Management of apparent life-threatening events in infants: a systematic review

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CRD summary
This review concluded that some historical and physical examination features could identify a risk of an apparent life-threatening event, in infants who appeared well and had no clear aetiology, but the true risk of an event or underlying disorder could not be ascertained. Numerous review limitations mean that these conclusions may not be reliable.

Authors' objectives
To determine in children who seem well and have no clear aetiology, after an apparent life-threatening event, those historical and physical examination features that indicated a risk of an adverse event or serious underlying diagnosis. To determine who would benefit from testing or hospitalisation, and which tests to use?

Searching
PubMed, CINAHL, and The Cochrane Library were searched for studies published in English, from 1970 to May 2011; search terms were reported. The reference lists of review articles were searched for further relevant studies.

Study selection
Clinical studies of apparent life-threatening events, in children younger than 24 months, were eligible. Case reports were excluded.

In the included studies, the tests and conditions assessed varied, as did the study settings.

Two reviewers independently selected studies, with disagreements resolved by a third reviewer.

Assessment of study quality
The authors stated that potential sources of bias were assessed, but no specific methods were reported; two references were given.

Data extraction
Two reviewers independently extracted the data, with disagreements resolved by a third reviewer.

Methods of synthesis
A narrative synthesis was presented.

Results of the review
Thirty-seven observational studies were included (sample range six to 627 patients); 18 studies were prospective and 19 were retrospective. Most studies lacked a control group, none of them satisfied a high level of evidence, and there was little consistency in populations, outcomes, follow-up, and measurement.

Risk factors for an adverse event or serious underlying diagnosis included a history of prematurity (four studies), multiple apparent life-threatening events (six studies), and suspected child maltreatment (seven studies).

Routine screening tests found no correlation between apparent life-threatening events and gastro-oesophageal reflux episodes (five studies). Brain imaging had low sensitivity or positive predictive values for the development of epilepsy (eight studies; follow-up of up to five years). Of the four studies on anaemia, none reported a causal role. Of the five studies on testing for cardiac arrhythmias using electrocardiographs or 24-hour Holter monitors, an abnormality that resulted in treatment was identified in 1.4% of children who later had apparent life-threatening events.

Authors' conclusions
Some historical and physical examination features could identify a risk of an event in infants who appeared well and had no clear aetiology at presentation. Testing tailored to these features might be of value. The true risk of an event or underlying disorder could not be ascertained.
The authors used broad inclusion criteria for the population and study design. They provided very little detail on how they selected the relevant prognostic risk factors, diagnostic tests and outcomes, making their eligibility criteria very difficult to reproduce. Restricting the search to studies published in English meant that some relevant studies may have been missed.

Suitable methods (two people independently duplicating processes) were used to reduce the risk of reviewer error and bias, but the process and methods of quality assessment were poorly described. A basic vote-counting narrative synthesis was presented with little focus on sample size and study quality (reported in study detail tables), and only very basic results were presented for many of the included studies.

The authors’ conclusions were cautious, but the review limitations mean that these conclusions may not be reliable.

Implications of the review for practice and research

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that the definition of an apparent life-threatening event should be clarified. Research should quantify the true risk of an event or a serious underlying disorder, then identify the key historical and physical examination factors that determine the need for admission and the scope of investigations.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.