Research networks in pediatric critical care: Productivity and impact

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Background

Conducting randomized controlled trials (RCTs) in critically ill children is challenging given the unique nature of this population, complexity of consent and assent, funding limitations, and small eligible patient pool(1). These challenges may impact not only the quantity, but the quality of pediatric RCTs.

Commitments to optimizing the conduct of research, sharing expertise and building capacity have led to the emergence of research groups or networks(2, 3). The productivity and quality of trials conducted by these groups with pediatric critical care have not been systematically evaluated.

Objectives

To evaluate the productivity, quality indicators, and the impact of RCTs conducted by established pediatric critical care research networks, compared to RCTs not conducted by research networks.

Methods

Data source: We used the Evidence in Pediatric Intensive Care database (epicc.mcmaster.ca) to identify network and non-network RCTs. This is a comprehensive repository of published RCTs (searches updated January 2014) of interventions applied to critically ill children(4). It excludes cross-over trials and trials enrolling only preterm infants.

Inclusion criteria: We included all RCTs published in English in 1999 or later (the year that the first research network trial was published). Trials were identified as being conducted by a research network if the publication reported that the project was conducted by, or in collaboration with, a research network or similar group.

Data extraction: Pairs of reviewers independently abstracted data. We defined a research network as a formal consortium, collective, cooperative or collaborative research group established for the purpose of facilitating the conduct of clinical research.

Impact: We assessed the impact of trials using the impact factor of the journal and the number of citations (using Web of Science™).

Results

We found 254 RCTs published between 1986 and 2013. Trials were conducted in 33 different countries and enrolled a total of 27,660 children. 206 of these trials were published in 1999 or later. 11 (5%) of these trials reported that they were conducted research network.

There were 3 research networks, all based in North America.

We found two types of research networks:

1. Investigator-initiated networks: The Canadian Critical Care Trials Group (CCCTG) (3 RCTs), The Pediatric Acute Lung Injury and Sepsis Investigators (PALISI) (5 RCTs) and both CCCTG and PALISI (1 RCT).


Discussion and conclusions

A minority of pediatric critical care RCTs were conducted by research networks.

Network trials are more likely to be multi-centred and reported funding than other trials. More than half of the network trials reported stopping early, most commonly for futility, yet were still larger in size; they also took longer to complete, were more likely to be published in higher impact journals and cited more frequently.

The greater proportion of network trials stopped early for futility compared to other trials may reflect transparent reporting, or design features such as pre-specified stopping rules. This underscores the challenges of adequately powering pediatric critical care RCTs for "definitive" outcomes such as mortality and duration of mechanical ventilation.

Lessons learned from such networks may guide us in fostering future collaborative, rigorous and efficiently conducted RCTs to inform the care of critically ill children.