



GUIDELINE 13.6

CHEST COMPRESSIONS DURING RESUSCITATION OF THE NEWBORN INFANT

The normal newborn infant has a heart rate above 100/min once breathing has been established, usually within a minute of birth. The normal range of heart rate thereafter is 110 to 160/min. In newborn infants cardiac output is rate dependent. If the heart rate is too slow the circulation will be inadequate to support tissue oxygenation.

Indications for starting chest compressions

Chest compressions are indicated when the heart rate is <60/min despite adequate assisted ventilation provided for 30 seconds (chest wall obviously moving with each inflation).

Because ventilation is the most effective action in neonatal resuscitation and because chest compressions are likely to compete with the performance and assessment of effective ventilation, resuscitators should ensure that assisted ventilation is being delivered optimally before starting chest compressions [Class A, expert consensus opinion].

Nevertheless, once compressions are started, they should be continued with as little interruption as possible until there is clear evidence of improvement in spontaneous heart rate [Class A, expert consensus opinion].

Chest compression technique

Chest compressions should be centred over the lower third of the sternum (above the xiphisternum and just below the nipples) and should compress the chest one third of the chest anterior-posterior diameter [Class A, extrapolated evidence^{1, 2}, expert consensus opinion³]

The recommended technique is two thumbs on the sternum, superimposed or adjacent to each other according to the size of the infant, with the fingers surrounding the thorax to support the back [LOE IV⁴⁻⁷] Usually the resuscitator faces the baby's head, but in special circumstances, such as when access is needed to the baby's abdomen, this position can be reversed.⁸

The two-thumb technique has advantages over the two-finger technique in improving peak systolic and coronary perfusion pressure, in providing compressions more consistently over long periods of time, and it is perceived as easier and less tiring for the rescuer [LOE IV⁵ and extrapolated evidence^{4, 6, 7, 9, 10}]. Therefore, the two-thumb technique is strongly preferred when two healthcare professionals are providing resuscitation [Class A, expert consensus opinion].

The two-finger technique (two fingers with the tips on the sternum) may be acceptable as an interim measure in circumstances where the two-thumb technique would critically impede access that is needed to the infant's abdomen or chest (such as for umbilical cannulation or thoracentesis) [Class B, expert consensus opinion]. The other hand should be used to support the back.

Inflations and chest compressions should be performed with a 3:1 ratio of 90 compressions per minute and a half second pause after each 3rd compression to deliver a breath [Class A, expert consensus opinion^{8, 11, 12}]. Compressions and inflations should be coordinated to avoid simultaneous delivery of a compression and a breath [extrapolated evidence¹³].

The chest should fully expand between compressions¹⁴, but the rescuer's hands should not leave the chest [Class A, expert consensus opinion⁸].

Effectively delivered chest compressions will result in pulsations evident on an oximeter. As soon as chest compressions are commenced, it is usual practice to increase inspired oxygen to 100% if a lower concentration has previously been used [Class B, expert consensus opinion].

Once chest compressions have been commenced, they should be performed with as little interruption as possible, and for at least 30 seconds between each pause to assess for improvement in spontaneous heart rate and cardiac output (preferably by auscultation, plus evidence of spontaneous pulsations on oximetry) [Class A, expert consensus opinion¹¹]. Do not stop unless assessment is needed to make treatment decisions. Signs of improvement in spontaneous cardiac output may also include a rise in oxygen saturation, and commencement of some spontaneous movement or breaths. Chest compressions should continue until it is obvious that the heart rate is >60/min.

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