Initial Clinical Assessment of Pediatric Patients

EMC 420: Maternal & Child Emergency Care

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Objectives

Upon completion of this lecture you should be able to:

- Discuss the three components of the PAT used in rapid "across the room" assessment of pediatric patients.
- Assess pediatric-specific features of initial assessment.
- Integrate findings to form a general impression.
- Describe the focused history and PE.

Rapid Assessment

- Rapid, "across the room," assessment of pediatric patients utilizes the Pediatric Assessment Triangle (PAT)
- PAT components are "heart, lungs, brain"
  - Pediatric texts refer to these as: "Circulation, Breathing, Appearance"
- Similar to the adult quick, across the room," assessment: Skin, Work of Breathing, Level of Consciousness

Pediatric Assessment Triangle

Breathing

Appearance

Circulation

Appearance

- LOC
  - Brain / CNS
    - O2 and perfusion
- **T** one
- **I** nteractiveness
- **C** onsolability
- **L** ook / Gaze
- **S** peech / Cry

Work of Breathing

- Abnormal airway sounds
- Nasal flaring
- Abnormal positioning
- Head bobbing
- Retractions

Circulation to Skin

Visual clues:

- Pallor
- Mottling
- Cyanosis
- Early and late shock
- Respiratory failure

Evaluate this Case

- As you approach the family's front porch, where the parents are waiting for you, you and your partner notice an infant with a seal-like barking cough.
- The parents report to you that their daughter is a 6 month old who has had cough and difficulty breathing.
- She has had a congested nose for 2 days, and she has felt "warm to the touch" (parents have not taken the temperature).
- Past history is unremarkable.

Your Initial PAT Impressions

Pick one of the following:

- 1. Stable: All three arms of the PAT are normal
- 2. Respiratory Distress: increased WOB, but circulation to the skin and appearance is normal
- 3. Respiratory Failure: increased WOB, and evidence of poor tissue oxygenation of the skin, or brain
- 4. Shock: Circulation is abnormal. There is "effortless tachypnea," and CNS/ appearance is normal
- 5. Isolated CNS dysfunction: appearance is abnormal, but circulation and work of breathing are normal
- 6. Cardiopulmonary Failure/Arrest: Cardiopulmonary failure/arrest : all three components are abnormal

Pediatric Assessment Triangle

Appearance
normal

Breathing
abnormal

Circulation
normal

Case 1 : General Impression

- Stable
- ***Respiratory distress***
- Respiratory failure
- Shock
- Central nervous system dysfunction
- Cardiopulmonary failure/arrest

Case 2: 5 mo. Old Male With Difficulty Breathing

- As you and your partner enter the house, you notice an infant who is lethargic, staring, has poor muscle tone, has obvious, marked, rapid retractions. There is circumoral cyanosis. The infant seems to be tiring.
- Past history [obtained after your initial interventions]:
  - Premature birth
  - He was in the hospital for 12 days; and
  - He was "on the breathing machine for 3 days"

Questions

What's your initial impression?

How will your impression guide your management?

Case 2 PAT Impressions

1. Stable ?
2. Respiratory Distress ?
3. Respiratory Failure: increased WOB, and evidence of poor tissue oxygenation of the skin, or brain
4. Shock: Circulation is abnormal, with "effortless tachypnea of shock," and with abnormal CNS ?
5. Isolated CNS dysfunction: appearance is the only abnormality
6. Impending Cardiopulmonary Arrest ?

Pediatric Assessment Triangle

Appearance
ABNORMAL

Breathing
ABNORMAL

Circulation
ABNORMAL

Case 2 : PAT Impression

- Stable
- Respiratory distress
- ***Respiratory failure***
- Shock
- Central nervous system dysfunction
- Cardiopulmonary failure/arrest

Approach / Case Progression

- Impression: Respiratory failure and/or cardiopulmonary failure
- Immediate priorities:
  - oxygenation and ventilation:
    - Support with BVM;
    - Prepare for endotracheal intubation.
  - Assess cardiac function, vascular access
  - Reassess after each intervention

Case Study 3: Vomiting and Diarrhea

- 11-month-old girl with one and a half days of vomiting, diarrhea
- Diarrhea has very watery; mother thinks that she noticed some blood
- Infant seems "weak" and has a poor suck. And attempts to feed the infant Gatoraide have only resulted in more diarrhea
- Called 911 when infant became "cool, limp and refused to drink anything"

Pediatric Assessment Triangle

Appearance
ABNORMAL

Breathing
normal (fast; no retractions)

Circulation
ABNORMAL

Case 3 Management

- Initial impression: ***Shock***
- Management
  - High flow oxygen by mask
  - Immediate IV access
  - Administer volume-expanding crystalloid (NS) in 20 mL/kg* increments
  - Continuous reassessment and complete exam

* 20 mL/kg for an 11 mo old;
10 mL/kg for a newborn

Case 4: "Minor Fall"

- 5-month-old male whose father called 911 after "the baby fell from the bed" onto carpeted floor of the trailer
- Father states infant "has been acting too sleepy." He became worried when there was no improvement in the sleepiness during the past four hr.s

