CALL THE SEPSIS ALERT:

A RETROSPECTIVE ANALYSIS OF RAPID RESPONSES

Sepsis alert utilization and its impact on time-to-antibiotic, ICU transfers, and in-hospital mortality.

INTRODUCTION

Rapid response teams (RRT) have been widely adopted by hospitals across the nation as a means to promptly gather specialized staff in setting of unexpected deterioration of floor status patients. Though evidences of its effectiveness in reducing overall mortality is lacking, rapid response interventions have generally been viewed as favorable in reducing out-of-ICU cardiopulmonary arrests, cultivating patient safety culture, and serving as opportunities to address goals-of-care.[1-4] Furthermore, RRT has been identified to have a unique role in sepsis - one of the most common triggers — to improve time-to-treatment and reduce mortality.[5-7] However, the components and implementation of RRTs contain a great deal of heterogeneity which likely contribute to the inconsistencies in available data.[1]

OBJECTIVE

Here at SMH, sepsis alert serves a unique function under the umbrella of rapid response by providing on-site pharmacist support in addition to routine clinical resource nurse (CRN), ICU team, and respiratory therapy. The objective of our study was to investigate frequency of sepsis alert, and compare its outcome in time-to-antibiotic time, ICU transfers, and in-patient mortality to that of regular rapid responses (RR) have.

METHODOLOGY

This was a retrospective analysis of rapid response data from 1/1-1/31/2024 and 5/1-5/31/2024, excluding MERT (outpatient rapids). Total reviewed N = 215. Three independent reviewers gathered data from electronic medical record audit; variables including: 1) sepsis suspected; 2) time-to-antibiotic; 3) mortality; 4) transfer to ICU.
Sepsis suspected was defined as sepsis mentioned in CRN rapid response note or MICU consult/admission note as one of the differentials. Time-to-antibiotics is measured from time of sepsis identification (RR/sepsis alert) to time of actual antibiotic administration by RN at bedside. All-cause hospital mortality was defined as death occurring during the same hospitalizations as the RR.
RRs that were deemed not related to sepsis were excluded from analysis. After application of exclusion criteria, the reminding RRs (N=92) are compared to sepsis alerts (N=22). T-test are used to analyze time-to-antibiotics. Chi-square's tests were used to analyze mortality and transfer to ICU.

RESULTS/FINDINGS

Figure 1. Among 215 RRs called through 1/1-1/31/2024 and 5/1-5/30/2024, 114 were suspected to have sepsis as an etiology of decompensation. Amongst those, only 22 sepsis alerts were utilized (19%).

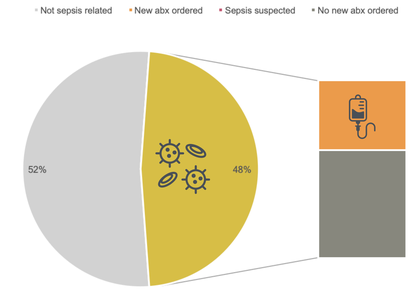

Figure 2. Out of the non sepsis alert RRs, close to half (48%) were suspected to have sepsis as an etiology of decompensation. Furthermore, in 39% of those cases, new antibiotics were ordered.

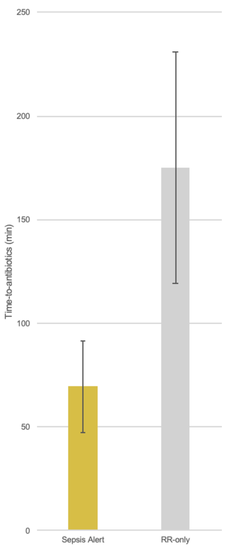

Figure 3. Time-to-antibiotic from time of identification in sepsis alert (69.2min; CI 47.1-91.3) versus sepsis-suspected RR-only group (175min; CI 119.1-230.9); significantly shorter time-to-antibiotics interval observed when sepsis alerts were utilized (p=0.002).

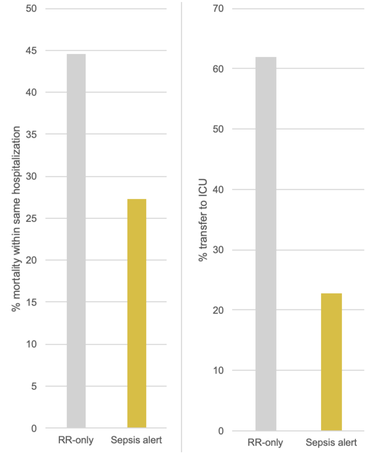

Figure 4. Percent mortality within same hospitalization was significantly lower in sepsis alert group (27.3%) when compared to sepsis-suspected RR-only group (44.6%) (p<0.001). Similarly, the percent transfer to ICU was also found to be significantly reduced when sepsis alert is utilized (22.7%) in comparison to other sepsis-suspected RRs (62%) (p<0.001).

TAKE HOME POINTS

1. Sepsis alerts are currently under utilized.
2. Sepsis alerts with pharmacy support significantly reduce time-to-antibiotics, ICU transfers, and in-hospital mortality.

DISCUSSION

On-site pharmacy support has been shown to significantly improve appropriate antibiotic dosing, and promote antibiotic stewardship in the acute setting.[15-17] Particularly in reduction of time to medication administration in rapid responses.[18] Sepsis and septic shock carrie high mortality rates of 10% and 40% respectively.[9] Current International guideline for management of sepsis and septic shock outlined in 2021 surviving sepsis campaign advised initiation of antibiotics within 1 hour of recognition of septic shock and within 3 hour for sepsis without shock.[8] Although the quality of evidence supporting this recommendation is low. Despite the conflicting evidence on precise timing thresholds, the majority of studies find that delays in antibiotics administration increase mortality and morbidity (such as development of shock).[9] In our analysis, we noted the significant reduction in in-hospital mortality and ICU transfer in sepsis alert group when compared to rapid response only. The decrease in time-to-antibiotic may serve as a mediating factor in these effects, and further highlight the value of on-site pharmacist support in expediting care and improving outcomes.

CONCLUSION

Sepsis alert, with the additional support of an on-site pharmacist, shows a **clear advantage** in attenuating sepsis-related decompensation. It reduces the time to antibiotic administration, diminishes mortality, and lowers the need for ICU transfer. Understandably, resources and budget may limit the availability of pharmacist support on all rapid responses. The option of sepsis alert offers a fair compromise to utilize this limited resource in the area of the highest yield. Unfortunately, we find that sepsis alerts are currently being **under-utilized**. Further effort including quality improvement initiatives should be undertaken to overcome barriers to activating a sepsis alert.

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