

“The Golden hour”

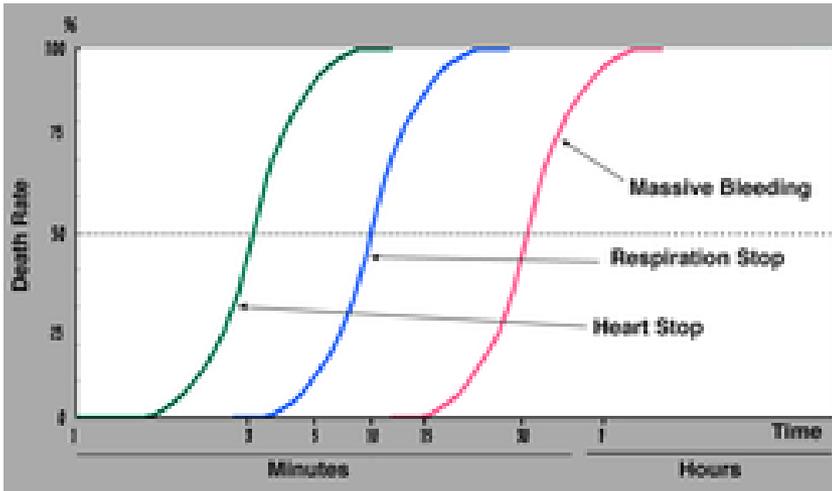
Giving the ‘high risk neonates’ the best possible start

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'Golden hour' concept: borrowed from trauma care



R Adams Cowley (1917-1991)
Father of Trauma Medicine

The concept of “golden hour” in context to neonates

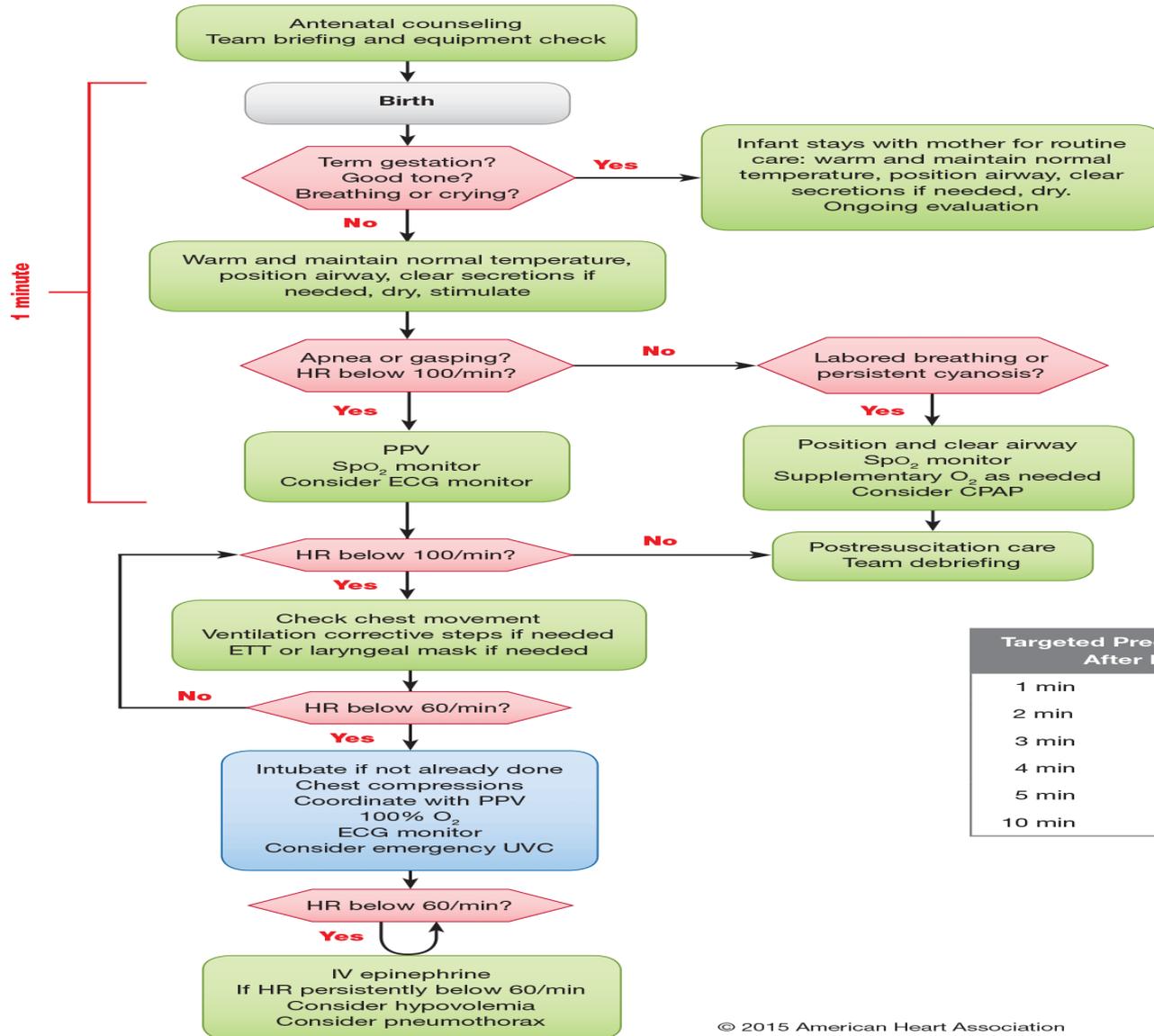
The first hour of life for a neonate represents a time period during which the infant faces challenges that carry the risks of short and long term injury, lifelong developmental delay or even death.

