





Vital Birth Transitions

- Cardiovascular responsiveness
- Systemic blood pressure changes
 - Transition from fetal circulation
- Establishment of respiration
- CNS responsiveness

Breathing at Birth

- Fetal breathing
- Stimulate sustained rhythmic respiration
 - Catecholamine surge
 - Induction of substances important for breathing
 - Substance P
 - Removal of placental
 - Humoral inhibitory factors
 - Cooling
 - Tactile stimulation
 - Rising CO₂

Apnea at Birth

- Birth asphyxia
- Maternal drugs
- CNS injury
- Septicemia
- Muscular or neurological disease
- Obstructing congenital malformations
- Other mechanical obstruction



Neonate not breathing at birth

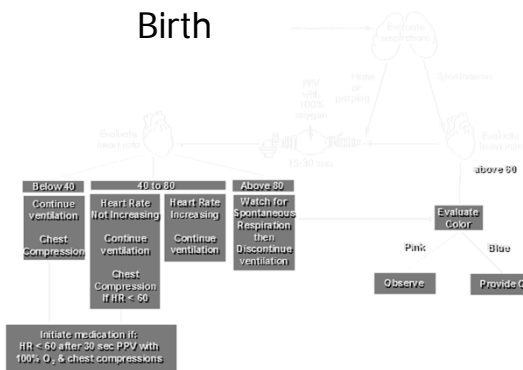
Monitor heart rate

- Birth bradycardia normal
- Is it accelerating?
- Is the bradycardia persistent?

Birth arrhythmias are very common

- Perfusing? – monitor
- Nonperfusing? – resuscitate

Birth



Preparation for Resuscitation

- Anticipation
- High risk situations
 - Obvious from history
 - Intrapartum course
- Unexpected
 - 50% of neonates requiring birth resuscitation
- Must always be prepared
 - Well thought out plan
 - Readily available equipment

EXIT Procedures



- Ex-utero
- Resuscitation during parturition
- Intrapartum
- Oxygen therapy for the mare
- Treatment
- Intubate if nose is available
- Resuscitation of the mare
- Use capnograph
- Can make the difference
- Expect initial poor lung perfusion









EXIT

- Luxury of time to correct the dystocia
- Assess fetal viability
- Rescue foals during dystocia
- Increase successful referral radius



Elements of Resuscitation

- Initial Assessment
- Apgar score
- Clearing the Airway
- Tactile Stimulation
- Thermal management
- Free Flow Oxygen
- Positive Pressure Ventilation
- Chest Compressions
- Medication

Initial Assessment



- Rapid assessment
 - When checking vaginal positioning
- Relative pulse rate and strength
- Apical pulse as soon as chest clears
- Expect initial bradycardia
- Rapidly increasing heart rate
- Transient arrhythmias

APGAR Score

Current Researches in Anesthesia and Analgesia—July-August, 1953

A Proposal for a New Method of Evaluation of the Newborn Infant.*

Virginia Apgar, M.D., New York, N. Y.

Department of Anesthesiology, Columbia University, College of Physicians and Surgeons and the Anesthesia Service, The Presbyterian Hospital



RESUSCITATION OF INFANTS at birth has been the subject of many articles. Seldom have there been such imaginative ideas, such enthusiasms, and dislikes, and such unscientific observations and study about one clinical picture. There are outstanding exceptions to these statements, but the poor quality and lack of precise data of the majority of papers concerned with infant resuscitation are interesting.

There are several excellent review articles^{1, 2} but the main emphasis in the past has been on treatment of the asphyxiated or apneic newborn infant. The purpose of this paper is the reestablishment of simple, clear classification or "grading" of newborn infants which can be used as a basis for discussion and comparison of the results of obstetric practices, types of maternal pain relief and the effects of resuscitation.

