Utilising pre-defined oral switch criteria to identify missed intravenous to oral antibiotic switch opportunities

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Introduction

Promotion of intravenous (IV) to oral conversion of antibiotic therapy has been included as an effective strategy in almost all antimicrobial stewardship (AMS) recommendations[1-2]. In practice, many hospitalised patients continue IV antibiotic therapy for longer than necessary[3].

To facilitate earlier IV to oral switch, agreed clinical criteria for switch would be beneficial[1]. Such criteria could assist in identifying and quantifying missed opportunities. Furthermore, development of a simple clinical criteria tool would enable other health professionals, such as pharmacists or nurses, to identify patients suitable for switch and promote earlier transition to oral antibiotics.

Aims

i. To develop agreed criteria for IV to oral switch suitable for bedside use, and
ii. To use these criteria to retrospectively identify and quantify missed opportunities for IV to oral antibiotic switch in patients admitted to a general medical unit of an Australian tertiary hospital.

Methods

Pre-defined clinical criteria for switching from IV to oral antibiotic therapy were developed by an AMS expert group based on review of the current published literature, refined by expert opinion and discussion with users. These criteria were piloted amongst local staff to ensure usability, reliability and validity.

An assessment tool was then developed that could be applied as a bedside checklist to enable clinical staff to objectively assess these criteria daily.

A retrospective audit of general medical patients prescribed IV antibiotics over a one month period (1st - 30th November 2016) in an Australian hospital was conducted.

Patients were included in the study if they were admitted under one of the four general medical units and received one or more IV antibiotics over the study period. Assessment of patients admitted to Intensive Care Unit began the day they were transferred to the wards.

Patients were excluded if they met one or more of the following criteria:
- Pre-specified infections where prolonged courses of IV therapy were explicitly recommended (e.g. *Staphylococcus aureus* bacteraemia, endocarditis)
- Infections that required prolonged IV antibiotics as specified in a formal Infectious Diseases consult
- Antibiotics for peri-operative surgical prophylaxis
- Transferred to another hospital or died during antibiotic course

Medical progress notes, observation and medication charts and pathology were reviewed each day of IV therapy until a switch to oral antibiotics was made. The IV to oral switch assessment tool for use at the bedside assessed if the patients had any signs of sepsis and if they were suitable for oral intake.

Assessment against the pre-defined oral switch criteria was conducted by an external AMS pharmacist. The criteria was used to determine the number of excess days (if any) of IV antibiotic therapy received after the time at which they met criteria for switch.

Results and Discussion

The following bedside checklist was developed:

Assessment of criteria for IV to oral antibiotic switch (put a tick (√) if met or a cross (x) if not met)							
Date							
Step 1: Assess for the presence of signs of sepsis (for the past 24 hours) *(*Document the value if abnormal)*							
Normal WBC count (WBC within 4-12 x 10^9 cells/L) *							
Normal temperature (>36°C and <38°C) *							
HR < 90bpm							
RR < 20/min							
To proceed to step 2, make sure the patient: • has at least three criteria within the above acceptable ranges • if **temperature > 38 °C** and this is the **only criteria outside of normal range**, the maximum temperature should be **LOWER** than the maximum temperature of the previous day							
Step 2: Assess for the accessibility of oral route (for the past 24 hours)							
Tolerating oral intake or receiving other oral/NG/PEG meds							
No absorption problems: diarrhea, vomiting							

Figure 1: Simple 6 point bedside assessment tool

The AMS expert group agreed that if a patient was febrile but their maximum temperature was lower than the maximum temperature the previous day, they were still able to meet switch criteria. This concept is supported in the literature[4].

Of the 370 patients admitted to the general medical units during the study period, 125 patients (34%) received one or more IV antibiotics. Of these patients, 81 patients (65%) were identified for inclusion in this study, and 44 patients met exclusion criteria.

When assessed against the pre-defined oral switch criteria using the tool, 34 patients (42%) were switched to oral antibiotics on the day they met pre-defined criteria for oral switch; 12 patients (15%) were switched to oral antibiotics before meeting the criteria for oral switch. A total of 35 patients (43%) were found to have received at least one excess day of IV therapy. The total number of days of excess IV therapy in this cohort was 58 days within one month, as described in figure 2.