Concept of GOLDEN MINUTE

Used in context of neonatal resuscitation

Resuscitation when needed provided maximum benefit in the first minute- the golden minute.

Neonatal Resuscitation Algorithm – 2015 Update



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%

Don't forget..... HISTORY!!!!

- This allows one to better serve the resuscitative needs of the neonate.
- Performing a risk assessment by evaluating maternal and fetal risk factors is important.
- Review of medical history including medications, may reveal other medical conditions (e.g. gestational diabetes, preeclampsia, etc.).
- Once the need for resuscitation is recognized, easy access to equipment, medication and supplies can result in a successful resuscitative effort.

Don't forget..... HISTORY!!!!

- Antenatal scans suggesting of polyhydramnios and oligohydramnios can be important pointers towards congenital malformations.
- AEDF and REDF can guide neonatologist to be well prepared with resuscitation team.

Objectives

- Components
- Evidence
- Are we doing it?

Components

1. Team approach
2. Prevent hypothermia
3. Effective but gentle resuscitation
4. Delay the clamping of cord
5. Transport and stabilization in NICU
6. Optimum respiratory support
7. Prevent iatrogeneses
8. Communication with family

1. Team approach

- Working with Others: **Working Together!**
- Effective communication with OB/anesthesia teams
- Standardize as many things:
 - Protocols
 - Checklists
 - Skills development- simulation
- Know 'how' and 'why' of 'what to do'

2. Prevent hypothermia

- LR temp around 25-27°C
- Radiant warmer- switched on beforehand.
- Everything that comes in contact should be pre-warmed.
- The temperature of the non asphyxiated infants should be maintained between 36.5-37.2°C.

Prevent hypothermia

- For infants less than 32 weeks use:
 - Radiant warmers and plastic wrap with a cap.
 - Increased room temperature.
 - Thermal mattress.
 - Warmed humidified resuscitation gases.

Prevent hypothermia

Maintaining normothermia in resource limited settings:-

- Covering of newborn in a clean food grade plastic bag up to the level of the neck and swaddle them after drying.
- Skin to skin contact or kangaroo mother care.

Nimbalkar SM, Patel VK, Patel DV, Nimbalkar AS, Sethi A, Phatak A. Effect of early skin-to-skin contact following normal delivery on incidence of hypothermia in neonates more than 1800 g: randomized control trial. J Perinatol. 2014;34:364-8

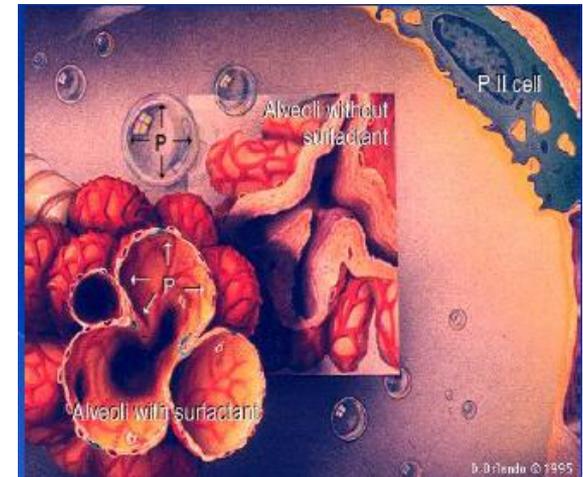
Therapeutic hypothermia

- Recommended now even in resource limited settings.
- Newer phase change material based devices are available and evidence regarding its use is increasing.

