

Impact of Rapid Response Teams on Patient Outcomes in Emergency Departments: A Multicenter Study

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ABSTRACT

Objective: To evaluate the impact of rapid response teams (RRTs) on patient outcomes in emergency departments (EDs), including in-hospital mortality, unplanned ICU admissions, and length of stay (LOS), through a multicenter observational study. **Methods:** This prospective study was conducted across six tertiary hospitals, involving 2000 adult patients who met RRT activation criteria. Data from the time of RRT activation to discharge or death were analyzed using multivariate logistic regression models, adjusting for patient demographics, comorbidities, and severity of illness. Key outcomes included in-hospital mortality, ICU admissions, and LOS. **Results:** RRT intervention resulted in a 20% reduction in in-hospital mortality (adjusted OR 0.80, $P = 0.03$), a 15% reduction in unplanned ICU admissions (adjusted OR 0.85, $P = 0.02$), and a 1.5-day reduction in LOS ($P < 0.05$). Early RRT activation within one hour of symptom onset was associated with improved outcomes. **Conclusion:** The implementation of RRTs in EDs significantly improves patient outcomes, emphasizing the importance of early activation. These findings support the integration of RRTs into emergency care protocols to enhance patient survival and optimize resource utilization.

KEYWORDS: Emergency department, ICU admissions, in-hospital mortality, patient outcomes, rapid response teams

INTRODUCTION

Rapid response teams (RRTs) have become an essential component of hospital emergency protocols, aimed at reducing in-hospital mortality and complications. Initially developed for inpatient settings, RRTs are now increasingly integrated into emergency departments (EDs) to manage critically ill patients or those showing early signs of deterioration. The core concept revolves around prompt identification and intervention to mitigate adverse outcomes, such as unplanned ICU admissions and prolonged hospital stays.^[1-3] However, despite their widespread adoption, evidence evaluating the specific impact of RRTs in EDs is limited.^[4-6] This study aims to provide multicenter data on whether RRTs can reduce mortality rates, ICU admissions, and length of stay when promptly activated in EDs. By analyzing outcomes in 2000 adult patients across six tertiary hospitals, this research contributes valuable

insights into the effectiveness of RRTs, emphasizing the importance of early intervention.

MATERIALS AND METHODS

This prospective observational study was conducted in six tertiary hospitals over an 18-month period. The study included adult patients (≥ 18 years) presenting to the ED who met predefined criteria for RRT activation, such as respiratory distress, hypotension, or altered mental status. Pediatric patients, those with “do not resuscitate” (DNR) orders, and transfers from other hospitals were excluded.

RRTs consisted of critical care nurses, respiratory therapists, and emergency physicians. Activation was based on specific criteria including abnormal vital

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signs (e.g., systolic BP <90 mmHg, HR >140 bpm, respiratory rate <8 or >30 breaths/min). Data collected included patient demographics, vital signs at RRT activation, and outcomes like mortality, ICU admissions, and LOS.

Statistical analysis utilized multivariate logistic regression models to assess the effect of RRT interventions while adjusting for confounders such as patient age, comorbidities, and severity of illness. A P value <0.05 was considered significant.

RESULTS

Table 1: Patient Demographics and Baseline Characteristics

The study included 2000 adult patients, divided into two groups: those who received RRT interventions ($n = 1500$) and those who did not ($n = 500$). The mean age was similar between the groups, with the RRT group having an average age of 66.3 years and the non-RRT group at 65.5 years. Both groups had a slight male predominance, with 56% males in the RRT group and 53% in the non-RRT group. Comorbidities were prevalent among the participants; hypertension was the most common, present in 63% of the RRT group and 61% of the non-RRT group. Diabetes was seen in 44% of patients in the RRT group compared to 46% in the non-RRT group. Chronic obstructive pulmonary disease (COPD) was also recorded, affecting 33% of the RRT group and 31% of the non-RRT group. These findings indicate that the groups were comparable in baseline characteristics, allowing for a fair assessment of the impact of RRT interventions on patient outcomes.

Table 2: Primary Outcomes

The primary outcomes evaluated included in-hospital mortality, unplanned ICU admissions, and the length of stay (LOS). The results showed that the in-hospital mortality rate was significantly lower in the RRT group (10%) compared to the non-RRT group (13%), with a P value of 0.03, indicating statistical significance. Similarly, the incidence of unplanned ICU admissions was lower in the RRT group (22%) compared to the non-RRT group (26%), with a P value of 0.02, supporting the positive impact of RRT interventions. Furthermore, the average LOS was shorter for patients in the RRT group (10.2 days) compared to those in the non-RRT group (11.7 days), with a statistically significant P value of 0.01. These findings demonstrate that the implementation of RRTs is associated with improved patient outcomes, including reduced mortality, fewer ICU admissions, and shorter hospital stays.

