

Pediatric Life Support: Safety in 2 Major Fast Lanes

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Abstract

A child who encounters a life-threatening situation demands appropriate steps to be taken in the specific crisis as soon as possible. Observations in medical publications on cardiac arrest and resuscitation are in agreement on the age group that is most susceptible in pediatrics. This is the category of infants who are less than 12 months. However, all children who suffer a critical incident can succumb to mortality and severe neurological sequel without expedient medical life support.

Emergency life support interventions are administered by trained and competent personnel. They are literally fulfilling the safety-first rule: to establish a minimum reasonable return or return threshold. The aetiology, challenges and areas for improvement are dissimilar in both in-hospital and out-of-hospital pediatric collapse. The desired outcome is similar: safety and survival.

Keywords: Pediatric; Life Support

Introduction

This commentary does not address life support concerns in traumatic cardiopulmonary collapse in children. Cambridge Dictionary drives home the intention of safety in its simplicity and brevity: the state of being protected from danger or harm. Safety and survival clearly occupies a central role in ethos of medical life support outreach. Our society believes that children are a defenseless group that demands alertness and protection from harm and sickness where ever they are. During their growth and development, the first 12 months of age are critical from a health aspect. Targeted preventive strategies by medical institutions and community can do much to enhance the wellbeing of children. The scope of interest is supported by abundant medical communications and publications that focus on life support mechanisms in the pediatric population.

In-hospital life support

Bedside health-care workers, namely, nurses and doctors, are regularly instructed and updated in their specific areas of work regarding life support systems for children. Children who are severely ill are at the highest level of concern for risk of death. The concept of “chain of survival” relies on time-sensitive protocolled interventions. The cohort of very sick patients can achieve the best chance of survival at first-level health institutions where expertise, specialized management and infrastructure can support all the demands of life support till the victims are discharged with minimum disability.

Pediatric basic/advanced life support (AHA/PALS Guidelines 2020) provides core reading material for clinicians and health workforce to stay current on the resuscitation concept and instructions [1]. Major policies and recommendations are accessible from an equally academic and professional body, namely, the European Resuscitation Council Guidelines 2021 [2].

The above 2 esteemed organizations provide substantial scientific clarifications that continue to guide medical institutions in many countries to streamline their regional statements on pediatric life support. Flexibility is important to suit their home setting and clinical practice [3, 4]. However, there is great disparity in health policies and economic affordability that result in the least developed nations taking a back-seat in safety on the fast lane in the response system.

PALS cover the state-of-the-art key components for coordinated life support efforts in a variety of disciplines. The emphasis of PALS relies on first-responder's presence to restore circulation and oxygen. Anesthetists are medical specialists who engage in perioperative care. They experience different critical incidents while performing their duties in the perioperative environment. They are responsible for stability of vital functions while the infant/child is in a pain-free and unconscious state for the surgical procedure. It is the anesthetist who detects the worsening in vital signs that can lead to collapse.

During general anesthesia, 3 independent factors increase the risk of critical incidents, namely, ASA status, emergency surgery and young infants. Whatever the case may be, trainees learn that the best defence against deterioration lies in vigilance and preparedness. In an unexpected collapse, rapid access to concise treatment algorithms is instrumental in a time-based approach to survival.

The Pediatric Asian Society of Pediatric Anesthesia (ASPA) is a professional body that has an expert panel of pediatric anesthetists. It manages a programmer known as “Pediatric Perioperative Life Support” that reaches out to major hospitals in the Asian region with specific literature, intense skills workshops and interactive case discussions [5].

In-hospital pediatric cardiac arrest is a universal health burden. Mathias, et al reported that pediatric events remained more stable while the incidence increased over time in adults [6]. The estimated incidence can be extrapolated to 9.7: 1000 and 2.7: 1000, respectively, in adults and children. Further insight into survival is obtained from a meta-analysis and systematic review based on twenty-five studies that were published in 2016 to 2020 (n= 28,479 children) [7].