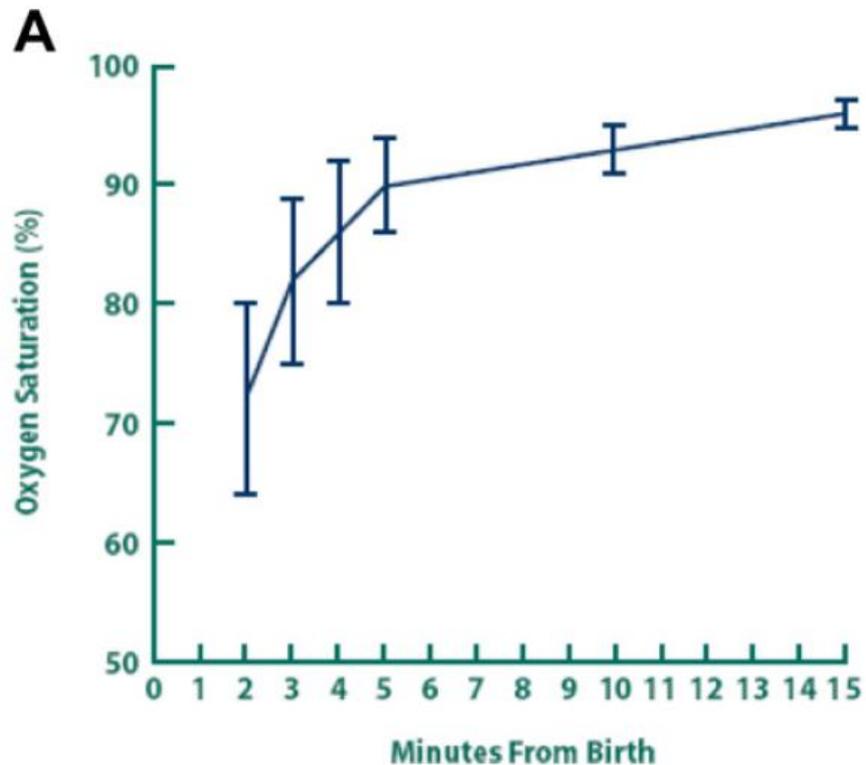
Thomas N, Chakrapani Y, Rebekah G, Kareti K, Devasahayam S. Phase changing material: an alternative method for cooling babies with hypoxic ischaemic encephalopathy. Neonatology. 2015;107:266-70.

3. Effective but gentle resuscitation

- Algorithm based approach, defined roles, effective communication
- Effective ventilation is the key
 - Appropriate rate and volume
 - Increase in HR, discernible rise in chest
 - Use of T-piece in VLBW babies: better control of TV



Oxygen level after birth



B

Target Pre-ductal 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%

Oxygenation after birth

- Room air for term neonates
- Begin with 21 -30 % in newborns < 35 weeks.
- Attach pulse oxymeter: Titrate according to pre-ductal oxygen saturation.

Delay the clamping of cord

Box 1

Reported benefits of delayed cord clamping: term infants

- Higher hemoglobin at 4–12 months of age
- Improved serum ferritin during the first year
- Improved total body iron stores at 1 year of age
- Improved survival from malaria in endemic regions
- Lower circulating lead levels in regions with high air pollution
 - Competitive effect between iron and lead

Box 2

Reported benefits from delayed cord clamping: preterm infants

- Higher circulating blood volume for 24–48 hours
- Fewer blood transfusions
- Better systemic blood pressure
- Reduced need for inotropic support
- Increased blood flow in the superior vena cava
- Increased left ventricular output
- Higher cerebral oxygenation index
- Lower frequency of any intracranial hemorrhage
 - No difference in rates of severe intraventricular hemorrhage

Delay the clamping of umbilical cord in babies not requiring resuscitation

AHA 2015 Recommendations

- Delayed cord clamping for > 30 seconds.
- No recommendations for infants resuscitated at birth.
- Cord milking- Routine use is not recommended.

