Medical Legal Forum – Use and Abuse of the Apgar Score

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"So members of the jury," said the defense attorney, "baby Marie's cerebral palsy, cannot be secondary to birth asphyxia since her Apgar scores were 6 at one minute, 7 at five minutes and 8 at 10 minutes". Apgar scores this high do not lead to a diagnosis of cerebral palsy secondary to hypoxic-ischemic encephalopathy or neonatal encephalopathy as it is called today".

A statement like the one above is not uncommon in today's presentations by attorneys who are using the Apgar score as a prognosticator for future neurological delay. Since the Apgar score is well accepted by the international community and is the most common hospital care form appearing on the newborn chart, it is not surprising that the relationship of the score to future disability is common.

However, there are many facets of the Apgar score, which need to be considered before using these numbers prognostically.

Virginia Apgar was an anesthesiologist at Columbia University and in 1953, proposed a new method of evaluation of the newborn infant. The actual Apgar epigram (A-appearance, P-pulse, G-grimace, A-activity, R-respiration) was devised by a pediatrician named Mervyn J. Covey. This epigram was created in 1961. Today we would consider this an acronym (a word formed from the first letter of each of the words in a phrase) rather than an epigram, which is a witty, ingenious, or pointed saying which is tersely expressed.

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Virginia Apgar's objectives were to provide an advocate for the baby and to encourage closer observation. In addition, she wanted to prevent asphyxiated infants from being incorrectly assessed, to ensure that healthy infants did not receive unnecessary resuscitation and to provide a shorthand for reporting the status of the newborn and the response to resuscitation.

It is important to realize that an Apgar score assigned during resuscitation is not equivalent to a score assigned to a spontaneously breathing infant. For that reason, there is no accepted standard for reporting an Apgar score in infants undergoing resuscitation after birth because many of the elements contributing to this score are altered by resuscitation.

Further complicating matters revolve around the criteria for defining perinatal asphyxia. ACOG Bulletin 163 (often quoted by attorneys) states that an Apgar score of less than 3 at five minutes is an essential criterion for perinatal asphyxia. In 2003, a second ACOG treatise entitled, "Neonatal Encephalopathy and Cerebral Palsy," stated that an Apgar score of less than 3 at five minutes is not an essential criterion but a suggested criterion. The latest ACOG treatise in 2014 titled, "Neonatal Encephalopathy and Neurological Outcome" no longer defines essential criteria but states that an Apgar score of less than 5 at five minutes and 10 minutes (with acidemia and signs of encephalopathy) correlates the risk of cerebral palsy. Additionally, the 2014 monograph states that "if the Apgar score at 5 minutes is >7, it is unlikely that peripartum hypoxia-ischemia played a major role in causing neonatal encephalopathy."

Many factors affect the Apgar score. These include preterm birth, maternal sedation, congenital malformation, trauma, interobserver variability, cardiorespiratory conditions, infection and, most commonly, the transitional state after birth.

We often forget that the most important goal of Doctor Apgar was to provide an advocate for the newborn infant immediately after birth.

The limitations of the score are that it only measures vital signs; it is too subjective; it has a limited timeframe; and to be abnormal (less than 3 at more than five minutes), the biochemical disturbance must be severe. For that reason, it is ideal to document whether the Apgar score is assisted or not assisted.

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The original Apgar score was assigned to a spontaneous breathing infant. However, in today's world, Apgar scores are assigned frequently after resuscitative efforts. That is, there may be positive pressure utilized initially. Oxygen is often provided, as are chest compressions when indicated. Therefore, the practitioner needs to know how the score was derived if prognosis, and further neurologic conditions are predicted.

For that reason, an assisted Apgar score form was developed and appeared in Guidelines for Perinatal Care (7th Edition), and in the October 2015 issue of the journal, Pediatrics. Although the recommendations are such that this expanded Apgar score reporting form should be utilized, this has not been the case. In most hospitals in the United States, the reporting on the Apgar

score form remains without any mention of assistance. The expanded Apgar score reporting form appears below.

