Sepsis call Emergency Department pharmacist service: a single healthcare network cohort study

Iouri Banakh[1], Stephen Louey[1], Graham Rivers[1], Tavan Hem[2], Lili Israelian[2], Junwon Kang[2], Vivienne Luu[2], Dr Firuz Tanyeri[3], Dr Rachel Rosler[3]

1. Pharmacy Department, Monash Health, Melbourne, Australia. Email: Iouri.Banakh@monashhealth.org
2. Monash University, Faculty of Pharmacy, Melbourne, Australia.
3. Monash Medical Centre, Emergency Department, Victoria, Australia.

Introduction

Sepsis is responsible for more deaths than trauma, acute coronary syndromes and ischaemic strokes[1], however, sepsis management procedures have not been established in the systematic manner as these other emergency conditions.

Delays in antibiotic administration during sepsis management contribute to the higher mortality and morbidity, and this has been identified as a key performance indicator for many Emergency Departments (EDs).[2]

The aim of this study was to evaluate a recently introduced service with pharmacists attending sepsis calls and supporting medical and nursing staff to improve patient outcomes EDs.

Method

A retrospective cohort study was carried at 2 EDs, within one network, after introduction of the sepsis call pharmacist service.

ED pharmacist were provided with additional sepsis management training to:

1. discuss with medical staff sources of infection, antibiotic selection and dosing based on local guidelines.
2. facilitate nursing staff antibiotic administration with direct to bedside antibiotic, diluent and administration equipment delivery and instructions on fastest rate and order of antibiotics to be given.

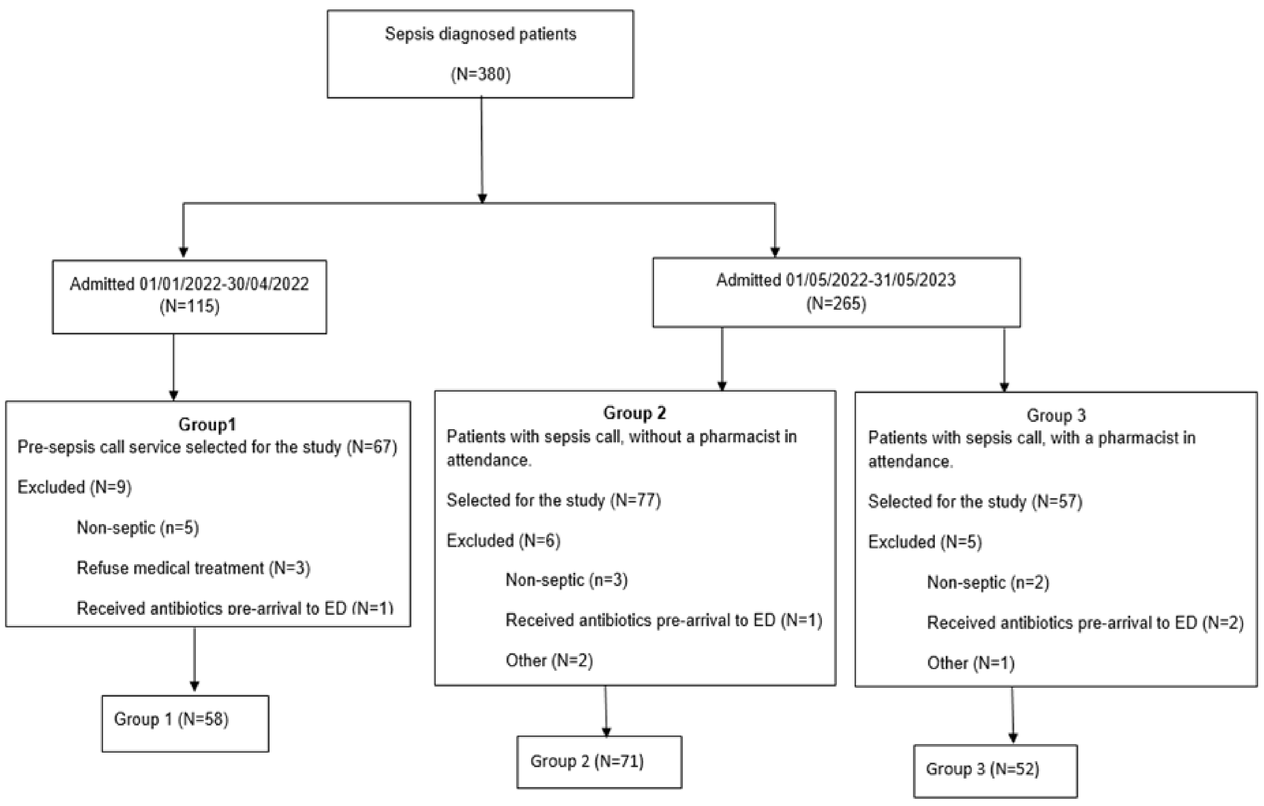
Patients included were adults with sepsis diagnosis in EDs.

