Neonatal resuscitation guidelines: How human factors can improve practice

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Introduction

The need for clinical training and practice in neonatal resuscitation is addressed only briefly by the International Liaison Committee on Resuscitation Recommendations (Perlman et al., 2010) and by only some resulting national guidelines (Kattwinkel et al., 2010). Although established courses of training such as the American Academy of Pediatrics/American Heart Association Neonatal Resuscitation Program (NRP) increasingly emphasise that teamwork underpins successful neonatal resuscitation, they do not address the diversity of clinical presentations possible or the full complexity of teamwork response that is needed. Furthermore, there has been little systematic analysis of how—or even whether—standard neonatal resuscitation algorithms are applied in practice. As a result, there is a risk that algorithms or interventions developed to assist neonatal resuscitation may be incomplete or ambiguous, particularly for complex presentations. In this paper we outline some of the complexities of neonatal resuscitation, the potential shortcomings of existing cognitive aids, and the challenges of team functioning, using evidence from the literature and from observation. We then recommend steps that must be taken if clinical team training and practice are to be improved.

Principles vs. practice

The unique challenges associated with perinatal adaptation mean that the strategy for neonatal resuscitation differs from that used for adult and even paediatric resuscitation. Neonatal resuscitation training courses such as NRP have extensive clinical guidelines, but have only broadly adopted the teamwork principles of aviation Crisis Resource Management (CRM). The current team training component of NRP lists 10 key behavioural skills based on CRM principles, without operationalizing those skills in the context of resuscitation.

The current consensus algorithm provides a clear overview of the technical steps for the .1%-.2% of babies who are very depressed at birth (Perlman et al., 2010); however, most babies require a graded response. Adhering rigidly to an algorithm may sometimes compromise the ability of the team to adapt in a resilient manner. For example, establishing an airway for the neonate is a time-critical goal, yet faster attempts at intubation tend to be less successful (Nadler & Liley, 2011) and sometimes unnecessary. Moreover, adhering to algorithms may intensify competing priorities, and may lead to inappropriate or even harmful activities in certain circumstances, such as when abnormal perinatal adaptation is compounded with congenital conditions.

Challenges of cognitive aids

The resuscitation algorithm is a cognitive aid designed to support clinical decision-making and to lead the user through a complex, time-critical series of tasks. However, it does not help clinical teams navigate the wide variability that resuscitations can present. Although well-designed and well-validated cognitive aids can improve team co-ordination and decision-making, poorly designed aids may distract clinicians and increase mental workload (Marshall, 2013). In addition, some clinicians have limited opportunity to practise using the consensus algorithm. Expertise in neonatal resuscitation is acquired by technical education, usually combined with simulator training and bolstered by clinical experience. Access to reinforcement activities in the form of simulation and exposure to resuscitations varies. As a result, clinicians may struggle to maintain a high degree of readiness and familiarity with the algorithms (Jukkala & Henly, 2009).

The composition of neonatal resuscitation teams varies, which may affect outcomes. Teams are dynamic, variable in size, and comprise clinicians with varying expertise and levels of experience. Current guidelines do not address how a resuscitation team might best perform its functions using the human resources available. For example, the most senior doctor present usually assumes the leadership role, monitoring the neonate’s status in
relation to time and responsiveness to interventions. However that same person will also commonly take the role of airway manager. Therefore, the most senior clinician must focus attention on the most technically challenging aspect of the resuscitation, while at the same time directing other team members according to the global situation.

Recommendations

There are compelling reasons to address the disparity between the consensus guidelines and the clinical practice of neonatal resuscitation. In order to design interventions that provide support to teams, we must first systematically define the specific team behaviours that characterise successful team co-ordination. Human factors professionals are uniquely positioned to provide a comprehensive analysis of resuscitation work as it actually exists. Understanding factors influencing the variability in how individuals and teams co-ordinate a resuscitation effort will help designers develop cognitive aids that are more likely to support the most vulnerable areas of neonatal resuscitation. We propose a design process that reflects the realities of resuscitation work, so providing a systematic approach to identifying both activity-shaping constraints and sources of variation in activity as teams address clinical challenges. The ultimate goal is to create targeted interventions that are more likely to reduce cognitive load and support team cohesion. The principles underlying this process may extend to other healthcare domains where the domain demands a tailored solution.

Keywords: patient safety, neonatal resuscitation, crisis resource management, cognitive aids, team performance

References


