

# Literature Reviews

## Comparison of three sites to check the pulse and count heart rate in hypotensive infants.

Sarti A, Savron F, Ronfani L, Pelizzo G, Barbi E. *Pediatric Anesthesia* 2006; 16:394-398

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Current international guidelines issued by the American Heart Association in 2000 state that, for health professionals, in order to diagnose cardiac arrest in infants and start chest compression, heart rate at the brachial pulse must be absent or less than 60 beats per min. Lay rescuers on the other hand, are instructed to look for signs of circulation, such as breathing, coughing, and movement.

In clinical practice, difficulties are encountered in detecting pulses both in adults and in children. There are no data on cardiac activity assessment in hypotensive infants, which is the most likely real event requiring chest compression in this age group. The authors have prospectively compared three sites for pulse detection and measurement in hypotensive infants during anesthesia namely, carotid, brachial, and femoral pulses. Forty hypotensive infants aged 1-12 months undergoing major surgery under general anesthesia were studied. Four pediatric basic life support (PBLIS)-certified health professionals, two physicians and two nurses participated in the study as examiners. All infants had intra arterial pressure and electrocardiogram monitoring.

Transient hypotension is frequent in infants after induction of general anesthesia and usually reverses as surgery begins. Hypotension was defined as systolic blood pressure below 70 mmHg, according to pediatric advanced life support guidelines. Each examiner, without knowledge of the actual monitored data of the patient, was asked to find the infant's

arterial pulse within 10 s and to count it for 15 s, using 3 methods; 1) palpating the brachial pulse between the inside of the elbow and the armpit with two middle fingers of one hand (current guidelines); 2) palpating the femoral pulse by pressing two middle fingers of one hand into the top of the thigh, halfway between the iliac crest and the groin; and 3) palpating the carotid pulse in the neck with two middle fingers between the inner side of the sternocleidomastoid muscle and the larynx.

During each examination the order of the three methods was randomized. In the whole sample, the proportion of successful heart beat detection was higher for the femoral site. The femoral site also proved to be the most rapid and accurate way of counting heart rate. The agreement between physicians and nurses was poor for brachial and carotid pulse determination and fair for femoral pulse detection. The mean discrepancy amongst the nurses was smaller than amongst the physicians. The discrepancy is not well explained.

### Comments:

These findings challenge the current international guidelines which specify the brachial pulse standard. It is interesting to note that the choice was based on only one study carried out more than 20 years ago on 25 healthy infants, whose brachial and apical pulses were palpated by their parents.

The authors have shown that there is indeed a time when accepted practices should be challenged. The overall success rate of detection of accurate pulse was only 50%. Thus excessive erroneous diagnosis of pulselessness is very probable under real clinical conditions, which often results in undesirable chest compression. However, once the pulse is detected, listening to precordial sounds may be the best way to count heart rate, because chest compression must be started at less than 60 times per min.

This study is not the final answer on the subject, but is a very good start for from time to time challenging entrenched guidelines.