GRE Outbreak Management in University Hospitals of Morecambe Bay NHS Trust

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Introduction

The first Glycopeptide Resistant Enterococcus (GRE) was identified in 1988. The need and the potential success in controlling the spread of this organism has been debated since. GRE is not a single entity, it is a group of different Enterococcus species carrying different genes to code the resistance. The source of GRE can be human, animal, food or environment. They are resistant to several antibiotics and antiseptics therefore they can easily survive in hospital environment. Controlling the spread of them requires complex multidisciplinary management, and can be expensive. On the other hand controlling GRE provides assurance to control other infectious agents spread by direct/indirect contact, and faecal-oral route.

University Hospitals of Morecambe Bay NHS Foundation Trust (UHMB) have been experiencing increasing prevalence of GRE in clinical specimens since 2015 (Figure 1.) that led us to introduce control measures to prevent local spread of GRE.

UHMB FT serves a population of 1.6 million people by two acute hospitals and three small rehabilitation/elderly care units. Royal Lancaster Infirmary (RLI) has ca 300 beds, Furness General Hospital (FGH) operates with ca 200 beds. The infection control team and microbiology labs cross-cover the Trust.(Figure 2.)

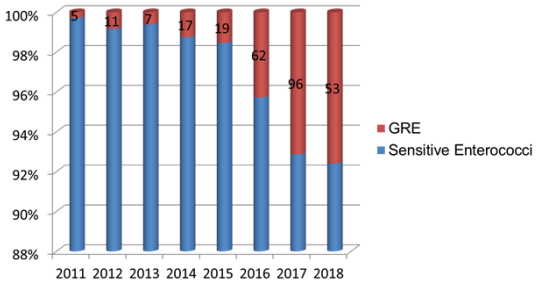

Figure 1. Prevalence of GRE in clinical samples in UHMB FT between 2011-2018

Figure 2. The boundaries of UHMB Trust

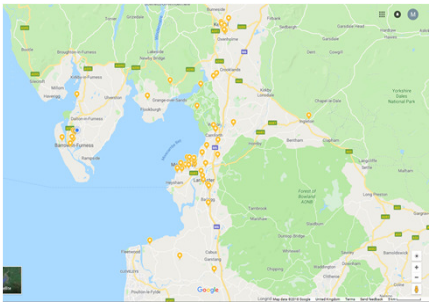

Figure 3. Distribution of the GRE positive cases

Epidemiology of GRE in UHMB FT

We first noticed local increased prevalence of GRE in certain areas in 2015. That led us to investigate epidemiological links between the cases.

69 GRE isolates from out of cc 200 have been PFGE (Pulsed Field Gel Electrophoresis) typed since 2015 in AMRHAI (antimicrobial resistance and healthcare associated infections) Reference Unit, Colindale . Only two patient had more than one isolate sent for typing.

There was a single outbreak strain identified in FGH that was spread to three medical wards and affected 7 patients.

Although Barrow area is historically more affected by resistant infections especially by ESBL, it seems that GRE hit Lancaster/Morecambe more than Barrow-in-Furness (figure 3).

In RLI 40 isolates were identified as epidemiologically linked isolates making 9 PFGE types. The hot-spot of the spreads were surgical wards.

There was no clonal prevalence associated with any postcode/area patients lived at.

The only epidemiological clone in FGH was spread in house within 6 weeks, and affected 6 patients and 3 medical wards. Due to the vigorous infection control measures this strain was last been seen in August 2017.

At RLI, 9 epidemiological clones were identified. Four of them spread within weeks on the same wards. Surgical Assessment Unit, General Surgical Ward and Orthopaedic Surgical Ward were hit by outbreaks involving 22 patients.

Demography of the GRE positive patients in UHMB

The average age of the patients was 78 year old (youngest is 42 y, oldest is 99 y). Majority of the patients lived in their own home, but 1/4 were nursing/residential home residents. The town Morecambe seemed to be the hot spot of the GRE that would be worth investigating further. It's worth noted that 43% of the cases were died by October 2018.