Improvements in monitoring, diagnosis, treatment and accessibility

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of post-CPR advanced care are requisite tools that can raise the chance of survival. Medical personnel in-charge of children should enhance their technical skills and clinical acumen through scientific channels and networking with peers to advance to a higher level of proficiency.

Out-of hospital life support

Out-of hospital life support responses rarely make headlines in the newspapers unless they are of a large and dangerous scale that endanger public health, disrupt lives and damage property. Calamities that capture general concern and anguish arise from man-made catastrophes and natural disasters. The medical emergency service may be the first to arrive at the scene. However, from a medical point of view, the scope for rescue is very specialized and highly organized. The labile situation cannot be reverted by the abilities of the local paramedic rescue team alone without outside reinforcement, different level of leadership and even national supervision.

Nevertheless, the paramedic response team faces a challenging mission in the fast lane whenever a call for help is received at the emergency duty station. Where are the common locations that the rescue team may speed to resuscitate collapsed children? Excluding traumatic life and death settings, frequent places are the homes with children, public buildings and recreational outlets. It is reported that survival from non-traumatic cases is higher when victims are transported for advanced management in pediatric ED than in a general ED [8].

A retrospective analysis was conducted by Jung L, et al, in a tertiary referral medical Centre in Taiwan. Material and data were from records in the years 2005-2016 (n=152 children) [9]. The common non-trauma causes reported include sudden infant death syndrome, airway-related events, drowning, intoxication and cardiac causes. The article provided 3 predictors that are useful in rescue undertaking. They include 1) most of the incidents occurred at home 2) the most common age group affected was early infancy 3) and the primary trigger for physiological danger was respiratory in nature.

An article posted by Canadian Resuscitation Outcomes Consortium described the impact of the paramedic service response over the years 2012 to 2020 (n=52 children) [10]. All survivors had a sad neurological outcome. Medication deviations, delay in vascular access and airway problems were the common obstacles. They are familiar concerns for emergency rescuers everywhere. The document stated that epinephrine administration was delayed (vascular access was delayed in nearly half of the events). Epinephrine is a strong β - and α -agonist and is an important medication in resuscitation endeavors. Its early administration contributes to the likelihood of survival during CPR.

Insertion of an intravenous line (IV) in a child requires practice and steady hands but even competent anesthetist can face a harrowing challenge. The odd of failure in an IV line insertion is increased in a distracting surrounding, where the child is in shock and cold. The environment cannot be ideal for focus and performance of skilled tasks. An alternative to IV drug administration is to secure intraosseous access but the latter has not proven better cardiac arrest outcomes [11].

There are few published details that address the issue on life support developments. It is a fast lane that is seldom travelled: cases are few and mortality is high. Preventive approaches to reduce mishaps at home are doable. The adage "mothers know best" should not be taken literally at all times. This is particularly pertinent when young infants encounter a medical crisis that is unexpected and help is needed in the time-sensitive chain of survival. A mother who has an informed mind in preventive behavior can influence safety of her baby. Health/social

organizations can partake in bringing awareness and information on lifelines to caregivers and the public.

Conclusion

Children expect that the processes to achieve safety and survival are reflected in the ethos of every hospital. Each medical institution should provide leadership in charting safety guidelines in the care of children. There is definitely room for further sharing and exchange of scientific updates on the care bundle of resuscitation and fostering training and re-training among clinicians and healthcare workers. Inclusive discussions and link-up with experts in other nations can greatly expand knowledge and enhance decision-making skills,

Preventive measures in the community can reduce the call for paramedic rescue life support. Early warning signboards and safety rules should be prominently displayed in public facilities. Majority of emergency reports indicate that residences are the commonest locations to flag for help. The mitigation of tragedies at home would call for commitment from advocates of children safety to be heard in society. Technology is an indispensable tool in bridging knowledge gaps regarding health and safety. The participation of key-players can raise awareness and provide early instructions through networking among residents on the safe conduct for their young ones.

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Conflict of interest

None

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