

Apgar Score: Utility, limitations, and clinical implications in neonatal practice

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Abstract

The Apgar score is a simple and widely used clinical tool for assessing the condition of newborns immediately after birth. It evaluates five parameters: heart rate, respiratory effort, muscle tone, reflex irritability, and skin color. This narrative review aims to summarize the current evidence regarding the utility, limitations, and clinical implications of the Apgar score in neonatal practice. The Apgar score remains useful for the initial assessment of neonatal adaptation and guiding immediate interventions. However, it has limited predictive value for long-term neurological outcomes and may be influenced by several factors, including prematurity and maternal medications. Despite these limitations, it remains an essential component of neonatal assessment worldwide.

Keywords: Apgar score; Newborn; Neonatal assessment; Resuscitation; Prognosis

1. Introduction

The Apgar score is one of the most commonly used tools for assessing newborns immediately after birth. Introduced in 1952 by Virginia Apgar, it provides a rapid and standardized evaluation of neonatal adaptation to extrauterine life [1].

The score is based on five clinical parameters: heart rate, respiratory effort, muscle tone, reflex irritability, and skin color. It is routinely assessed at 1 and 5 minutes after birth and is widely used in delivery rooms worldwide [2,3].

Despite its simplicity and widespread use, the Apgar score has certain limitations, particularly in predicting long-term outcomes [4]. This review aims to explore its clinical utility, limitations, and current applications in neonatal practice.

2. Methods

This narrative review was conducted using a literature search in electronic databases, including PubMed and Google Scholar. Articles published in English between 2000 and 2024 were considered.

The search strategy included keywords such as “Apgar score,” “newborn assessment,” “neonatal resuscitation,” and “perinatal outcomes.” Relevant studies, including clinical trials, observational studies, and international guidelines, were reviewed.

Articles were selected based on their relevance to the utility, limitations, and clinical implications of the Apgar score. Reference lists of selected articles were also screened to identify additional relevant studies.

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2.1. Components of the Apgar Score

The Apgar score is based on five clinical parameters: heart rate, respiratory effort, muscle tone, reflex irritability, and skin color [1]. Each parameter is assigned a score from 0 to 2, resulting in a total score ranging from 0 to 10.

Heart rate is considered the most important component, with a score of 0 if absent, 1 if below 100 beats per minute, and 2 if above 100 beats per minute. Respiratory effort is scored based on the presence and quality of breathing or crying.

Muscle tone evaluates the newborn's activity and flexion, while reflex irritability assesses the response to stimulation. Skin color reflects the level of oxygenation, although it may be influenced by ethnicity and other factors.

A total score of 7 to 10 is considered normal, 4 to 6 indicates moderate difficulty, and a score below 4 suggests severe neonatal distress requiring immediate intervention.

3. Discussion

The Apgar score remains one of the most widely used tools for assessing newborns immediately after birth due to its simplicity, rapid application, and universal availability [2,3]. It provides clinicians with an immediate evaluation of neonatal adaptation to extrauterine life and helps guide initial management in the delivery room.

Several studies have demonstrated that low Apgar scores are associated with increased neonatal morbidity and mortality [5,6]. In particular, a persistently low score at 5 minutes is associated with a higher risk of adverse outcomes, including respiratory complications and early neonatal death [4]. Therefore, the Apgar score plays an important role in identifying newborns who require urgent medical intervention.

However, despite its clinical usefulness, the Apgar score has important limitations. It was not originally designed to predict long-term neurological outcomes, and its prognostic value in this regard remains limited [4,7]. Many infants with low Apgar scores may recover without long-term complications, while some with normal scores may still develop neurological impairments.

In addition, the Apgar score may be influenced by several external factors. Prematurity is one of the most significant confounding factors, as preterm infants often have lower scores due to physiological immaturity rather than true perinatal distress [3,8]. Maternal medications, such as sedatives and anesthetic agents, may also affect neonatal tone and respiratory effort, leading to lower scores independent of the infant's actual condition.

Another limitation is the subjective nature of some components of the score, particularly muscle tone and reflex irritability, which may result in interobserver variability [8]. This variability may reduce the reliability of the score, especially in settings with limited training or experience.

Despite these limitations, the Apgar score continues to be recommended in international neonatal guidelines as part of the initial assessment of newborns [2,9,10]. It remains a valuable tool when used appropriately and interpreted within the broader clinical context, including gestational age, perinatal history, and response to resuscitation.

Overall, the Apgar score should not be used in isolation but rather as one component of a comprehensive neonatal evaluation. Combining it with clinical judgment and additional diagnostic tools allows for a more accurate assessment and better management of newborns.

4. Conclusion

The Apgar score remains a simple, practical, and widely used tool for the initial assessment of newborns immediately after birth. It plays an important role in guiding early clinical management and identifying infants who require urgent medical attention.

However, its limitations, particularly in predicting long-term neurological outcomes and its susceptibility to various influencing factors, should be recognized. The Apgar score should therefore be interpreted within the broader clinical context and not used as a sole indicator of neonatal prognosis.

Overall, the Apgar score continues to be an essential component of neonatal assessment and remains widely recommended in clinical practice worldwide.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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