Detection of GRE in Microbiology laboratory

Since 2016 UHMB laboratories investigated and actively screen GRE from routine clinical samples, and faecal samples/rectal swabs in case of outbreak situation.

Every inpatient sample regardless of whether they are relevant clinically is investigated for the presence of GRE, routinely Positive cases and their contacts are flagged up with alert message in the hospital patient management system (LORENZO), and they are required to produce 3 negative faecal/rectal screening samples before they are released from isolation.

Faecal samples/rectal swabs are cultured on aztreonam agar plates with vancomycin disc. Any Gram-positive colonies which are resistant to vancomycin are investigated further for GRE. Identification of bacteria is done by VITEK GP card. Vancomycin, teicoplanin sensitivity tests are performed by E-tests. Isolates from inpatients are sent to Reference Lab for epidemiological typing.

Guidelines Review

The guidelines for controlling GRE in hospital settings can be part of the multi-resistant organisms guidelines.

Hospital Infection Control Practices Advisory Committee (HICPAC) CDC published comprehensive recommendations in 1995 for preventing the spread of Vancomycin Resistance Enterococci (VRE) in hospital settings in case of outbreak situation.

The first review of GRE outbreak management in the UK was published in 2004 in Journal of Hospital Infections. The conclusion was that standard precautions and prudent use of antibiotic should do the trick. At that time no national guidelines suggested a more vigorous approach. In January 2006 the Guidelines for the control of Glycopeptide-resistant enterococci in hospitals were published in the same journal in 2006. Public Health England refers to a link that is not accessible on-line. Health Protection Scotland advises isolation for those patients colonised or infected with diarrhoea, wounds or drains only, otherwise standard precautions are recommended by them.

There is no international or national agreement with regards to the infection control management of GRE colonisation/infection/outbreak. Local risk assessment and approach is advised in general.

Infection control management of GRE in UHMB FT

Following the CDC recommendations for GRE outbreak management we introduced the following measures:

Patients who were found to be positive with GRE were isolated with contact precautions. The bay was then closed for contact screening. Stool samples or rectal swabs were requested for GRE screening - 3 in total, 48 hours apart. Ongoing enhanced and increased cleaning was introduced during the patient stay and in the closed bay until further cases ruled out. We increased the presence of the IPC team on the affected ward to monitor adherence of enhanced cleaning and contact precautions. Once screening was complete the bay is terminal cleaned, and decontaminated using the TECcare CONTROL, a broad spectrum high level disinfectant. TECcare CONTROL is dispensed throughout the room over a period of 45 minutes using the specialist TECcare VorTEC misting system, and this ensures all surfaces within the room are thoroughly disinfected. Any isolation room with a patient positive for GRE was fogged on patient discharge, again using the specialist TECcare CONTROL disinfectant solution dispensed by the VorTEC misting system.

Discussion

There was slight differences in the management of the GRE outbreaks depending on the actual risk assessment and the presence of the IPC team on the wards. We found obvious local epidemiological links in those cases that were closely related by PFGE typing. We had 69 bed days lost due to bay closures. The outbreaks resulted over 1000 terminal cleans.

There was a successful clone that managed to hide in an elderly care unit and spread again on surgical wards. At that time the decision was to apply the Scottish Guidelines on elderly care unit and not to isolate, screen and deep clean the unit. Another potential lapse with regards of another successful clone was the lack of fogging for terminal cleaning. The engagement of the ward nurses and doctors significantly affected the features, and duration of the outbreaks.

Our experience suggests that vigorous effort of controlling GRE as early as possible results in less cases, therefore less effort, cost and resources to use. Hidden spread between cases is unavoidable in hospital setting if we don't contact isolate the known cases.

Additional benefit of investing energy in GRE control could have been the very low level of Clostridium difficile infection (CDI) rate in our Trust, that used to be famous for the high prevalence of CDIs.

Literature

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