risk management strategies[4,5,6]
- SOP includes revised screening criteria as recommended by the South African Society of Clinical Microbiology [6] e.g.
- - reduced screening to 1 rectal swab on admission only, and
  - a screen on > 2 weeks stay in ICU repeated weekly if negative.
- Adherence to the SOP is being monitored and all additional risk-management strategies implemented, and are being measured.

4) Australian Commission on Safety and Quality in Health Care. *Recommendations for the control of Multi-drug resistant Gram-negatives: carbapenem resistant Enterobacteriaceae (October 2013)*. Sydney. ACSQHC, 2013.

5) Saidel-Odes L and Borer A. Limiting and controlling carbapenem-resistant *Klebsiella pneumoniae. Infection and Drug Resistance* 2014:7 page numbers

6) Lowman W, Bamford C, Govind C, Swe Swe Han K, Kularatne R, Senekal M, Brink A, Moodley P, Thomas J, Smit J, Perovic O.The SASCM CRE-WG: consensus statement and working guidelines for the screening and laboratory detection of carbapenemase-produc... Enterobacteriaceae. *South Afr J Infect Dis* 2014;29(1):5-11

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