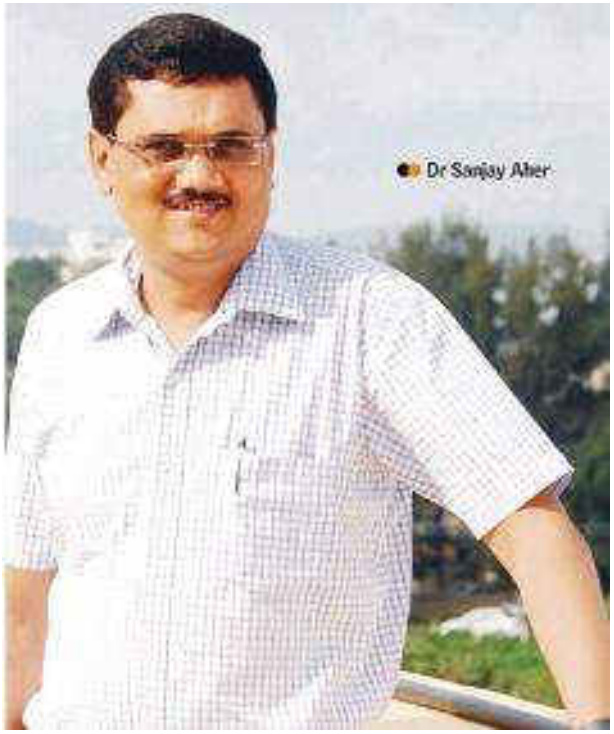

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First Golden Hour - Preterm Care at Birth

Dr. Sanjay Aher

DM Neonatology

Introduction

- Time period during which the infant faces challenges that carry risks of short and long term injury, lifelong developmental delay & even death.

- The decisions taken during this time are based on multiple systems that require attention, knowing that care in these first minutes can translate into lifelong medical problems.

What is Golden Hour Strategy?

- Communication and collaboration (inter & intra- team) using evidence-based protocols and procedures
- To standardise as many elements as possible for delivery and initial management of a very preterm birth
- Good communication with obstetrician about impending preterm birth
- Importance of collaborative counselling of the family
- Preresuscitation check list
- Clearly assigned roles and responsibilities for the personnel

First golden hour of a preterm is nothing but an excellent team work

Introduction

In this way, the first hour of neonatal life parallels the concepts upon which is based the :

GOLDEN HOUR OF TRAUMA

Reproduced from the editorial, David J. Annibale; R. Bissinger. Advances in Neonatal Care. July 2010, Vol 10, No5 pp 221-223

Corner Stones of Golden Hour Bundle

- Thermoregulation
- Cardiovascular stability
- Respiratory support
- Nutrional requirements in the DR, during stabilization and upon admission to NICU

What is done in this golden hour ???

- Prompt stabilization of the airway and cardiopulmonary support to establish / maintain vital signs. (+ temperature in newborns)
- Paying attention to multiple aspects of the patients condition. (vital signs, saturation, and response to resuscitation.)
- Attention to injury prevention & progression.

  (alveolar recruitment vs Spine stabilization, O2 toxicity vs shock)
- Rapid initiation of vascular access
- Rapid initiation of therapeutic intervention.

  (Surfactant vs Volume resuscitation)

Golden hour of Trauma

- Involves system of trauma centers, trauma teams, aeromedical transport support and efforts to get victim to appropriate care within an hour.
- Terminology is not scientifically supported.

Golden hour of Neonatology

- **Involves providing a definitive care to the newborns in the stabilization area itself**
- **We are specifically referring to the initiation of treatments in a systematic & efficient manner.**
- **Also, neonatal resuscitation is complex and takes place in an extremely dynamic & complex environment where communication and team effort is foremost important.**

Thus.....

The promise of the golden hour

in neonatal care lies not only in

evidence based treatment, but

also in team structure,

communication and proficiency.

