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Culture Sampling & 'Day 3' Reviews of Piperacillin-Tazobactam

Introduction

Antimicrobial resistance (AMR) is a global public health issue due to increasing multi-drug resistant bacteria and limited antibiotic development. The 2016/17 AMR CQUIN focus is to reduce the use of broad-spectrum antibiotics, which is guided by the *Start Smart - Then Focus* toolkit.

Other issues with broad-spectrum IV administration include:

- Complications from IV administration, e.g. line access, phlebitis, pain
- Increased prevalence of *C. difficile* infections, especially with combination penicillins (*NICE; 2015 Mar.)*
- Significant burden to nursing staff workload and greater risk for medication errors

As per LTHT Sepsis Management Guidelines (2016), piperacillin-tazobactam is the broad-spectrum IV antibiotic of choice for empirical treatment in patients over the age of 65 presenting with sepsis. Entering October 2016, use of piperacillin-tazobactam at LTHT was 13% above the CQUIN target reduction. Aiming to reduce inappropriate usage of piperacillin-tazobactam was the major area of improvement for our antimicrobial stewardship (AMS) plan.

Aims

1. Identify whether appropriate microbiological sampling was performed prior to piperacillin-tazobactam initiation, complied with guidelines and whether therapy was amended in light of the results.
2. Assess the extent in which clinical reviews of empirical therapy were undertaken within 48-72 hours ('day 3' review) and outcomes were clearly documented in the medical notes and on the prescription.

Methods

Included all patients initiated on, or completing a course of, piperacillin-tazobactam on the adult general acute surgical and medical wards over a two-month period (October-December 2016).

Information was obtained from paper drug charts (medical wards) or eMeds (surgical wards), patients' medical notes and PPM+ electronic results server.

Results

1. Culture Sampling

N=77 patients

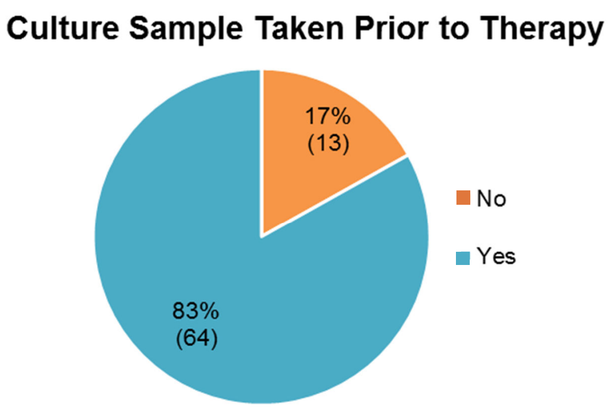

Figure 1. Proportion of patients who had a sample taken for microbiology culture and sensitivities prior to initiating piperacillin-tazobactam.

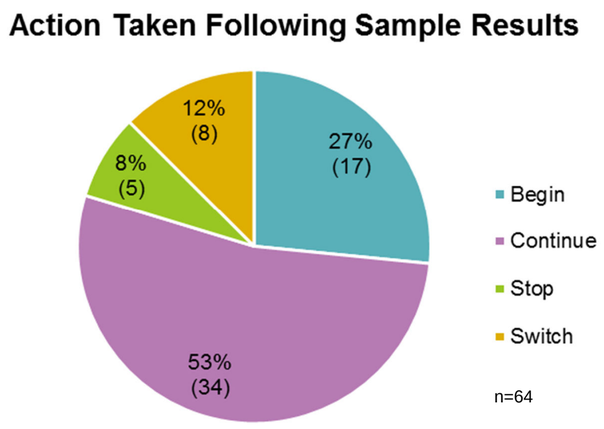

Figure 2. The action taken on empirical piperacillin-tazobactam therapy following receipt of culture sample results.

- Majority of patients had a culture sample taken prior to therapy
- 77% of samples complied with all recommendations in the relevant LTHT guideline
  e.g. blood & sputum for HAP
- Started empirically for 15 different clinical indications
  Most frequent was sepsis (34%)
- Only 6 of the 15 indications had piperacillin-tazobactam listed as appropriate empirical therapy in LTHT guidelines
  (= 66% of patients)
- 72% of sample cultures sent were negative for growth
- Of those continued on piperacillin-tazobactam following results (n=34), 65% had no growth identified

