

Modified rapid cardio-pulmonary cerebral assessment (mRCPCA)

Airway & Breathing

The assessment is started by placing both hands palm down (one on the chest and the other on the abdomen) with an eye on ones watch. Respiratory rate (RR) is counted for 6 seconds and multiplied by 10.



Figure 1: Assess RR and feel /listen for grunt and stridor.

If RR is low normal for age and mental status is “unresponsive”, relative bradypnea must be considered and bag valve mask ventilation is initiated.

As the RR is being counted, the responder, listens for grunt and stridor (anticipating an obstructed airway in the unresponsive child) and looks for retractions and pattern of respirations; whether thoracic or abdominal. Grunt or abdominal respiration are suggestive of impending respiratory failure.

The infra-axillary area is auscultated for air-entry and adventitious sounds.



Figure 2: Auscultate infra-axillary region on both sides.

Circulation:

The heart is auscultated, and the heart rate is counted for 6 seconds and multiplied by 10. While counting quality of heart sounds is noted. Are the sounds difficult to hear (muffled) or can you hear a gallop?



Figure 3: Assessment of HR.

The responder proceeds to assess the core peripheral temperature gap by placing one hand on the abdomen and sliding the other hand down the leg to the ankle. She notes whether, it is warm throughout or cool below ankle, knee, or thigh.



Figure 4: Core-peripheral temperature gap.

Comparison of the central and peripheral pulse is performed by placing the index finger of one hand on the femoral and the other on the dorsalis pedis, comparing the strength.



Figure 5: Comparison of pulses.

Table 1: Interpretation of concurrently palpated pulses

Femoral pulse	Dorsalis Pedis	Inference
+++	++	Normal
+++	+++	Vasodilation (suggestive of warm shock)
+++	+	Narrow pulse pressure (suggestive of cold shock)
+++	0	Hypotensive shock
+ or 0	0	Cardiac arrest

Color is assessed by comparing the physician's palm with the color of the patient's sole. If found to be relatively pale, dusky, ashen, or flushed, it is documented as "abnormal".

Capillary refill time (CRT) is assessed by elevating the limb above the level of the heart and blanching the skin. Normally, CRT is immediate. Both a delay or rapid CRT may be interpreted as signs of poor perfusion when associated with altered level of consciousness, respiratory impairment and altered heart rate.



Figure 6: Compare color and CRT

Assessment of liver-span is performed by placing the palm of their right hand on the abdomen, parallel to the right costal margin, starting near the inguinal region and progressing upwards. Using a pen, the border of the liver is marked along the medial aspect of their right index finger, parallel to the right costal margin. The upper border is identified by percussing for liver dullness in the mid-clavicular line from the intercostal space. Wherever, dullness is felt, a horizontal line is drawn. The liver span measured in the mid-clavicular line using a measuring tape. The consistency of the liver edge (firm or normal) is also noted. (see table 2: Assessment of liver span)



Figure 7: Palpate lower border along the right costal margin and mark.



Figure 8: Percuss for the upper border of liver dullness.



Figure 9: Mark upper border.



Figure 10: Measure span in the mid-clavicular line.

Table 2: Approximate normal liver span of infants and children

Age	Liver span (cm)
Birth	5.6-5.9
2 months	5
1 year	6
2 years	6.5
3 years	7
4 years	7.5
5 years	8
12 years	9

Adapted from: Naveh Y, Berant M. Assessment of liver size in normal infants and children. *J Pediatr Gastroenterol Nutr.* 1984;3(3):346-8.

Disability

The level of consciousness is scored using the AVPU scale. Tone and posture are documented as abnormal if the child is floppy, not able to sit or stand by himself.

The eyes are examined for eye position and abnormal movements (conjugate deviation, nystagmus, or lid twitch). Pupils are checked for pupillary response to light and equality.

Abnormal eye signs are seen not only in primary status epilepticus but also in patients who are profoundly hypoxic and shocked (i.e. non-convulsive-status-epilepticus (NCSE)). It is crucial to differentiate between seizures due to a primary epileptogenic activity and “seizure like movements” associated with severe cerebral hypoxia or ischemia, since administration of anticonvulsants without managing the underlying cause in the latter could be fatal.



Figure 11: As you examine for pupillary response to light, make note of the eye position and movements.

Blood Pressure (BP)

BP is measured manually using an age-appropriate cuff. Measurement of diastolic BP (DBP) (disappearance of Korotkoff sounds) is as important as systolic BP (SBP). Pulse pressure is the difference between SBP and DBP. A DBP less than 50% of SBP is diagnostic of vasodilation. Monitoring mean arterial pressure (MAP) is an essential component of the PREM process. Even if SBP is high, MAP maybe low for age indicating the need for an inotrope. Hence it is crucial to monitor DBP, MAP and pulse pressure – and not just SBP.



Figure 12: Measuring BP.

Adapted from National Health Mission-Strengthening of Pediatric Emergency Care System in Tamil Nadu-Establishment of Pediatric Resuscitation and emergency Units under Tamil Nadu Accidents and Emergency Care Initiative under the name of PREM G.O(D)No. 539, Department of Health and Family Welfare, dated 30.11.19.