APGAR SCORE

Gestational Age _____ weeks

SIGN	0	1	2	1 minute	5 minute	10 minute	15 minute	20 minute
COLOR	Blue or Pale	Acrocyanotic	Completely Pink					
HEART RATE	Absent	<100 minute	>100 minute					
REFLEX IRRITABILITY	No Response	Grimace	Cry or Active Withdrawal					
MUSCLE TONE	Limp	Some Flexion	Active Motion					
RESPIRATION	Absent	Weak Cry: Hypoventilation	Good, crying					
			TOTAL					

Comments:

Resuscitation

Minutes	1	5	10	15	20
Oxygen					
PPV/NCPAP					
ETT					
Chest Compressions					
Epinephrine					

Figure 1: Expanded Apgar scoring.

A true abuse of the Apgar score occurs when it is utilized alone as evidence of asphyxia. To make a diagnosis of perinatal asphyxia, many other factors need to be considered in addition to the Apgar score. These include non-reassuring fetal heart rate patterns, abnormal umbilical cord gasses, neuroimaging and neonatal electroencephalography, evidence of histologic placental dysfunction, and clinical findings that corroborate neurological dysfunction.

In addition, we continue to use the Apgar score prognostically in premature infants. Since one measure of the score is "activity" and premature infants often have decreased activity, how can we utilize the score in the premature infant prognostically?

Another less appreciated fact is that Dr. Apgar believed that at least two people should provide an independent score. She discussed variation in scoring and noted that this variation is decreased in infants with high or low scores. In addition, it was clear that the variation in the score was less if the numbers were decided quickly. How many times do you recall that after delivery and resuscitation, you were asked to assign a score since at 1, 5, and 10 minutes retrospectively since the physician and the resuscitation team were actively pursuing other activities?

Consider the following poem which was penned in the Journal of Perinatology in 1989. In addition, Joe Butterfield, an icon in neonatology, lobbied for a stamp to be created in her image. This is a 20 cent stamp, which appears below. Unfortunately, very few of these stamps have ever been utilized.

A Timely Scenario (September 1989)

Virginia Apgar, in '53,

was practicing anesthesiology.

She said to colleagues with great frustration,

"The newborn babe needs observation.

Correct assessment with more attention,

leads to appropriate intervention.

If we pick numbers that seem to jive,

can this predict who will survive?"

A scale devised that very year

was clinically oriented, and did seem fair.

Heart rate, reflex irritability, and muscle tone

were numbered singly, each one alone.

Respiratory effort and color too,

Hence, the score—but what to do?

Measured at minutes, one, five, and ten,

Instructed what to do and when---

Problems arose with such a roar,

Who should assign this "Apgar Score"?

The obstetrician called numbers high,

for perfect babies would not die.

The pediatrician, not wanting blame,

called numbers low—this was a shame.

This left the task to the poor nurse,
who often found the job a curse.
Five clinical signs made up the score,
but in reality, there were several more.
The obstetricians yelled and booed,
wailing that they'd soon be sued.
Pediatricians countered, "Don't be afraid,
Asphyxia's a term that soon will fade."
And then some babies born premature,
could not be measured with the score.
Cord pH, gestational age
Made the number a poor gauge.
Faulty recall, postdated noting
had the lawyers really gloating.
Potential help for this condition
mimics Olympics competition:
Skaters, gymnasts, and divers, too,
are all assigned a score by few.
A special team of five or more
could redefine the Apgar score.
In house, on-call for deliveries,
their Apgar scores would surely please.
A 3, 4, or 7.1,
hold up your cards—we've just begun.
Three and one-half million births a year,
Who will fund a cost so dear?
Perhaps the answer is soporific,
as we attempt to be scientific.
Encourage closer observation,
adapt a score without inflation.
Modify existing terms—
We've opened up a can of worms.

Figure 2: The Virginia Apagar Stamp

Although most infants with low Apgar scores will not develop neurological dysfunction the numbers on the score, continue to be utilized in the medical-legal community. We opened up a "can of worms," and although the Apgar score is provocative, it should not be used in this way in medical-legal investigations.

What is most interesting is that Virginia Apgar was also a fine musician and made string instruments as a hobby. It has been said that the wood she fashioned her instruments from was taken from the telephone booths in New York City. I am not certain that this fact is actual but I do know that Virginia Apgar's instruments are now enshrined in the American Academy of Pediatrics Administrative Building.

