The Impact of an Antimicrobial Stewardship Team on the Appropriateness of Antimicrobial Therapy in Suspected Sepsis

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Background

Early administration of appropriate, broad-spectrum antimicrobials improves survival outcomes in sepsis.[1]

However, early administration of empiric antimicrobial therapy must be balanced with unintended consequences such as emergence of drug-resistant micro-organisms, opportunistic infections (e.g. *Clostridium difficile* infection) and adverse drug effects.

The NSW *'Sepsis Kills'* guidelines recommend empiric antimicrobials be reviewed 24 hours after commencement, and again following preliminary microbiology results, to consider ceasing or de-escalating therapy.[2]

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Medical Emergency Team (MET) calls

Sepsis is considered at all MET calls where infection is suspected. Empiric antimicrobial therapy is initiated and managed by treating units.

Antimicrobial Stewardship (AMS)

The AMS team (ID physician and pharmacist) review patients on broad spectrum antimicrobials or with positive blood cultures, identified by electronic approval (Guidance MS®) following pharmacist notification.
The team does not routinely review patients with suspected sepsis.

Aim

To determine the impact of AMS team review on the appropriateness of antimicrobial therapy in patients with MET calls for suspected sepsis.

Methods

A randomised controlled trial was undertaken of non-ICU patients with a MET call for suspected sepsis between February and August 2018.

Patients were randomised to standard care (antimicrobial therapy managed by treating unit) or intervention (standard care plus AMS review within 48 hours of the MET call).

AMS review included focused review of the patient's medical record and pathology results by the AMS team or relevant consult team.

The primary outcome was appropriateness of antimicrobial therapy 72 hours post MET call, determined by a panel of blinded ID physicians.

Secondary outcomes were duration of therapy, ICU admission, and in-hospital mortality.

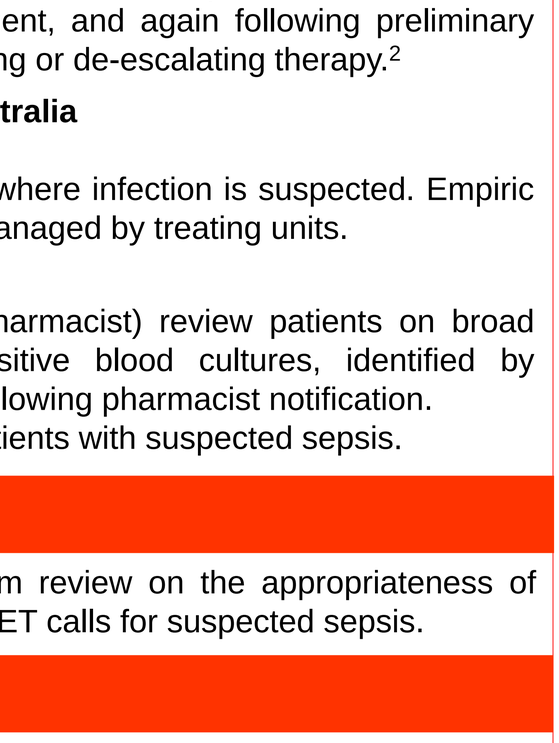

Figure 1. Study design and patient enrolment

Results

Table 1. Baseline characteristics

	Control n=45	Intervention n=45
Age, median [IQR]	63 [47, 75]	67 [57, 75]
Male, n (%)	23 (51)	28 (62)
Blood cultures taken at MET call	39 (87)	43 (96)
Positive blood cultures at MET call	7 (18)	3 (7)
Presumed source of sepsis		
Respiratory	19 (42)	21 (47)
Urine	6 (13)	7 (16)
Febrile neutropenia	5 (11)	5 (11)
Other	15 (33)	12 (27)
Antimicrobials given at MET call	43 (96)	44 (98)
Sepsis [a]	25 (56)	22 (49)
Septic shock [b]	5 (11)	3 (6)

[a] Defined as change in SOFA score >2 points
[b] Defined as refractory hypotension plus lactate >2 mmol/L

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Results

Antimicrobial appropriateness

A significantly greater proportion of patients in the intervention group were receiving appropriate antimicrobial therapy 72 hours following the MET call (67 vs. 44%, p=0.03).