Primary outcome: time from being seen by triage nurses to first antibiotic administration.

Secondary outcomes: in-hospital mortality, need continuous renal replacement therapy (CRRT), acute kidney injury (AKI), intensive care unit (ICU) admission, length of stay (LOS) at the hospital, and antibiotic appropriateness/compliance with local guidelines.

Results

Figure 1: Patient flow diagram



Results continued

There were no differences in patients' baseline characteristics, with an average age >65 years across all 3 groups.

The most common sources of sepsis were: urinary tract and respiratory infections, as well as sepsis of unknown source.

The most common pathogens on blood culture results were Escherichia coli and Staphylococci in groups 1 and 3; Escherichia coli and Streptococcus species in group 2.

Table 1 Main results

	Group 1 (N=58)	Group 2 (N=71)	Group 3 (N=52)
Time to first antibiotic administration (minutes [IQR])	302.0 (117.0-399.3)	201.3 (75.0-276.0) *	89.8 (51.3-114.3)*
First antibiotic within 60 minutes (N [%])	1 (1.7%)	11 (15.5%)*	17 (32.7%)*
Mortality (N [%])	11 (19.0%)	16 (22.5%)	6 (11.5%)
Continuous renal replacement therapy (N [%])	2 (3.4%)	4 (5.6%)	0 (0.0%)
AKI (N [%])	17 (29.3%)	18 (25.4%)	8 (15.4%)
ICU admission (N [%])	16 (27.6%)	21 (29.6%)	3 (5.8%) *
Length of stay (days [IQR])	7.0 (2.8-9.3)	8.6 (2.0-11.0)	6.9 (1.0-9.0)
Empirical therapy (N [%])	57 (98.3%)	68 (95.8%)	50 (96.2%)
Choice of antibiotic in accordance with hospital guidelines (N [%])	29 (50.0%)	38 (53.5%)	50 (96.2%) *
Dose of antibiotic in accordance with hospital guidelines (N [%])	24 (41.4%)	34 (47.9%)	48 (92.3%) *

*statistically significant result

Mortality was reduced with pharmacist sepsis call service in both the ICU admitted (*group 1* 5.2% versus *group 3* 1.9%) and the non-admitted patients (*group 1* 13.8% versus *group 3* 9.6%).

Discussion

The results of this study have demonstrated that ED pharmacists can significantly improve time to antibiotic administration when incorporated in a multidisciplinary approach.

The improved rates in meeting the key performance indicator of first antibiotic administration within 60 minutes were associated with trends of lower mortality, reduced AKI, CRRT and ICU admissions.

The results are similar to other national and international ED pharmacist service outcomes, however below the target for majority of patients.[3,4]

Main limitations of the study was the single network and small size of the study.

The results of this study indicate that the introduction of a pharmacist sepsis call service reduced the time to first antibiotic administration, ICU admissions and AKI rates.

Further research is required to optimise the results, to meet the international guideline targets of antibiotic dosing within the first hour, and to confirm improved mortality rates for non-ICU admitted patients.

References:

1. Rudd KE, Johnson SC, Agesa KM, et al. Global, regional, and national sepsis incidence and mortality, 1990-2017: analysis for the Global Burden of Disease Study. Lancet. 2020; 395 (10219):200-211.
2. Evans L, Rhodes A, Alhazzani W, Antonelli M, Coopersmith CM, French C, et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021. Critical Care Med. 2021; 49 (11): e1063-e1143.
3. Cavanaugh JB Jr, Sullivan JB, East N, Nodzon JN. Importance of pharmacy involvement in the treatment of sepsis. Hosp Pharm. 2017; 52 (3): 191-197.
4. Roman CP, Dooley M, Nevill A, Szmidel M, McGloughlin S, Luckhoff C, et al. Introduction of an emergency medicine pharmacist-led sepsis alert response system in the emergency department: a cohort study. Emerg Med Australas. 2023: 35: 564-571.

#MM2023SHPA conference

Monash Health