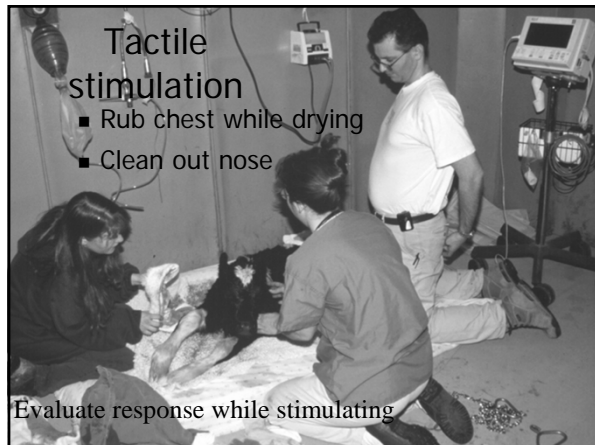
The principle of giving a "score" to a patient as a sum total of several objective findings is not new and has been used recently in judging the treatment of drug addiction.³ The endpoints which have

APGAR Score

Score	0	1	2
Heart Rate	Absent	< 60 Irregular	> 60 regular
Respiratory Rate	Absent	irregular	regular
Muscle Tone	Limp	Some Flexion	Active Sternal
Reflex Nasal Stimulation	No Response	Grimace Weak Ear Flick	Sneeze/Cough Ear Flick/Head Shake
Ear Tickle			

Clear Airway

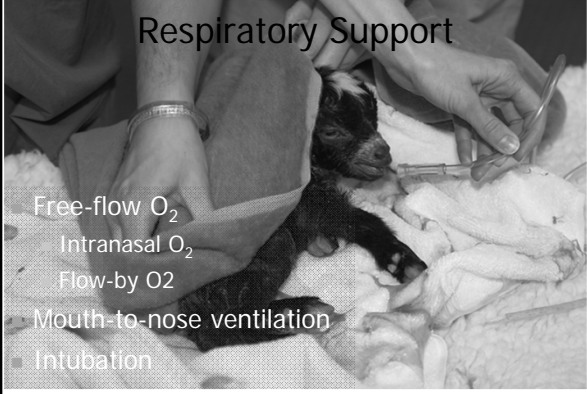
- During dystocia or PPS
 - Clear as soon as nose visible
 - May ventilate while foal is in canal
- Clear meconium by suctioning
 - Only if neonate is not vigorous
 - Can induce apnea and bradycardia
 - Can collapse lungs – induce hypoxia



Thermal management


- Dry foal with towels
- Move to warm area
- If not in shock
 - Use radiant heat
 - Use hot water bottles
 - Warm air

Respiratory Support



- Free-flow O₂
- Intranasal O₂
- Flow-by O₂
- Mouth-to-nose ventilation
- Intubation

Mouth-to-Nose Ventilation



If the foal does not
breathe spontaneously

Ventilation

- Self-inflating bag with O₂ reservoir
- Never spontaneous ventilation
 - Establish FRC
 - Prolonged inspiration phase 1st breath - 5 sec
 - Appropriate tidal volume
- Then 40/min – hyperventilate
 - Unless require CPR
 - Avoid more than mild hyperventilation
- If early in asphyxia
 - 30 sec 100% O₂ will >HR
- If late - myocardium failing
 - Need chest compression

Cardiovascular Support

- Assessment
- Nonperfusing rhythm?
 - Most frequently bradycardia
- Chest compression
 - If not perfusing (bradycardia and not rising)
 - If HR not perfusing in 30 sec - use drugs

Effectiveness of Chest Compression Cardiac Output

- Feel central arterial pulse
- Monitor pupil size
- Measure end-tidal CO₂

Medication

- Drug-depressed
 - Alpha2-adrenoceptor agonists reversal
 - Atipamezole
 - Yohimbine
 - Not tolazoline
 - Diazepam reversal - flumazenil
 - Opiate reversal – naloxone
 - Volatile anesthetic reversal – ventilation
- ALS – CPR
 - Epinephrine
 - Vasopressin

Intratracheal Drug Administration

- Epinephrine
- Atropine
- Lidocaine
- Naloxone