ORIGINAL ARTICLE

Comparison of three types of intervention to enhance placental redistribution in term newborns: randomized control trial

AK Yadav¹, A Upadhyay¹, S Gothwal², K Dubey³, U Mandal¹ and CP Yadav⁴

- Three hundred eligible neonates were randomly allocated to three parallel group-

Group 1- UCM Group 2- DCC Group 3- DCM

- Primary outcome- hemoglobin and serum ferritin at 6 weeks of age.

ORIGINAL ARTICLE

Comparison of three types of intervention to enhance placental redistribution in term newborns: randomized control trial

AK Yadav¹, A Upadhyay¹, S Gothwal², K Dubey³, U Mandal¹ and CP Yadav⁴

- The study concluded that combining UCM with DCC results in better iron stores at 6 weeks when compared to either interventions alone.

5. Transport and stabilization in NICU

Transport

- Follow best principles

Stabilization in NICU

- Keep the bed ready
- Optimize respiratory support
- Insert lines
- Provide source of energy
- Nutrition- enteral or parenteral

6. Optimum respiratory support

- Early CPAP for preterm babies
 - Maintains FRC
 - Preserves surfactant
- Selective (natural) early surfactant and InSurE

CPAP and surfactant for ELBW babies

Evidence based strategies for optimal respiratory support to the preterms

Sustained inflation	CPAP use	Intubation
<ul style="list-style-type: none">➤ Routine application of sustained inflation > 5 seconds is not recommended.	<ul style="list-style-type: none">➤ Early CPAP is preferred than routine intubation.	<ul style="list-style-type: none">➤ Routine intubation not preferred.➤ Along with PPV use approximately 5cm H₂O PEEP.➤ Ventilate at a rate of about 40- 60 breaths per minute.

Delivery room CPAP

- CPAP should be started from birth in all babies at risk of RDS, such as those < 30 weeks' gestation who do not need intubation for stabilisation.
- CPAP with early rescue surfactant- optimal management for babies with RDS.

Delivery room surfactant

- Early surfactant administration is preferred and in those who require intubation for stabilisation may be given surfactant in the delivery room.
- Baby with RDS should be given rescue surfactant early in the course of the disease.
- Preferred for ≤ 26 weeks' gestation when fiO_2 requirements > 0.30 and babies > 26 weeks' when FiO_2 requirements > 0.40 .



**World Health
Organization**

Early versus delayed selective surfactant treatment for neonatal respiratory distress syndrome

