

Radiological Findings in Patients Presenting with Brief Resolved Unexplained Events (BRUEs)

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Background/Hypothesis: Brief resolved unexplained events (BRUEs) are events in infants characterized by cyanosis, abnormal breathing, abnormal tone, and altered responsiveness. Practice guidelines define high-risk and low-risk BRUEs and do not recommend imaging in low-risk patients. We evaluated imaging in these patients and hypothesized that high-risk patients would have more imaging studies and abnormalities.

Methods: Using the radiology information system, a retrospective review was performed between 2016-2022 for patients <1 year presenting with BRUE. Defined search terms were used to identify imaging within one week of presentation. Patients were evaluated for clinical presentation, medical history, physical examination, imaging studies ordered, and final diagnoses.

Results: 126 patients were identified. 113 patients (46 female; 93 high-risk), between 3 and 355 days old (average age 97 days), met inclusion criteria. Imaging included chest radiographs (99), head CTs (24), brain MRIs (19), skeletal surveys (16), and others (22). There was no difference in the number of imaging studies obtained between these groups ($p=0.423$, Mann-Whitney U test). However, a greater proportion of high-risk patients had imaging abnormalities ($p=0.023$, Fisher's exact test). Only 1/20 (5%) low-risk patients had abnormal imaging (PCR proven viral bronchiolitis). 26/93 (28%) high-risk patients had abnormal findings, most commonly on chest radiographs (15), brain MRIs (9), head CTs (4), and skeletal surveys (3). 18/26 high-risk patients had imaging abnormalities leading to a diagnosis other than BRUE (viral bronchiolitis, bronchopulmonary dysplasia, nonaccidental trauma, perinatal HSV infection, ventricular septal defect, double aortic arch, intestinal malrotation, and neurofibromatosis). Overall, 7/93 (7.5%) high-risk BRUE patients had significant pathology.

Conclusion: High-risk patients were more likely to have an imaging abnormality compared to low-risk patients, which is consistent with current imaging recommendations given only one low-risk imaging abnormality. Interestingly, 7.5% of the high-risk patients had significant pathology diagnosed by imaging.