Table 1: Patient demographics and baseline characteristics

Characteristic	RRT Group ($n=1500$)	Non-RRT Group ($n=500$)
Mean Age (years)	66.3±12.2	65.5±13.1
Male Gender (%)	56%	53%
Hypertension (%)	63%	61%
Diabetes (%)	44%	46%
COPD (%)	33%	31%

Table 2: Primary outcomes

Outcome	RRT Group ($n=1500$)	Non-RRT Group ($n=500$)	P
In-hospital Mortality (%)	10%	13%	0.03
Unplanned ICU Admission (%)	22%	26%	0.02
Length of Stay (days)	10.2±5.6	11.7±6.1	0.01

DISCUSSION

The results of this study demonstrate the positive impact of RRTs on patient outcomes in emergency settings. RRT activation was associated with a significant reduction in mortality, unplanned ICU admissions, and length of stay. These findings align with the premise that early intervention in critically ill patients can mitigate the progression to severe outcomes, including death.^[5-7]

The study's data showed that early activation of RRTs, specifically within one hour of symptom onset, was crucial for achieving optimal outcomes. Patients who received RRT intervention early had a significantly lower mortality rate (8%) and reduced ICU admissions (18%) compared to those with delayed activation. This underscores the importance of timely RRT activation protocols in emergency departments to improve patient survival and recovery rates.^[8-10]

The multivariate analysis further highlighted RRT activation as an independent predictor of better outcomes, with an adjusted odds ratio of 0.80 for in-hospital mortality. This suggests that the presence of an RRT, regardless of other factors like age and comorbidities, provides a protective effect.^[11,12]

Limitations include the observational nature of the study and its focus on large tertiary care centers, which may limit generalizability to smaller hospitals. Future research should aim to explore the long-term impacts of RRT interventions, such as post-discharge survival and cost-effectiveness.

CONCLUSION

This study confirms the effectiveness of RRTs in emergency departments, demonstrating their role in reducing mortality, unplanned ICU admissions, and

length of stay. Early activation, particularly within the first hour of symptom onset, is critical for maximizing these benefits. These findings support the continued integration of RRTs into emergency care protocols, emphasizing the value of prompt intervention in improving patient outcomes.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Jones D, Bellomo R, DeVita MA. Rapid-response teams. *N Engl J Med* 2011;365:139-46.
2. Winters BD, Weaver SJ, Pfoh ER, Yang T, Pham JC, Dy SM. Rapid-response systems as a patient safety strategy: A systematic review. *Ann Intern Med* 2013;158:417-25.
3. Devita MA, Smith GB, Adam SK. Identifying the hospitalized patient in crisis-A consensus conference on the afferent limb of rapid response systems. *Resuscitation* 2010;81:375-82.
4. Buist MD, Moore GE, Bernard SA, Waxman BP, Anderson JN, Nguyen TV. Effects of a medical emergency team on reduction of incidence of and mortality from unexpected cardiac arrests in hospital: Preliminary study. *BMJ* 2002;324:387-90.
5. Subbe CP, Davies RG, Williams E, Rutherford P, Gemmell L. Effect of introducing the modified early warning score on clinical outcomes, cardio-pulmonary arrests and intensive care utilisation in acute medical admissions. *Anaesthesia* 2003;58:797-802.
6. Bonafide CP, Localio AR, Roberts KE, Nadkarni VM, Weirich CM, Keren R. Impact of rapid response system implementation on critical deterioration events in children. *JAMA Pediatr* 2014;168:25-33.
7. Churpek MM, Adhikari R, Edelson DP. Trends for detecting clinical deterioration. *Resuscitation* 2016;102:1-5.
8. Segon A, Ahmad S, Segon Y, Kumar V, Friedman H, Ali M. Effect of a rapid response team on patient outcomes in a community-based teaching hospital. *J Grad Med Educ* 2014;6:61-4.
9. Devita MA, Bellomo R, Hillman K, Kellum J, Rotondi A, Teres D, *et al.* Findings of the first consensus conference on medical emergency teams. *Crit Care Med* 2006;34:2463-78.
10. Berwick DM, Calkins DR, McCannon CJ, Hackbarth AD. The 100000 lives campaign: Setting a goal and a deadline for improving health care quality. *JAMA* 2006;295:324-7.
11. Farkas A, Devlin JW, Aliberti S, *et al.* RRTs and patient safety. *Crit Care* 2015;19:253.
12. Myers JS, Polish P, Wise S. Patient outcome improvements with rapid response implementation. *Clin Outcomes* 2017;12:289-300.