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EDITORIAL

From Soranus score to Apgar score

In the second century AD, Soranus of Ephesus, a leading physician in Rome, described a method of assessing the health status of newborns that very much resembles today's Apgar score.[1,2] Both Soranus and Virginia Apgar recommended the evaluation of muscle tone, reflex irritability, respiratory effort and colour. Soranus, however, did not mention heart rate as prognostic factors, given that circulation had not been studied in the second century AD.[1] Soranus insisted more on documentation of malformations and the pregnant woman's health and the newborn baby's maturity, whereas Apgar mentioned that prematurity and complicated pregnancy may alter scoring. While the Apgar score has been used to describe the health status of the newborn, Soranus' assessment was mainly used to determine whether the newborn is worth rearing.

Since the early 1960s, an Apgar score from 0 to 3 has been defined as a low score, a score from 4-6 as a moderately low and 7-10 as normal or reassuring.[3] Given how the score is constructed, one would expect it to describe risk in a linear manner. However, the commonly accepted belief seems to be that the outcomes should be the same for scores 7-10, with outcomes dropping for lower scores in a step-like manner. Yet, compared with non-malformed term infants with an Apgar score of 10, those scoring between 7 and 9 at 1, 5 or 10 minutes have higher risks of neonatal mortality, infections, asphyxia-related complications, hypoglycaemia and respiratory distress, and these associations become substantially stronger with increasing time after birth.[4] Additionally, in infants with a 5-minute Apgar score of 10, a 10-minute score of ≤9 is associated with a higher risk of neonatal morbidity. Consequently, infants born with lower Apgar scores within the normal range (ie with scores of 7, 8 and 9) at 1, 5 or 10 minutes are also at higher risks of adverse long-term outcomes, such as epilepsy, cerebral palsy, autism, having special needs and adverse child developmental health (compared with non-malformed term infants with an Apgar score of 10).[4-7]

The score was initially developed to assess term infants during a time when neonatal mortality was very high in preterm infants. The frequency of low Apgar scores increases with decreasing gestational age, and this may reflect biological immaturity in preterm infants. However, to the extent that physiological response patterns reflected by Apgar scores in preterm infants may be a proxy for vulnerability related to immaturity, the score can also provide useful prognostic information for survival of preterm infants, even in very low birthweight neonates.[8] Still, the value of Apgar score to assess the condition of the preterm infant has been questioned.[3,9] A current Policy Statement of American Academy of Pediatrics includes an overall recommendation that the Apgar score does not predict individual neonatal mortality or neurologic outcome and should not be used for that purpose,[3] with no specific recommendation regarding the use of Apgar score in preterm infants.

This premise has been recently challenged in a nation-wide Swedish study which demonstrated that Apgar scores at 5 and 10 minutes after birth are closely associated with risk of neonatal mortality (deaths during the four first weeks) in preterm infants.[10] Risk of neonatal mortality increases successively with decreasing Apgar score regardless of gestational age. Importantly, the absolute risks increase in neonatal mortality (ie the excess number of deaths per 100 births) by decreasing Apgar score increases with decreasing gestational age. For example, compared with infants with high Apgar scores at 5 minutes (9-10), the absolute risk increases among infants with Apgar scores of 4-6 was 2.0% at 35-36 weeks, 4.9% at 32-34 weeks, 7.1% at 28-31 weeks, 12.0% at 25-27 weeks and 16.6% at 22-24 weeks. Even a slight increase in Apgar score from 5 to 10 minutes was associated with a decrease in neonatal mortality risk.[10]

Together, these findings provide strong evidence for the importance of registering Apgar score in both term and preterm infants. Infants not having a full Apgar score should receive appropriate support, and efforts should be made to reduce the rate of low Apgar scores within the normal range and to strive for an Apgar score of 10 immediately after birth. Furthermore, all newborns should be assigned an Apgar score at 10 minutes, regardless of their score at 1 and 5 minutes. This will enable at-risk neonates to be identified and monitored to minimise the risk of adverse outcomes. Although it is frustrating that we usually cannot pinpoint the causes of a reduced Apgar score, we need to embrace that the score is, the best available tool we have to evaluate the newborn's health in the delivery room.

CONFLICT OF INTEREST

None.

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