

# Experts' Consensus on the criteria for the diagnosis and grading of neonatal asphyxia in China

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Neonatal asphyxia (NA) refers to a critically ill condition in which there is an acute interruption of gas exchange between mother and fetus via placental blood flow, causing severe fetal hypoxia and acidosis, which can be followed by the depression of respiratory, circulatory, and central nervous systems. As a result, the neonates can not establish and maintain effective spontaneous breathing. There are no uniform criteria for the diagnosis of NA both in China and abroad. Based on the research advances and real conditions in China, the Neonatal Professional Committee of Chinese Medical Doctor Association summoned a working panel to develop the diagnostic and grading criteria of NA to further standardize its clinical diagnosis and treatment.

## Criteria for diagnosis

- (I) With high-risk factors of asphyxia;
- (II) The neonate has severe respiratory depression at birth, and can not establish effective spontaneous breathing within one minute after birth with an Apgar score of  $\leq 7$ , including that has not established effective spontaneous breathing 5 minutes after birth with an Apgar score of  $\leq 7$ ; or the Apgar score was relative high at birth but declined to  $\leq 7$ , 5 minutes after birth;
- (III) Low umbilical arterial blood pH ( $< 7.15$ );
- (IV) Other causes of low Apgar score have been ruled out. These causes include but not limited to: congenital malformations of the circulatory, respiratory, and/or nervous systems; neuromuscular disorders; fetal hemorrhagic shock; fetal hydrops; fetal passive drug toxicity from intrapartum high

dosage use of anesthetic/analgesthetic agents or magnesium sulfate to the mother.

(II), (III), and (IV) are the major criteria, and (I) is a minor criterion.

## Criteria for grading

- (I) Mild asphyxia: without hypoxic-ischemic organ injury;
- (II) Severe asphyxia: with hypoxic-ischemic organ injury.

This Experts' Consensus on the Criteria for the Diagnosis and Grading of Neonatal Asphyxia can not be used for deciding whether a neonate needs for neonatal resuscitation. The neonatal resuscitation should be based on the Guidelines on Neonatal Resuscitation developed by Chinese Neonatal Resuscitation Expert Panel (*Chinese Journal of Perinatal Medicine* 2011;14:415-9).

Furthermore, once a neonate at high risk of asphyxia is born, clamp a 10-cm umbilical cord (near the fetal side) with two sterile hemostats immediately, cut off the umbilical cord from the outer side of the hemostats, and sampling the umbilical cord arterial blood from the cut down umbilical cord for blood gas analysis. For neonates who receive resuscitation, further examinations should be performed for any potential organ injury after they entered the intensive care unit; meanwhile, differential diagnosis should also be conducted. The diagnosis of hypoxic-ischemic organ injury should be based on the following documents: (I) The Subspecialty Group of Neonatology, Pediatric Society, Chinese Medical Association. Diagnostic criteria for neonatal hypoxic-ischaemic encephalopathy. *Chinese Journal of*

Contemporary Pediatrics, 2005;7:97-8; and (II) Yu RJ. Multi-organ damage in neonatal asphyxia. In: Shao XM, Ye HM, and Qiu XS. Practical neonatology. 4th edition. Beijing: People's Health Publishing House;2011:234-9.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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