



Importance of effective collaboration between pediatric intensive care and emergency departments



Niranjan Kissoon
 University of British Columbia, Acute and Critical Care Programs, British Columbia Children's Hospital, Room K4-105, 4480 Oak Street, Vancouver, British Columbia V6H 3V4, Canada
 Tel.: +1 604 875 2507
 Fax: +1 604 875 3076
 nkissoon@cw.bc.ca

'The challenge facing practitioners should not be whether, but how do we integrate all acute care services into a comprehensive healthcare system available to all critically ill and injured children?'

Pediatric critical care and pediatric emergency medicine are disciplines that share responsibility for providing care for acutely injured or critically ill children. In many parts of the developed world, these disciplines are recognized subspecialties of pediatrics with excellent training programs, a well-defined body of knowledge, sufficient practitioners at the senior level and a track record of clinical and academic productivity [1,2]. Indeed, from modest beginnings in the 1960s, pediatric critical care medicine has evolved and can boast dramatic major advances in the areas of lung injury, sepsis, traumatic brain injury and postoperative care. Pediatric emergency medicine has also made significant advances in the evaluation and treatment of respiratory distress, asthma, croup, epiglottitis, traumatic injuries, poisonings, cardiopulmonary resuscitation and sepsis. Both pediatric emergency medicine and pediatric critical care have developed impressive and aggressive research programs both in the USA and Canada [101-104].

What these disciplines share in common is their expertise to render care to patients with the greatest physiological instability. For many of these children, critical illness first occurs in diverse settings outside the hospital environment, and early recognition and early aggressive therapy can lead to improved outcomes. Furthermore, the best outcome can be guaranteed if there is good communication and a seamless continuum of care starting in the pre-hospital setting, which is linked to an efficient transport system and tertiary pediatric emergency and tertiary pediatric critical care teams (Figure 1)

Importance of collaboration to improve outcomes

The challenge facing practitioners should not be whether, but how do we integrate all acute care

services into a comprehensive healthcare system available to all critically ill and injured children? This task certainly requires leaders with vision and political will, and also involves persuasion, planning and appropriate deployment of resources. The importance of close working relationships between the intensive care unit (ICU) and the emergency department is highlighted by a report in critically ill adults in which greater than a 6-h delay in transfer from the emergency department to the ICU resulted in increased hospital length of stay and higher mortality [3]. Similarly, in children with septic shock and respiratory failure, a delay in obtaining a mechanical ventilator necessitating hand ventilation in the emergency department for greater than 6 h resulted in a 20% increase in mortality, again underlying the need for a close working relationship and transfer of patients without delay [4]. In my experience, root cause analyses of adverse events and outcomes of patients treated in the emergency department and transferred to the pediatric ICU (PICU) invariably reveals suboptimal communication between teams during transfer as a major contributor to adverse outcomes.

Close collaboration between the PICU and the pediatric emergency department is important in all institutions, but assumes greater importance in smaller and medium-sized institutions, where both disciplines may be handicapped by limited resources and limited expertise. For instance, the need for emergency airway management leaves little time for deliberation. The urgency is further compounded by the fact that emergency physicians, even in busy facilities, may intubate a child infrequently – hence, maintaining their skills is an issue. In fact, the National Emergency Airway Registry data have shown that the pediatric critical care physicians are involved in the emergency department intubations (likely in the more difficult cases) [5].

Both disciplines are usually involved in the care of the same patient, either simultaneously if they are unstable in the emergency department, or sequentially from pre-hospital through to PICU admission. In many of these patients, adverse changes in physiology may be unpredictable, and the early involvement of both teams



may prevent deterioration or allow each to understand the ‘physiological personality’ of the patient, that is, response to therapeutic maneuvers, fluids and drugs.

The rewards of close collaboration of transport and pediatric emergency and ICU teams are well demonstrated by the proven outcome of early goal-directed therapy in the treatment of shock [6], as well as the reduction in fatality in meningococcal disease when teams with expertise and resources work together, with greater interaction between specialists in local hospital and retrieval services [7]. The management failure in the treatment of meningococcal sepsis is attributed to failure in recognizing severity, failure of supervision by consultant and failure of assessment of patients, resulting in too little fluid and inadequate inotropes [8]. This failure can, to some extent, be attributed to communication and cooperation between pediatric emergency and critical care disciplines.