Number of days of excessive IV antibiotic therapy per patient (n=81)

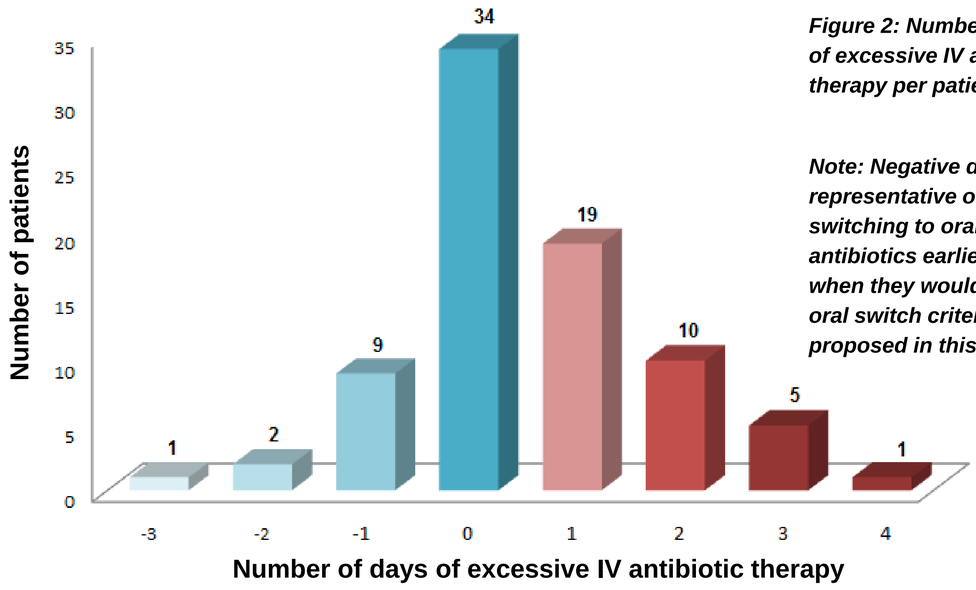

Figure 2: Number of days of excessive IV antibiotic therapy per patient (n=81)

Note: Negative days are representative of patients switching to oral antibiotics earlier than when they would have met oral switch criteria proposed in this study

Of the 35 patients that received at least one excess day of IV therapy, the indications for the antibiotics are described in figure 3.

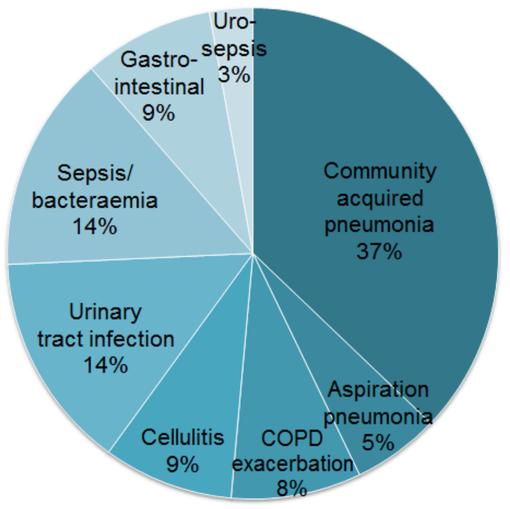

Figure 3: Indications where intravenous antibiotics were given in excess by one or more days according to oral switch criteria (n=35)

There were 56 antibiotics given in excess by one or more days. Of these, ceftriaxone was most commonly implicated (see figure 4).

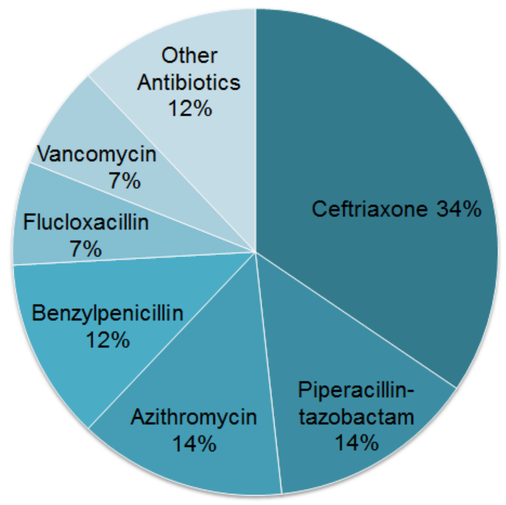

Figure 4: Intravenous antibiotics that were given in excess by one or more days according to oral switch criteria (n=56)

The findings suggest that there may be scope to use the pre-defined clinical criteria to prospectively identify and review patients who may be suitable for oral antibiotic switch. This oral switch intervention could be readily conducted by pharmacists or nurses by using the simple 6 point bedside assessment tool.

Conclusion

Our findings demonstrated that there were significant missed opportunities for IV to oral switch in general medical patients. These might have significant impact on lengths of stay and healthcare costs. The pre-defined oral switch criteria based on readily available bedside information could be utilised to promote earlier transition to oral antibiotics. This tool may be suitable for implementation in pharmacist or nurse- led IV to oral antibiotic switch programs.

References

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