Golden hour strategies in Periviable neonates :

The golden hour strategy is a philosophical approach that reinforces communication and collaboration using evidence based protocols and procedures that standardize as many elements as possible for delivery and initial management of a very preterm birth.

Myra Wyckoff. Initial resuscitation and stabilization of the periviable neonate – The Golden hour approach. Semin. Perinatol. Semin Perinatol 2014 Feb;38(1):12-6.

Problems in periviable neonate stabilization .....

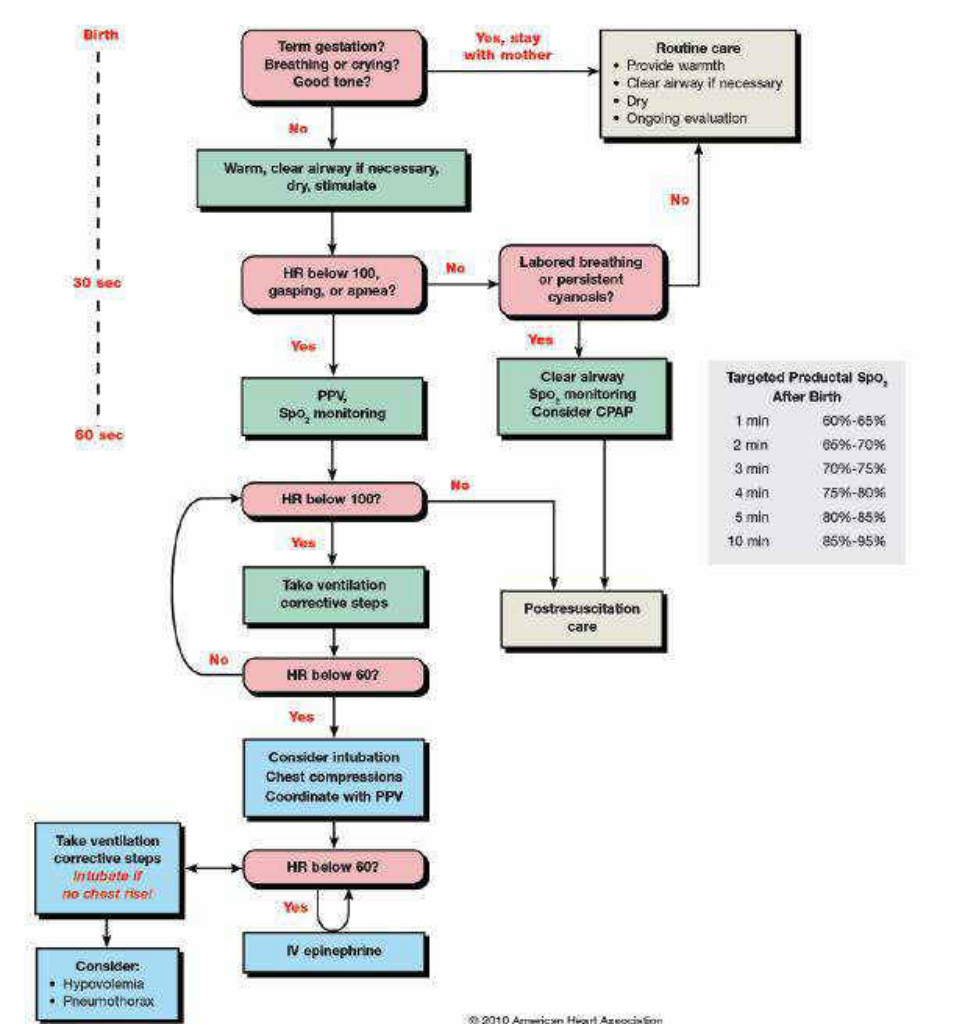
- More prone to Hypothermia .
- Poor energy stores.
- Immature tissues that are damaged easily by hyperoxia
- Weak chest muscles that limit adequate ventilation.
- Immature nervous system that may lead to poor respiratory drive.
- Surfactant deficiency that may contribute to poor lung expansion and gas exchange.
- Increased risk of infection due to underdeveloped immune system.
- Fragile capillaries within the immature brain, which can rupture and cause IVH.
- Small total blood volume that make them more susceptible to hypovolemic effects of blood loss.

