Dr. Sanjay Aher,
DM Neonatology,
Fellowship in Neonatal Perinatal Medicine, Toronto, Canada
Neonatal Intensivest, Neocare Hospital, Nasik, Maharashtra

Neonatologist
Special Interests: Neonatal Ventilation, Neonatal Anemia and Management of Extreme Preterms
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
In this way, the first hour of neonatal life parallels the concepts upon which is based the:

GOLDEN HOUR OF TRAUMA

Corner Stones of Golden Hour Bundle

• Thermoregulation
• Cardiovascular stability
• Respiratory support
• Nutritional 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 patient's 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.
The promise of the golden hour in neonatal care lies not only in evidence based treatment, but also in team structure, communication and proficiency.
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.

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.
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


<table>
<thead>
<tr>
<th>NPIP:</th>
<th>RN:</th>
<th>RT/2nd RN:</th>
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<tr>
<th>Baby MRN:</th>
<th>Gestational age:</th>
<th>Birth Time:</th>
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**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: [ ] yes | [ ] no**
- Plastic barrier & one hat applied [ ] at __________ a.m./p.m.
- Inspiratory hold of __________ cm PIP X S seconds given: [ ] yes | [ ] no
- Started on mask CPAP with __________ cm H2O pressure at __________ a.m./p.m.
- Adjusted to __________ cm H2O pressure at __________ a.m./p.m.
- PPV given: [ ] yes | [ ] no
- What settings?

**Oxygen initialized with initial setting of % @ __________ minutes of age for sats:**
- 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 at __________ cm at lip**
- Surfactant given: [ ] yes | [ ] no @ __________ minutes of age, Dose: __________
- Extubated at __________ minutes of age to __________ (resp support needed; i.e., 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; i.e., 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 team improve upon?
- What follow-up if any is needed?
Golden Hour Checklist

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.

QUESTIONS:

What did team do well?

What can the team improve upon?
Golden Hour Checklist

TRANSFER:
Transferred to the NICU on (PnP/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

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.
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.
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 polyethylene plastic cap or woolen cap.

- Monitoring the infants temperature in the delivery room to guide further interventions and to prevent iatrogenic hyperthermia.
Some steps specific to prematurity ..... 

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Some steps specific to prematurity

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2. Delayed cord clamping
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:

<table>
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<tr>
<th>Sustained Inflation</th>
<th>CPAP use</th>
<th>Intubation</th>
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| • Small clinical trials suggest that sustained initial inflations (10-20s) may reduce the need for intubation and BPD development. | • 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. | • 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 neonates.

- The current recommendation is to use the interquartile range of oxygen saturations of healthy term infants as the goal.

<table>
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<tr>
<th>Targeted Preductal SpO₂ After Birth</th>
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<td>1 min</td>
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<td>2 min</td>
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<td>4 min</td>
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<td>5 min</td>
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<td>10 min</td>
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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.
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....!!!
Birth Weight 550 gm

After 3 years

Thank You...!!!