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Disclaimer:

This column does not give specific legal advice, but rather is intended to provide general information on medicolegal issues. As always, it is important to recognize that laws vary state-to-state and legal decisions are dependent on the particular facts at hand. It is important to consult a qualified attorney for legal issues affecting your practice.

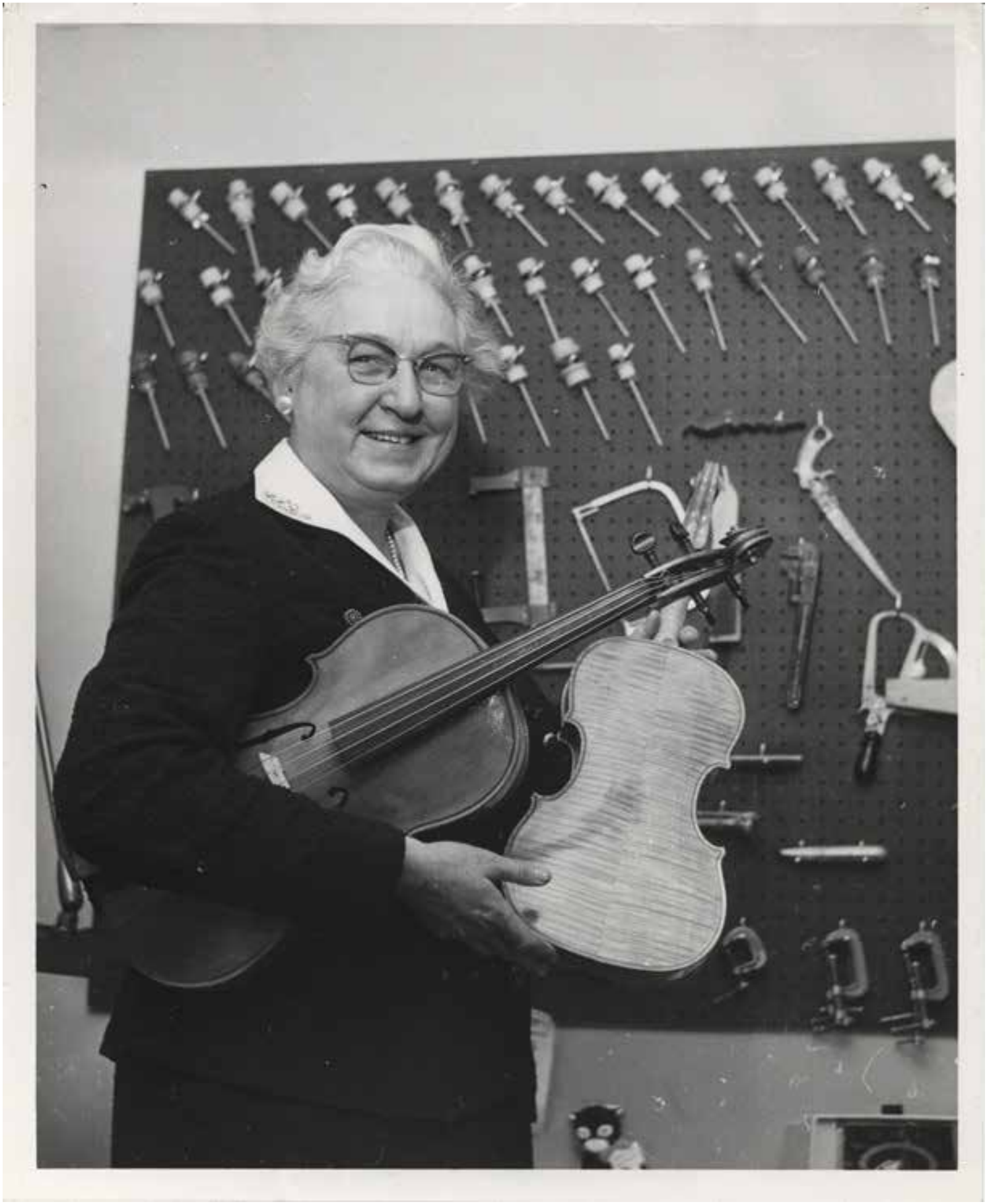

Figure 3: Virginia Apgar and her string instrument

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