Highly Stressed Parents

Resuscitation Specifications

Resuscitation should be done in accordance with the recommendations of

Neonatal Resuscitation Programme



Additional Resources in the Delivery Room

- Additional trained personnel, including some skilled at intubation
- Additional strategies for maintaining temperature

Additional Equipment Needed

- Compressed air
- Oxygen blender
- Pulse oximeter

Keeping Premature Babies Warm

- Increase delivery room temperature
- Preheat radiant warmer
- Use warming pad
- Consider polyethylene bag for babies <28 weeks' gestation

Decreasing Brain Injury

- Handle the baby gently
- Avoid the Trendelenburg position
- Avoid high airway pressures when possible
- Adjust ventilation gradually based on physical examination, oxymetry, blood gases
- Avoid rapid intravenous fluid boluses and hypertonic solutions

Golden Hour checklist

Brenda Wallingford, **Implementation and Evaluation of "Golden Hour" Practices in Infants Younger Than 33 Weeks' Gestation.** NAINR. 2012;12(2):86-96.

Medscape

Delivery Room Golden Hour Form

NNP: _____ RN: _____ RT/2nd RN _____

Baby MRN: _____ Gestational age: _____ Birth Time: _____

PRE-BIRTH:

NeoPuff set up prior to delivery ☐ yes | ☐ no

Laryngoscope/blade checked prior to delivery ☐ yes | ☐ no

Placed into polyurethane bag ☐ yes | ☐ no

On chemical mattress ☐ yes | ☐ no @ ___ a.m./p.m

Two hats applied ☐ or plastic barrier & one hat applied ☐ at _____ a.m. | p.m.

Inspiratory hold of _____ cm PIP x 5 seconds given ☐ yes | ☐ no

Started on mask CPAP with _____ cm H2O pressure @ _____ a.m. | p.m.

- Adjusted to _____ cm H2O pressure @ _____ a.m. | p.m.

PPV given ☐ yes | ☐ no What settings? _____

Oxygen initiated with initial setting of _____ % @ _____ minutes of age

for sats of _____

- Adjusted to _____ % at _____ a.m. | p.m.
- Additional Adjustments to _____ % at _____ a.m. | p.m.
- Percentage of oxygen needed to maintain sats 88-92 _____ %

Intubated at _____ minutes of age with _____ ETT secured @ _____ cm at lip

Surfactant given ☐ yes | ☐ no @ _____ minutes of age. Dose: _____

Extubated at _____ minutes of age to _____ (resp support needed; ie, CPAP, O2)

Infant's axillary delivery room temperature: _____ °C taken at _____ a.m. | p.m.

TRANSFER:

Transferred to the NICU on (PIP/PEEP/O2/mask or ETT) _____

ADMISSION TO NICU:

Respiratory support settings: _____

Extubated at _____ minutes of age to _____ (resp support needed; ie, CPAP, O2)

Axillary temperature _____ °C taken at _____ a.m. | p.m.

Giraffe bed closed to isolette @ _____ a.m. | p.m.

Polyurethane bag removed at _____ a.m. | p.m. with axillary temp of _____ °C

Axillary Temp 1 hour after polyurethane bag removed _____ °C

QUESTIONS:

What did team do well?

What can the team improve upon?

What follow-up if any is needed?

Golden Hour Checklist

PRE-BIRTH:

NeoPuff set up prior to delivery ☐ yes | ☐ no

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Axillary Temp 1 hour after polyurethane bag removed _____ °C

What follow-up if any is needed?

Some steps specific to prematurity .....