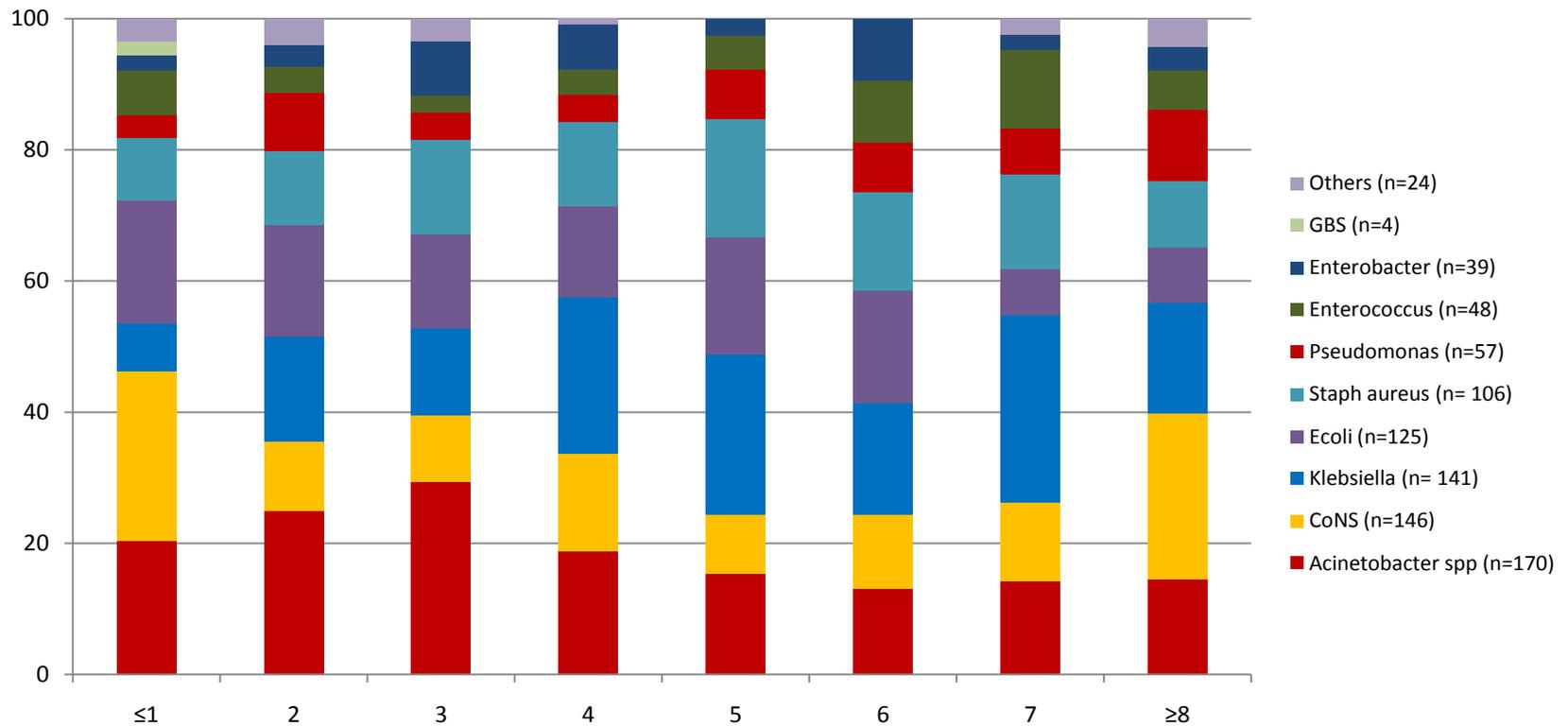
In preterm infants who are intubated for RDS or HMD, administration of surfactant within the first two hours of life, compared with those who are given surfactant beyond two hours of life, results in a reduction in:

- Pneumothoraces by 30% [relative risk (RR) 0.70; 95% confidence interval (CI) 0.59–0.82];
- Pulmonary interstitial emphysema by 37% (RR 0.63; 95% CI 0.43–0.93);
- Neonatal mortality rate by 13% (RR 0.87; 95% CI 0.77–0.99);
- Chronic lung disease by 30% (RR 0.77; 95% CI 0.55–0.88) and combined outcome of death or chronic lung disease by 16% (RR 0.84; 95% CI 0.75–0.93).

Prevent iatrogeneses

- Transmission of infection
- Physical injury
- Medication errors
- Acute lung injury
- IVH, PPHN

Prevent iatrogeneses



Decreasing brain injury

- Gentle handling
- Avoid trendelenburg position
- Avoid high airway pressures
- Adjust ventilation gradually based on physical examination, oximetry and blood gases.
- Avoid rapid fluid iv boluses and hypertonic solutions.

Cardiac compression strategies..

- Give 100 % oxygen with chest compressions
- Routine use of End tidal carbon dioxide monitors or pulse oximeters for detection of return of spontaneous circulation is not recommended.

Communication with family

- Before birth
- After birth- gender, condition, what has been done, what is planned to be done
- Allow the family to see the baby
- Involve in decision making
- Create a trusting environment wherein family feels that the baby is in safe hands
- Assess social and economic burden- try to help as much

Implementation and Evaluation of “Golden Hour” Practices in Infants Younger Than 33 Weeks' Gestation

Brenda Wallingford, DNP, APRN-NP, NNP-BC,¹ Lori Rubarth, PhD, APRN-NP, NNP-BC,
Amy Abbott, PhD, RN, and Linda J. Miers, DSN, RN, APRN-CNS

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.

QUESTIONS:

What did team do well?

What can the team improve upon?

Implementation and Evaluation of “Golden Hour” Practices in Infants Younger Than 33 Weeks' Gestation

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TRANSFER :

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

What follow-up if any is needed?

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

Take home message

- Strong communication
- Team work
- Evidence based best practical strategy
- Good clinical skills

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.

Thank you

Questions ???