Table 2. Primary and secondary outcomes

Outcome	Control (n=45)	Intervention (n=45)	P value
Appropriate antimicrobial therapy at 72 hours, n (%)	20 (44)	30 (67)	**0.03**
Median time to appropriate therapy, days	3.1	1.8	0.19
Median duration of antimicrobials, days	10.7	8.7	0.39
ICU admission due to sepsis (post intervention period), n (%)	8 (18)	6 (13)	0.56
Median ICU length of stay, days	1.6	1.1	0.52
All-cause in-hospital mortality, n (%)	5 (11)	5 (11)	1.00
Sepsis-related in-hospital mortality, n (%)	4 (9)	3 (7)	0.69

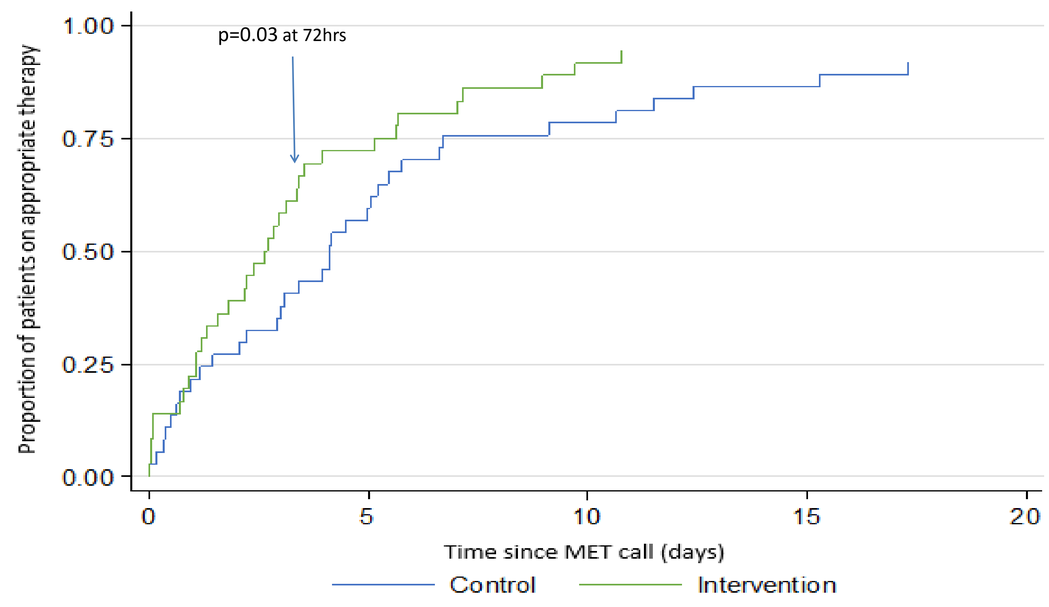

Figure 2. Cumulative distribution graph showing time to appropriate therapy

AMS recommendations and acceptance

In the intervention group, 27 recommendations were made by the AMS team for 40 patients; 74% were accepted.

Antimicrobial therapy was discontinued, de-escalated, or changed to oral therapy in 12 of 40 patients (30%). Antimicrobial therapy was optimised by initiating an agent, changing to an alternative agent, or optimising the dose in 6 of 40 patients (15%).

Discussion

Internationally, this is the first randomised controlled trial evaluating AMS team review in patients with suspected sepsis. The results of this study allow AMS teams to prioritise their resources and identify which patients benefit from review.

Conclusion

AMS team review resulted in significant improvement in appropriateness of antimicrobial therapy following MET calls for suspected sepsis. Patients with suspected sepsis are an identifiable group of patients that may benefit from routine AMS team review.

References

1. Rhodes A, et al. *Intensive Care Med* 2017;43(3):304-77.
2. Burrell AR, et al. *Med J Aust* 2016;204(2):73