1. Delivery room temperature stabilization.
2. Delayed cord clamping.
3. Delivery room respiratory support.
4. Delivery room oxygen use.
5. Cautious use of cardiac compressions and medication.

Some steps specific to prematurity .....

1. **Delivery room temperature stabilization.**
2. Delayed cord clamping.
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1. Temperature Management

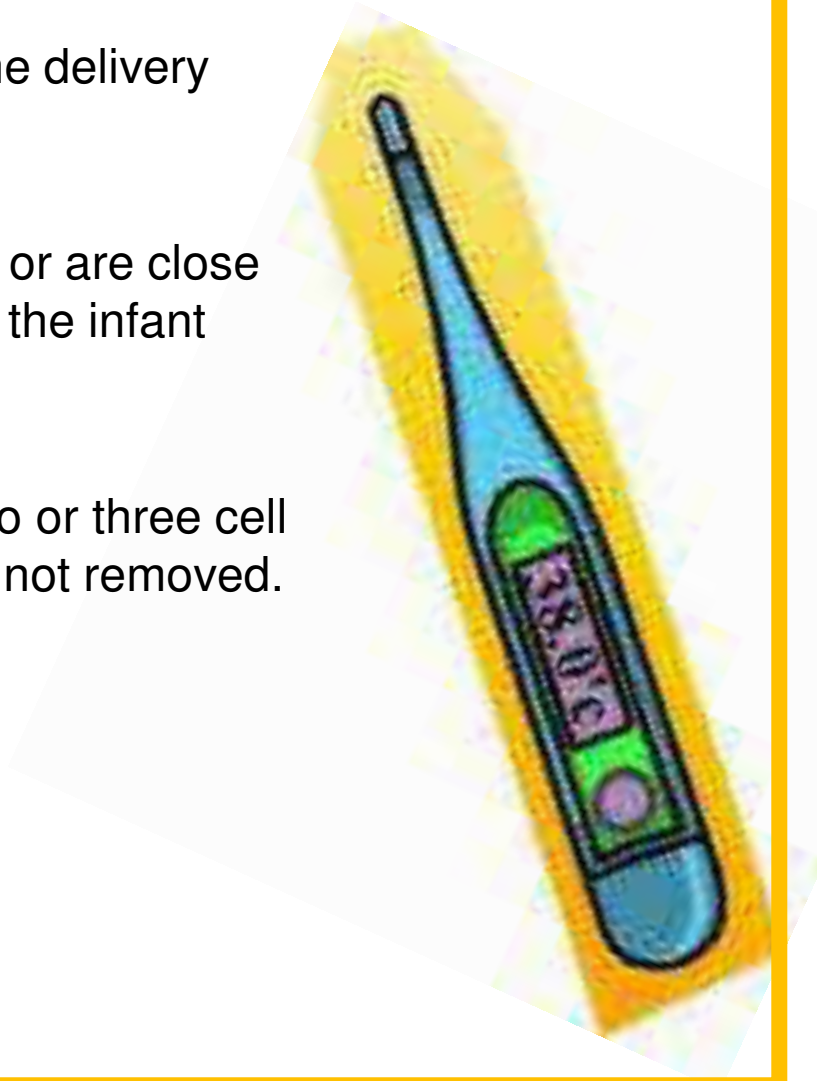
Why Hypothermia...??

VLBW & ELBW babies are unable to respond to thermal stress due to :

- Less developed stores of brown fat
- Decreased subcutaneous fat, with less insulative capacity
- Ineffective thermogenesis in response to cold stress.
- Increased trans epidermal water loss
- Inability to take in enough calories to provide nutrients for thermogenesis and growth and decreased glycogen stores

Temperature Management Strategies

- Increase the ambient room temperature of the delivery room or operating room to 77°F (25-27°C)
- Surfaces that come in contact with the infant or are close by, including the towel used to catch and dry the infant must be prewarmed.
- Strategies for drying must ensure that the two or three cell layers of the poorly supported epidermis are not removed.