Importance of comprehensive services for care

The importance of a seamless functional system is starkly underlined by the outcomes in areas in which one discipline is not well developed. For instance, in the state of Andhra Pradesh, India, where pediatric emergency medicine and pediatric intensive care services are excellent, but where emergency transport is lacking, the outcomes are less than ideal: there is a 52% mortality rate for infants aged under 1 year, and a 33% mortality rate for children aged 1–5 years [9]. Moreover, almost half of the children died within 12 h of admission to the hospital, underlining the detrimental effect of late presentation or inadequate prehospital services [9]. The importance of the entire spectrum of care is also revealed by a multicenter trial of pediatric intensive care units in Malaysia, where the authors compared nonspecialized transport (n = 827) with in-hospital transfers (n = 877), and found no difference in the standardized mortality rate adjusted for Pediatric Risk of Mortality (PRISM), length of stay or age [10]. They concluded that the pediatric retrieval service might not lead to improved outcomes if pre-PICU care is not improved first [10]. These are glaring examples to underline the importance of practitioners of pediatric intensive care and pediatric emergency medicine taking a broader view of the entire spectrum of care needed for the critically ill child, rather than solely concentrating on our individual silos. Experience has shown

that the weakest link in the chain of care will be the determinant of outcome, regardless of the quality of care given in other locations (Figure 1). Indeed, the American Academy of Pediatrics recognizes the need for a total systems approach by stating, “Only the comprehensive cooperation of a broadly diverse group of people will have a significant effect on improving the care and outcome of injured children” [105].

The PICU and pediatric emergency departments are the logical disciplines to take the lead in deciding what is best for the severely ill or injured child. Other services, such as transport and other subspecialties, are very important resources to assist these disciplines to be successful in their endeavors. However, these resources need to be used wisely and coordinated in such a manner that there will be no duplication of efforts. Close cooperation should lead to the development of protocols to manage clinical situations that may arise, and provides the rationale for the development of pediatric emergency and critical care clinic affinity groups.

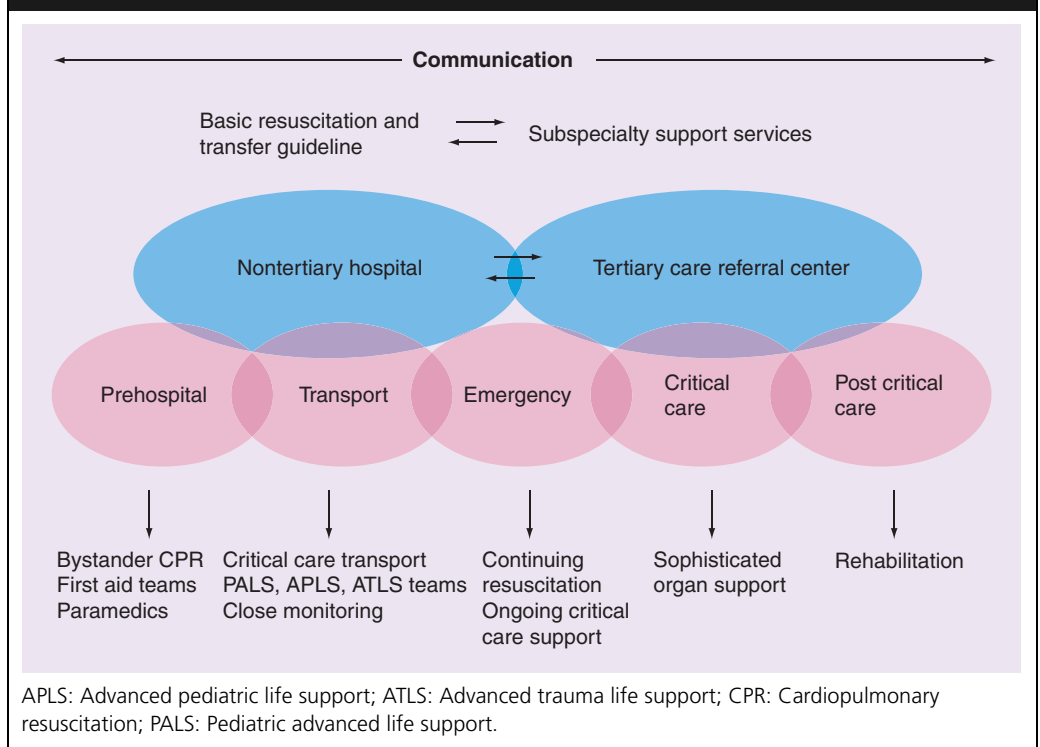
‘The ideal is to develop healthcare teams that share the same passion for the care of children, regardless of geographical location.’

Collaboration in teaching & research

Pediatric Life Support and Pediatric Advanced Life Support Courses, each discipline can claim equal stake for their contributions. Collaboration should also be extended to research in cardiopulmonary resuscitation, respiratory failure and neuroresuscitation, which clearly relies on coordinated efforts from both parties. Progress in the treatment of shock is a clear example of the interest and intersection of both disciplines in advancing knowledge and bettering outcomes. Another example would be brain cooling to ameliorate secondary brain injury, where post-neurological insults would dictate that the cooling was started early. This would likely occur in the emergency department, before the patient arrives in the intensive care unit [11,12].

The fact that both disciplines may be faced with catastrophic or unheralded deterioration in children, that critical illness in children is rare and that maintenance of skills is problematic again dictates cooperation in training. For instance, many institutions are using simulators

Figure 1. Communication.



their individual silos; they are passionate about providing superb care within the walls of their units. However, both disciplines are likely not aware of their broad circle of influence and their ability to influence policy and decisions to improve the lives of ill and injured children in a wider context. Indeed, discussions of whether collaboration between the PICU and the emergency department

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