

Purpose

ABP guidelines for residency training state pediatricians should be able to diagnose, manage and triage patients with heart disease. Patients previously cared for in PICUs and NICUs are now in expanding CICUs with minimal resident staffing. Graduating pediatricians thus receive less exposure and training in acute cardiology than previous generations. This could lead to lower quality patient care. In addition, acutely ill cardiac patients present infrequently and with high acuity. Similar to cardiac arrests and code events, trainees need to learn how to manage these situations despite minimal clinical training opportunities.

Simulation is a practical method that has been used successfully to train learners to provide acute care. We hypothesize that a simulation-based educational intervention would improve residents' ability to recognize, stabilize and triage cardiac patients, thus addressing evolving educational gaps efficiently within current work hour guidelines.

Methods

Second and third year pediatric residents complete four cases covering common acute cardiac pathophysiologies on a simulator manikin followed by debriefing. This is followed by a self-directed, narrated computer presentation covering the learning objectives discussed in the debriefing. Subjects return at one month for four post-intervention simulation cases and again at 4-6 months to demonstrate knowledge retention. Total subject time commitment is three hours. All simulation cases are scored by two independent raters using a Likert scale instrument that was reviewed by content experts. The scales score history taking, exam, management, efficiency and communication with parents and subspecialists. Time to case completion is also recorded. Finally, a global evaluation of subject performance is given on a 10-point scale. Subject pre- and post-intervention scores were evaluated with paired t-tests.

Results

To date, 14 subjects have completed the pre-intervention and 1-month post-intervention phase of the study with plans to enroll and complete 30-40 subjects by September 2015. Mean pre-intervention total score was 72% (SD \pm 8.1%). Mean 1-month post-intervention total score was 92% (SD \pm 3.3%). Paired t-test demonstrated statistically significant improvement in subject performance ($p < 0.01$). Mean global evaluation score and efficiency score improvements were comparable to the total score ($p < 0.01$). Subjects showed lowest pre-test performance and greatest improvement in critical coarctation and Tetralogy of Fallot hypercyanotic spell cases.

Conclusion

Preliminary data show statistically significant improvement in resident performance after completing our intervention (simulation plus instructional presentation). Subjects have shown consistent improvement in all four cases and have shown improved efficiency, confidence and competency after intervention. Further study over the next six months will add more subjects to the analysis and attempt

to demonstrate knowledge retention at the 4-6 month follow-up time period. We also hope to expand our subject population to include ED providers and pediatric hospitalists as well as integrate this effective simulation curriculum into the pediatric cardiology rotation to improve education for future residents.