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Timing of palliative care team referrals for inpatients receiving rapid response services: A retrospective pilot study in a US hospital

M. Williams[a,*], M. Cardona-Morrell[b], P. Stevens[c], J. Bey[c], M.E. Smith Glasgow[d]

[a] School of Nursing, Lansing Community College & Sparrow Hospital , Lansing, USA
[b] The Simpson Centre for Health Services Research and Ingham Institute for Applied Medical Research, The University of New South Wales, Sydney, Australia
[c] Sparrow Hospital, Lansing, USA
[d] School of Nursing, Duquesne University, Pittsburgh, USA

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ABSTRACT

Background/objectives: Research indicates up to one-third of rapid response team calls relate to end-of-life symptoms. The CriSTAL criteria were developed as a screening tool to identify high risk of death within three months. The primary purpose of this pilot study was to investigate the timing of palliative care referrals in patients receiving rapid response team services, and patients' CriSTAL criteria score on admission. The potential feasibility of using the CriSTAL tool to stimulate earlier Palliative Care Team (PCT) referral served as an underlying goal, and investigation of a relationship between specific CriSTAL criteria and the prediction of in-hospital death was a secondary objective.

Design: A retrospective chart review of rapid response calls made in 2015 was used to identify patient risk of death on admission based on the CriSTAL criteria. The presence and timing of PCT referral as well as patient survival status to hospital discharge were documented for comparison.

Setting/participants: A sample of 183 charts from 584 inpatients involved in over 600 RRT events recorded in 2015. The study was undertaken in a 676-bed teaching hospital in the Midwestern U.S.

Methods/results: Ninety-one patients died during the hospital stay while 92 patients from the 493 individuals who survived were randomly selected for full analysis. Applying CriSTAL criteria to the 141 individuals aged 50 years or older indicated that frailty (OR = 1.43, 95%CI 1.08–1.89, p = 0.012), being a male (OR = 3.14; 95%CI 1.40–7.05, p = 0.006), and the presence of two or more comorbidities (OR = 3.71, 95%CI 1.67–8.24, p = 0.001) were the most significant predictors of in-hospital death after adjusting for age. A CriSTAL score of 6 was the optimal cut-off for high-risk of in-hospital death. Palliative care consultations within the high-risk population occurred for 45.2% of the deceased and 40.4% of the survivors. Consultation often occurred within two days of the RRT event and many patients (46.8%) died within one day of the consultation.

Conclusion: A positive relationship was found between the CriSTAL score, palliative care referral, and in-hospital mortality in patients who received RRT services. The study indicates a need for earlier PCT referral, showcases the potential to identify high risk of in-hospital death upon admission and supports the feasibility of using the CriSTAL criteria tool to encourage earlier PCT referrals.

What is already known about the topic?

- Ensuring the efficiency of services requires monitoring health data related to patient's condition and outcome.
- Up to one-third of RRT calls involve end-of-life (EOL) issues.
- The CriSTAL checklist has been proposed as an objective evidence-based composite measure for death prediction.

What this paper adds

- Request for PCT services was not made prior to an RRT call despite identifiable risk factors on admission.
- The interval between PCT referrals and RRT calls in dying patients suggests delayed identification of palliative care needs.
- Using CriSTAL on admission would have identified patients at high risk of death and in need of PCT referral earlier.

Implications for practice, theory or policy

- More timely end-of-life care and early discussion on options can be

* Corresponding author.
E-mail address: willi356@lcc.edu (M. Williams).

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achieved by identifying high-risk patients on admission.
- The use of the CriSTAL criteria as a tool to identify the need for earlier PCT referral is feasible.
- Transitioning from active to palliative care needs to be reconsidered in older patients with high risk of death on admission.

1. Introduction

As front line care givers, nurses are often responsible for initiating Rapid Response Team (RRT) calls. Developed in the U.S. as a part of the *100,000 Lives Campaign,* the purpose of these teams was to improve success rates for individuals facing critical health care changes (Gosfield and Reinertsen, 2005). However, adverse outcomes are more common for this population than the general hospital population (Jones and Warrillow, 2014) and patients with a diagnosis of cancer who receive rapid response team services have significantly higher mortality rates and resource utilization (Austin et al., 2014). In fact, patients at the end-of-life account for up to one third of such calls, (Jones et al., 2013) including those with pre-established Do Not Resuscitate orders (Coventry et al., 2013). Such efforts to prolong life negatively impact quality of life for patients and their families, and contributes to escalating costs of healthcare (Jennings and Morrissey, 2011).