2. Day 3 Reviews

N=112 patients

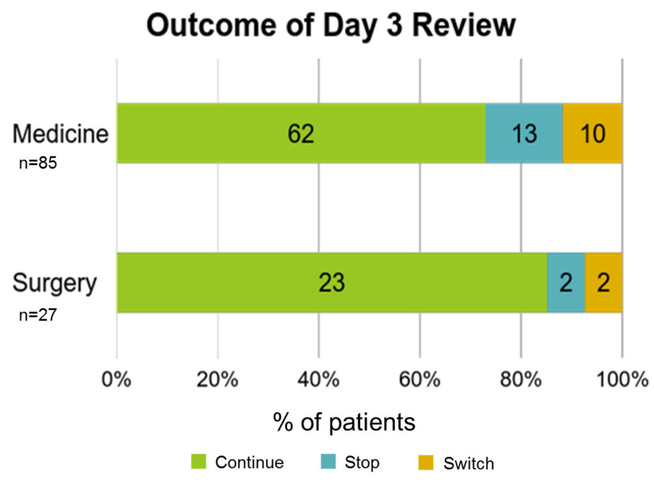

Figure 3. Clinical outcome following a 'day 3' review of empirical piperacillin-tazobactam therapy.

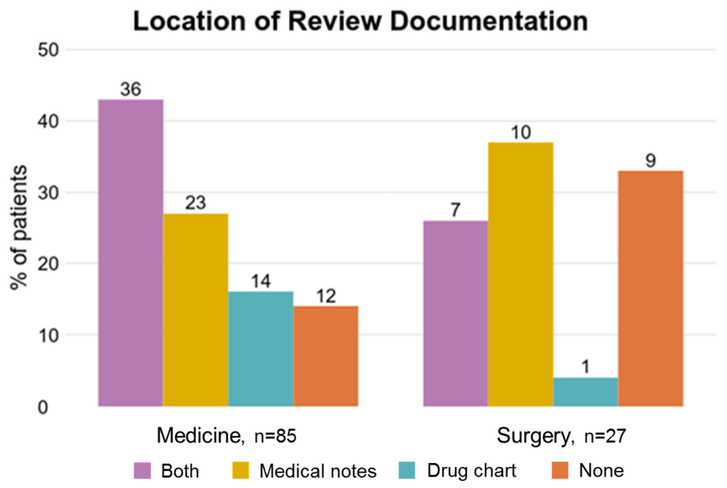

Figure 4. Location of the documentation which stated the clinical decision and outcome following the 'day 3' review.

- Majority of patients continued on piperacillin-tazobactam therapy:
  73% in medicine
  85% in surgery
- 24% of patients were not suitable for oral therapy
  e.g. NBM, severe infection
- No evidence for IVOS or OPAT in other (76%) patients
- Less than half had documentation in both the medical notes and drug chart
  42% in medicine
  26% in surgery
- More than half of reviews entered in the notes had a rationale documented
  69% in medicine
  53% in surgery
- No review documented at all in 14% of medical and 33% of surgical patients (19% in total)

Conclusion

Inconsistent compliance to LTHT antimicrobial guidelines in regards to undertaking appropriate sampling and documenting the evidence of 'day 3' reviews.

A significant proportion of patients were initiated on piperacillin-tazobactam, despite its use not being indicated in the guidelines. Inappropriate prescribing of broad-spectrum antibiotics is a major contributor to the rise in AMR and pharmacists have a critical role in educating and informing prescribers on correct usage of antibiotics.

In addition, failing to take culture samples hinders the ability to tailor therapy.

Without sufficient documentation, it cannot be confirmed that all results and options (e.g. IVOS) have been considered and is unclear as to the appropriateness of continuing piperacillin-tazobactam in the individual. The 19% (n=21) of cases which had no evidence of a review occurring at all is anticipated to be due to poor practice in documenting reviews, rather than reviews not occurring.

IMPACT realist review (Wong G, et al. *BMJ 2015;5[10]*) highlighted concerns of junior medics in reviewing antimicrobials, which included fear of patient deterioration and criticism from senior colleagues. Thus overprescribing was preferred to the risk of undertreating.

Recommendations

- Clear summary of information in antimicrobial guidelines in regards to sampling and treatments
- Highlighting antimicrobials on electronic drug charts
  - Transition from paper to electronic charts removed the designated antimicrobial prescribing section which some prescribers used as a prompt for reviewing
- Consultants and senior prescribers to encourage junior doctors to promote AMS and critically review antimicrobial therapy
- Practical teaching and education to trainee doctors of AMR, the process of reviewing antibiotics and the importance of documenting clinical updates
- Nursing staff to handover to medics when patients have resumed eating but still receiving IV therapies

Pharmacy Services