



# Perinatal Resuscitation in Developing EMS setting- Lebanon

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# Objectives

- Describe challenges of perinatal resuscitation in developing EMS settings
- Present neonatal outcomes in Lebanon
- Highlight key treatment interventions during perinatal resuscitation



# Developing EMS settings

- Limited resources
- Limited training
- Lack of advanced technology
- Issues with command, coordination and communication
- Issues related to receiving facilities



# Neonatal Outcomes

- *Birth asphyxia*
  - *The failure to initiate and sustain breathing at birth*
  - One quarter of all neonatal deaths
  - 1ry and 2nry apnea





# Long Term Outcomes

- Mortality
- Severe morbidity
  - Hypoxic ischemic encephalopathy
  - Meconium aspiration syndrome
  - Pulmonary air leaks including pneumothorax
  - Intraventricular hemorrhage
  - Severe anemia
  - Admission to neonatal intensive care unit
  - Severe hyperbilirubinemia and cerebral palsy



# EMS System In Lebanon

- Fragmented, with no lead agency
- Volunteer based with multiple agencies
- Absence of EMS plan and EMS law
- Lack of prehospital standards
  - Education, credentialing, scope of practice
  - Response time
- Lack of
  - Medical oversight
  - Hospital categorization



# Prehospital Care in Lebanon

- Not reimbursed
- Emergency responses
  - Transport > Treatment
  - BLS level of care
- Interfacility transports:
  - Most at BLS level
  - For ALS/Critical: Random teams including physicians



# EMS Utilization Lebanon

- Lebanese Red Cross:
  - > 130,000 emergency calls
  - > 70,000 transports per year
  
- Civil defense:
  - >35,000 patient transports per year







# EMS Utilization Lebanon

- American University of Beirut Medical Center:
  - Largest tertiary care center in Lebanon
  - 56,000 ED visits yearly
  - **ONLY 6% of patients arrive by EMS**





# Health Expenditure Per Capita (current US\$)





# Neonatal Outcomes In Lebanon

- Most patients use private care for transport
- Outcomes mainly reflective of ED/Hospital phases of care
- Prehospital phase excluded



# Mortality Rate, Neonatal (per 1000 live births)





# Perinatal Resuscitation EMS

- Structure:
  - System of care in place
  - Personnel, resources, equipment
- Care delivery
  - Mostly BLS
  - 6% require advanced resuscitation
    - Preterm and low birth weight



# Patient Care Goals

- Routine newborn care
- Neonatal assessment
- Infants requiring resuscitative efforts
- Interventions for infants in distress
- Additional resources based on patient condition and/or environmental factors



# Usual Care for Neonates

- Facilitate delivery
  - Scene control, positioning, PPE and clean supplies
- Drying, warming, positioning, suction, tactile stimulation
- APGAR score assessment (1, 5 min)
- Clamp and cut umbilical cord



# Usual Care for Mother

- Deliver placenta
  - Should not delay transport
- Control vaginal bleeding
- Comfort
- Skin to skin with newborn





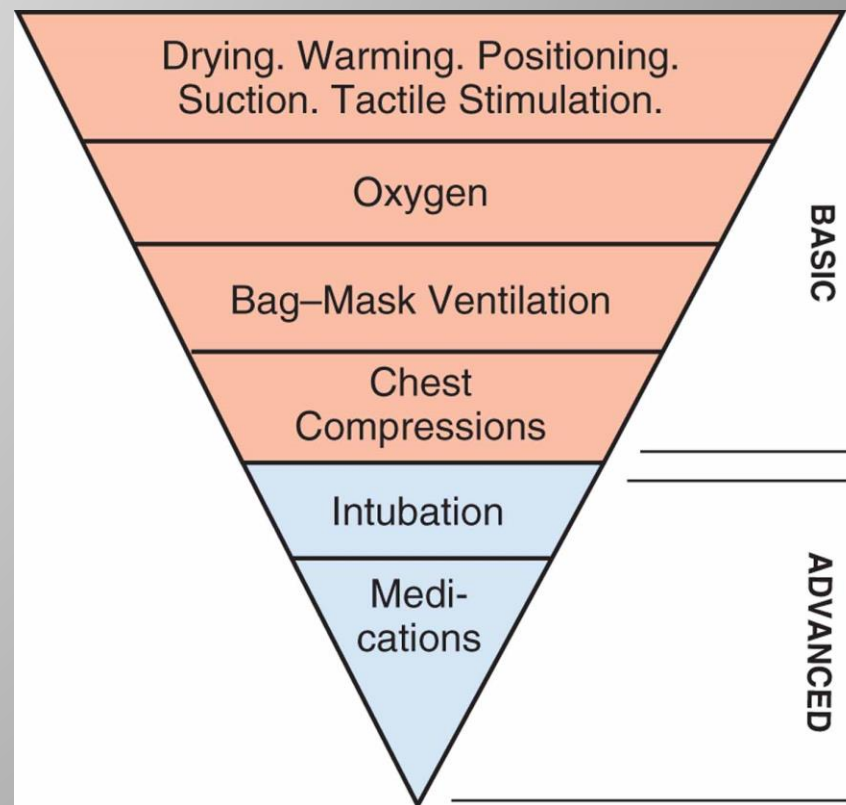
# Complicated Deliveries

- Breech presentation
- Limb presentation
- Prolapsed umbilical cord
- Multiple births
- Premature birth
- Bleeding
- Meconium



# Advanced Resuscitation

- Complicated deliveries
- Neonate related issues
  - Low APGAR Score
  - Color (central cyanosis)
  - Respiration effort, heart rate, muscle tone
  - Hypothermia
  - Hypoglycemia





# Advanced Resuscitation

## Decisions based on Heart Rate



### **HR >100**

- Central Cyanosis? → Blow by Oxygen
- Resp Distress → BVM ventilation Room Air
- Endotracheal intubation?

### **HR <100**

- BVM ventilation Room Air (40-60)
- if No improvement after 90 sec, 30 % to 100% FiO<sub>2</sub>
- Endotracheal intubation?



# Advanced Resuscitation

## Decisions based on Heart Rate



### HR <60

- BVM ventilation supplemental Oxygen
- Chest compressions with positive pressure ventilation
  - 3:1 ratio (90 compressions and 30 breaths per minute)
- Endotracheal intubation?



# Special Considerations

- 10% of newly born infants require some assistance to begin breathing
- Maternal bleeding → infant at risk of hypovolemia
- Low birth weight → ↑ hypothermia
- Oxygen saturation goal of 85-95%
- Effective resuscitative efforts → ↑ in heart rate



# Neonatal Transport

- NICU level of care needs
- Transport environment an extension of NICU
- To appropriate facilities (NICU, specialized services)
- Lebanon:
  - Local ambulances and EMS providers
  - NICU team (RN, Physician, Inhalation therapist)
  - Transport equipment (incubator, pumps etc)





# Summary Neonatal Resuscitation

- Treatment is mostly basic care
- Resuscitation interventions based on HR and respiratory effort
- Advanced resuscitation requires specialty care level
- Transport to appropriate facility most important in developing EMS settings



# Questions?



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