

Reducing diagnostic testing and hospitalizations for low-risk BRUE patients

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Abstract

A brief, resolved, unexplained event (BRUE) is defined as short, sudden and now-resolved episode of cyanosis, pallor, irregular or absent breathing, change in tone, and/or altered level of responsiveness in an infant without an identifiable cause based on history and physical examination. Despite clear recommendations from the American Academy of Pediatrics (AAP) to minimize diagnostic testing and discharge patients with low-risk BRUE to home from the emergency department (ED)¹, the majority of BRUE patients at CHCMN are still admitted to the hospital and undergo costly diagnostic testing. In this quality improvement project, we aimed to decrease hospitalization rate by 20% for patients with low-risk BRUE by December 2019 via a two-armed approach of (1) increasing resident familiarity with AAP guidelines and (2) improving family discharge education.

Introduction

- BRUE was previously known as ALTE (Apparent Life-Threatening Event), a problematic term that does not specify etiology, implies concern for a child's life being at risk. Additionally, no clear guidelines for testing were provided with this term and large evaluations were commonplace.
- In 2016, AAP reclassified ALTE → BRUE. This publication included precise diagnostic criteria, differentiation between low and high risk patients, and specific recommendations for evaluation based on risk stratification (figure 1). Despite these clear guidelines
 - Reduction in LOS has not occurred at CHCMN (figure 2)
 - diagnostic testing remains common (figure 3)
 - and rates of admission remain high. Of the 280 infants diagnosed with BRUE in the CHCMN ED from 2016-2017, 5% were discharged from the ED, 76% admitted to the floor and 19% admitted to PICU.
- Low levels of provider knowledge of the AAP guidelines and ineffective parental education on the safety of discharging to home are thought to be contributors to high rates of medical testing and hospitalizations.

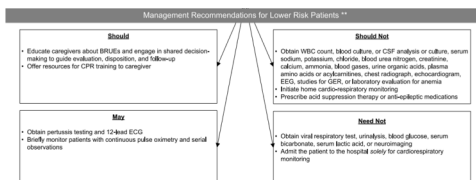


Figure 1. AAP 2016 treatment and evaluation guidelines for low-risk BRUE. ¹

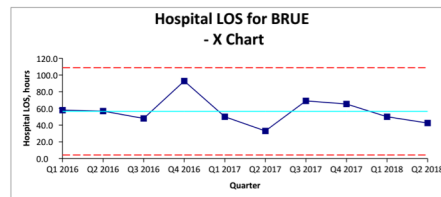


Figure 2. CHCMN BRUE hospital LOS 2016-2018. Despite AAP guidelines released in 2016, no significant decrease in LOS has been achieved

For all BRUE encounters:	% with test ordered (n/N)
Chest X-Ray	43.2 (121/280)
Blood culture	23.2 (65/280)
CBC w/ diff	42.5 (119/280)
ECG	25.7 (72/280)
Viral Respiratory Panel PCR	11.4 (32/280)

Figure 3. Frequency of commonly ordered testing for BRUEs at CHCMN.

Methods

Provider Survey:

A ten question survey was administered via Google Surveys to pediatric residents at the University of Minnesota to assess knowledge of BRUE definition, criteria for low vs. high-risk BRUE, and recommended management for low-risk BRUE. Following the survey, project members provided a brief lecture on the same topics. The same survey was repeated one month later to assess knowledge retention. To assess the efficacy of our educational lecture, results only from residents who completed both quizzes were compared.

Patient-Family Education:

To improve patient and family education, the previous discharge instructions regarding ALTEs were updated with the KidsHealth® After Care Instructions for BRUE. This handout was first modified by the QI team for accuracy, verbiage, and length. After these updates were made, our team sought the input of the Children's Hospitals and Clinics of Minnesota Family Advisory Council. The families received teaching on BRUEs and were asked to review the parent and family education material. Parent comments were reviewed and further edits were made.

Results

Provider Survey

A total of 55 residents completed the pre-test and twenty four residents completed the post-test. Nineteen residents completed both surveys.

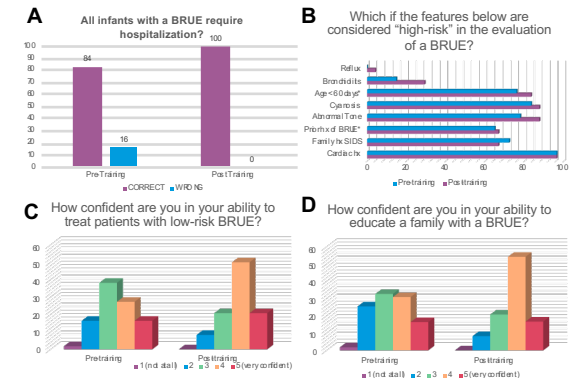


Figure 4A. Most respondents knew prior to education that routine hospitalization is not recommended. There was similar knowledge of recommended testing prior to intervention. 4B. No residents correctly identified the criteria that differentiate low-risk BRUE, high-risk BRUE, and non-BRUE events on either the pre or post-test. Correct answers are identified with an asterisk. After the teaching residents felt more comfortable both managing patients with low-risk BRUEs (4C) as well as educating families on BRUEs on the post-test (4D).

Patient-Family Education

Feedback on the patient-family education materials included:

- Focus on the reassuring aspects of low-risk BRUE
- Low-risk BRUE → no additional monitoring
- More risks to patients who stay in the hospital if not indicated
- Stay within the scope of BRUE education (e.g. provide a separate handout for GER management if that is a concern)

Conclusion

- Baseline resident knowledge of AAP recommendations for hospitalization and testing for low-risk BRUEs was high. Therefore, Interventions aimed at resident education are unlikely to reduce hospital admission rates.
- Knowledge of specifics from the history and physical that categorize a patient as low-risk was low, even after educational intervention. Easy access to written guidelines, (e.g specific CHCMN management algorithm) may improve familiarity with these criteria.
- Further research is needed to evaluate the new BRUE educational material when used in the ED setting.

Limitations

- Broad scope of project, difficult to delineate measurable and attainable goals within the scope of resident QI experience
- Limited access to patient families with BRUE experience
- Low participation of residents; single center study.