The role of RRT members in the provision of end-of-life care is increasingly recognized although still controversial. In a recent multicenter study conducted in Canada, Australia, and Sweden approximately one third of medical emergency team calls involved issues of limiting medical therapy or end-of-life concerns, while 57.7% of patients were seen by the rapid response team within two days of death and 29.5% were seen on the day of death; these results suggest a misuse of expert resources rather than failure to rescue (Jones et al., 2012). By contrast, multiple retrospective studies consistently show that rapid response teams may improve end-of-life care by stimulating the transition from active treatment to less aggressive care (Jones et al., 2007; Tam et al., 2014; Sulistio et al., 2015). The most recent IOM Report, *Dying in America*, points out that providing a patient-centered, palliative approach to care during the final phase of life provides “the best chance of maintaining the highest possible quality of life for the longest possible time” (Institute of Medicine, 2015). Thus, it is worth examining the provision of aggressive intervention through the use of RRT calls, and timely referral to a palliative care team (PCT) for patients nearing the end-of-life.

The introduction of a RRT does not necessarily improve end-of-life care (Downar et al., 2013a) and their substantial involvement may result in missed opportunities for palliative care consultation. The increasingly common use of extreme life-sustaining measures and intensive care technology is in direct conflict with what many individuals and family members want from end-of-life care (Heyland et al., 2006). Acknowledging that *less intense* care during the final phase of life correlates with a higher quality experience for patients and their loved ones is an important first step in avoiding unnecessary and costly interventions for terminal patients (Wright et al., 2008). The use of prognostic tools to identify patients with palliative care needs is another strategy.

The primary purpose of the present study was to examine the timing of PCT referral for patients who received RRT services. Retrospective data was also interrogated using the CriSTAL tool (Cardona-Morrell and Hillman, 2015) (Criteria for Screening and Triaging to Appropriate aLternative care) to investigate a potential relationship between patient risk of death on admission and PCT referral for those patients who received RRT services during hospitalization. To the authors’ knowledge, the CriSTAL tool had not been used in a U.S. population, so further investigation of the CriSTAL parameters as they relate to predicting in-hospital death was examined as a secondary goal. Specific objectives of the combined project were to identify:

- The percentage of patients for whom the CriSTAL criteria indicated a high risk of death upon hospital admission.
- The number of patients who received support from the palliative care team before or during the hospital stay.
- Individual and combined parameters in the CriSTAL tool that predict death during hospitalization.

2. Methods

The study was conducted in a 676-bed magnet-status, teaching hospital in the Midwestern part of the United States with well-established rapid response and palliative care programs. Three institutional data sources of RRT calls were compiled to develop an initial listing of adult patients admitted to the acute care hospital who received verifiable rapid response services in 2015. Only the most recent hospitalization where a rapid response event occurred for any individual patient was included. Those patients who received RRT services and died during the hospitalization served as index cases. A computer-generated simple random sample of an equal number of controls (survivors) was also chosen for analysis to eliminate bias. Clinical parameters were compared between the two groups, but no matching of index and control cases was attempted.

Inclusion criteria

- Adult patients aged 18 years and older admitted to the hospital for acute care services with length of stay $\geq$24 h (including those in the emergency department).
- RRT call was recorded during the index admission.

Exclusion criteria

- Code-Blue call.
- RRT call was cancelled.
- RRT call was placed for a hospital visitor, outpatient, or patient on the rehabilitation or long term care units.
- Data was insufficient to identify a patient associated with a paged call.
- RRT charting system was initiated in the emergency room for intubation.

Variables related to risk of death were ascertained using the original 29 CriSTAL criteria (Cardona-Morrell and Hillman, 2015), which is an additive unweighted measure of physiological parameters, age, nursing home residence, chronic conditions, previous hospitalizations, admission history to intensive care, abnormal ECG, proteinuria and evidence of four frailty parameters as measured by the Fried’s score (Fried et al., 2001). Each CriSTAL parameter was given a binary (yes or no) assignment based on hospital admission data, the 5-item Fried’s score was included and the total CriSTAL score was identified as a sum of each indicator. Thus, CriSTAL scores could potentially range from 0 to 32. Any parameter not identified in the chart was assumed to be absent or negative (Appendix A in Supplementary material). Frailty parameters and comorbidities were also extracted from the electronic medical record, as was evidence of a palliative care consult 30 days before or after the rapid response call. Hospital records were searched to identify in-hospital death from any cause.

The Study protocol obtained ethics approval by the Sparrow Health System’s Institutional Research Review Board December 1, 2015 (813420-1). Patient consent was waived due to the retrospective nature of the study.

Descriptive statistics were used to address the first two objectives including an analysis of differences in parameters between patients who died and survived the hospital stay, and those who received palliative care referral. Time intervals, defined by days from admission to rapid response, days from the rapid response event to palliative care consultation, and days from palliative care consultation to death were also calculated. Additional analysis was performed to investigate the