Temperature Management Strategies

- The periviable infant should be placed in a high diathermancy food grade polyethylene bag or wrap without initial drying up to the level of the shoulders.
- Preterm infants can be placed on a chemically activate thermal mattress that improves temperature stabilization.
- Head should be covered with a polyethelyne plastic cap or woolen cap.
- Monitoring the infants temperature in the delivery room to guide further interventions and to prevent iatrogenic hyperthermia.

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2. Delayed cord clamping

Evidences

- The question of optimal time to clamp the umbilical cord after delivery is controversial.

- Systematic reviews of the trials suggest that for an otherwise uncomplicated preterm birth, delaying cord clamping for 30 – 180 sec following delivery improves blood pressure and decreases IVH and the need for blood transfusion.

- However, there is limited data regarding the hazards or benefits of delayed cord clamping in the non vigorous infant, and almost no data regarding Periviable neonates.

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Providing Respiratory support

Goals of delivery room respiratory support

- Improving lung compliance
- Decreasing the work of breathing
- Avoiding apnea
- Providing assisted ventilation as needed.

Goals of delivery room respiratory support

- Establish and maintain FRC
- Use minimal oxygen concentration
- Avoid iatrogenic complications
- Use least invasive & gentle approach.

Evidence Based strategies for providing Respiratory support to these babies:

Sustained Inflation

- Small clinical trials suggest that sustained initial inflations (10-20s) may reduce the need for intubation and BPD development.

CPAP use

- Immediate application of CPAP to prevent collapse of surfactant deficient preterm lungs reduces the need for intubation, exogenous surfactant administration and ventilator duration, but not the rates of BPD.

Intubation

- It is quite possible that a periviable infant will need effective PPV and intubation for stabilization.
- Studies have demonstrated that although about half of 24wk GA infants can be stabilized on CPAP in the delivery room, very few infants of <24wks avoided delivery room intubation.
- If a baby is intubated, early use of surfactant may be beneficial.

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4. Oxygen use

Oxygen use strategies :

- Avoid hypo / hyper –oxia during resuscitation of a preterm newborn is critical.
- Oxygen toxicity can cause morbidities like ROP, BPD, IVH, etc.
- Blended oxygen is advocated for neonatal resuscitation.
- No specific starting concentration recommendation is made for preterm babies, but ranges between 21 – 40 % is generally used.
- The optimal starting concentration of O2 for preterm resuscitation is an active area of current research.

Oxygen use strategies :

- Pulseoximetry must be available at every delivery of a periviable neonate.
- The pulseoximeter sensor is placed on the Right hand / wrist and subsequently connected to the monitor for the quickest and most accurate signal.
- Optimal goal saturations per minute of life have not been determined for ELBW or periviable neona
- The current recommendation is to use the interquartile range of oxygen saturations of healthy term infants as the goal.

Targeted Preductal SpO_2 After Birth	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

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5. Caution

Cardiac compression and medication use strategies :

- For ELBW babies, compressions and medications are prognostic markers for adverse neurodevelopmental outcomes.

- ELBW babies who receive CC and medications in the delivery room and have a 15 min APGAR score <2 have only a 14% chance of disability free survival.

- Given the high rates of poor outcomes, families may decide in counselling before birth that they prefer to forego trials of CC and medications if initial ventilator support fails to stabilize heart rate of their periviable neonates.

Take Away Message ....!!

- A standardized approach, using the best possible evidence should be used.
- Temperature control is the most important factor in the first Golden hour
- For an otherwise uncomplicated preterm birth, delaying cord clamping for 30 – 180 sec following delivery is advocated.

Take Away Message ....!!

- Strong communication
- Teamwork
- Medical knowledge
- Clinical skills are essential

Important goal is to provide least invasive support needed while always being prepared for the worst....!!!

Thank You...!!!