Call the Sepsis Alert: a retrospective analysis of rapid responses

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Introduction

Rapid response teams (RRT) have been widely adopted by hospitals across the nation as a mean to promptly gather specialized staff in the setting of unexpected deterioration of floor status patients. Although evidence of its effectiveness in reducing overall mortality has been lacking, rapid response interventions have generally been viewed as favorable in reducing out-of-ICU cardiopulmonary arrests, cultivating patient safety culture, and serving as an opportunity 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 RRT contains a great deal of heterogeneity which likely contribute to the mixed evidence observed in data available[4].

Here at SMH, sepsis alert serves a unique function under the umbrella of rapid response by providing an on-site pharmacist support in addition to routine CRN, ICU team, and respiratory therapy. We aim to investigate retrospectively the utilization rate of sepsis alert by measuring the outcome of time-to-antibiotic and mortality to that of regular RRTs.

Method

Retrospective analysis of rapid response data from 1/1/2024-1/31/2024, 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 is defined as sepsis mentioned in CRN rapid response note, or MICU consult/H&P note as one of the differentials. Time-to-antibiotics is measured from time of sepsis identification (RRT/sepsis alert) to time of actual antibiotic administration by RN at bedside. All-cause-mortality included in analysis if occurred during the same hospitalizations the RRT. RRTs that are deemed not related to sepsis are excluded from analysis; this is defined as sepsis not being consider a possible etiology according to CRN rapid response or MICU consult/H&P note. After application of exclusion criteria, the remaining RRTs (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

Among 215 RRTs 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%). Out of the non-sepsis alert RRTs, close to half (48%) were suspected to have sepsis as an etiology of decompensation. Furthermore, in 40% of those cases, new antibiotics were ordered. Time-to-antibiotic from time of identification in sepsis alert (69.2min; CI 47.1-91.3) versus sepsis-suspected RRT only (175min; CI 119.1-230.9); significantly shorter time-to-antibiotics interval observed when sepsis alerts were utilized (p=0.002). Percent mortality within same hospitalization and percent ICU transfer at time of RRT are both significantly lower in the sepsis alert group in comparison to the sepsis-suspected RRT group (p<0.001)

Discussion

Sepsis and septic shock are well-recognized phenomenon that carries a high mortality rate of 10% and 40% respectively[9]. The current International guideline for management of sepsis and septic shock, outlined in surviving sepsis campaign most recently updated in 2021, advised initiation of antibiotics within 1 hour of recognition of septic shock and within 3 hour for sepsis without shock[8]. The utilization of sepsis alert exceeds the recommended time window of antibiotic initiation in comparison to the rapid response only group. On-site pharmacy support has been shown to significantly improve appropriate antibiotic dosing and promote antibiotic stewardship in the acute setting[15-17]. Sepsis alert, with the additional support of on-site pharmacist, shows a clear advantage in sepsis-related decompensations. It reduces the time to antibiotic administration, diminishes mortality, and lowers transfer to the ICU. Understandably, resources and budget limitations may hinder the availability of pharmacist support on all rapid responses. The option of sepsis alert offers a fair compromise to better utilize our resources in the areas where they're most needed. Unfortunately, it is currently being under-utilized as evident in our analysis. Further effort including quality improvement initiatives should be undertaken to overcome the barriers in its use.