Case 4 Physical Exam

- 5-month-old who appears lethargic; does not respond to you or anything in his environment
- RR: 28; non labored
- HR: 92; full
- BP: 96/- mmHg
- HEENT: no signs of trauma
- EXTR: red marks on the upper arms

Pediatric Assessment Triangle

Appearance
ABNORMAL
Lethargic, poorly responsive to environment

Breathing
normal

Circulation
normal

Case 4 Management

- General impression: Primary CNS Disorder
  - Structural , or
  - Metabolic dysfunction
- Management:
  - A/B: High flow O2, closely monitor ventilation
  - IV access, blood draw (obtain blood for glucose and other studies)
  - Rapid glucose screen
  - Transfer to a center with CT capabilities

Initial Assessment

- **A :** Gurgling upper airway sounds
- **B :** Irregular respirations
- **C :** Infant is pale.
- **D :** Responds to painful stimuli. Pupils equal
- **E :** Signs of trauma

- *What are your management priorities?*

Further Management

- Consider RSI, secure airway (with premedication to blunt increase in intracranial pressure)
- 100% oxygen
- Monitor end tidal CO_2 and oxygen saturation
- IV volume-expanding fluids as needed
- This infant will need a head CT and neurosurgical consultation

General Impression and Initial Stabilization

- Pediatric Assessment Triangle
  - An instant evaluation of overall physiologic status
  - Are there pediatric differences in the assessment of ABCDEs ?

Airway

- Manual airway opening maneuvers: Head tilt-chin lift, jaw thrust
- Suction: Can result in dramatic improvement in infants
- Age-specific obstructed airway support:
  - <1 year: Back blow/chest thrust
  - >1 year: Abdominal thrust
- Advanced airway techniques

Breathing: Respiratory Rate
[PEPP, PALS, APLS]

Age	Respiratory Rate
Infant	30 to ***60***
Toddler	24 to 40
Preschooler	22 to 34
School-aged child	18 to ***30***
Adolescent	12 to 16

Either slow or fast respirations are worrisome

Pediatric and Adult RR "Ballpark" Mnemonic

- Infant : < ***60***
- Preschooler : < 50
- Preteen : < 40
- Adult : < 30

Breathing: Auscultation

- Listen with stethoscope over midaxillary line
- Stridor: Upper airway obstruction
- Wheezing: Lower airway obstruction
- Grunting: Poor oxygenation;
  - pneumonia, drowning, pulmonary contusion
- Crackles: Fluid, mucus, blood in airway
- Decreased/absent breath sounds: Obstruction

Circulation: Heart Rate

Age	Normal Heart Rate
Infant	100 to ***160***
Toddler	90 to 150
Preschooler	80 to ***140***
School-aged child	70 to ***120***
Adolescent	60 to ***100***

Circulation

- Pulse quality: Palpate central and peripheral pulses
- Skin temperature: "Reverse thermometer sign of advancing shock" (APLS) [epi functions like a chemical tourniquet]
- Capillary refill
- Blood pressure:
  - Normal BP = 80 + (2 X age in years)
  - Minimum BP = 70 + (2 X age in years)

Disability

- Quick neurologic exam
- AVPU scale:
  - Alert
  - Verbal: Responds to verbal commands
  - Painful: Responds to painful stimulus
  - Unresponsive
- Brainstem function : quickly screened by pupillary responses to light
- If the infant/child is responsive, check for symmetry of movement of all four extremities and for any abnormal posturing or motor movements.

Exposure

- Proper exposure necessary to:
  - Identify anatomic abnormalities
  - Evaluate physiologic function and minimize heat loss
- Maintain warm ambient environment and minimize heat loss (cold-stressing will increase metabolic stress in an already unstable patient)
  - Monitor temperature
  - Warm IV fluids

The PAT at Various Ages Developmental Issues

What does a normal PAT look like in:

- 2-week-old?
- 2-month-old?

What does an abnormal PAT look like in:

- 2-week-old?
- 2-month-old?

Normal 2 wk old Infant PAT

Appearance
Eyes open, moves arms and legs, strong cry

Breathing
Abdomen rises and falls with each breath

Circulation
Face and trunk normal; hands and feet blue; cutis marmorata in cool ambient environment

PAT in a 2 wk old in <u>SHOCK</u>

Appearance
Irritable, alternating irritability/lethargy, lethargy, unresponsive

Breathing
See-saw movements of abdomen and chest; retractions, nasal flaring

Circulation
Pallor, true mottling
(patches of pallor and cyanosis or erythema)

Normal Assessment: Less Than 2 Months Old

- Consoled when held, gently rocked
- Brief awake periods
- Little or no eye contact
- No "social smile"
- Does not recognize parents vs. strangers
  - No stranger-anxiety

Normal Assessment : 2-6 Months Old

- Social smile
- Recognizes caregivers
- Tracks light, faces
- Strong cry, increasing vocalization
- Rolls over, sits with support
- When possible, do much of the exam in caretaker's lap/arms.

Summary

Usefulness of the PAT approach:

- Rapid PAT followed by ABCDEs,
- Allows us to form a general impression
  - That will guide treatment priorities
- Allows us to begin early recognition and intervention for respiratory failure and shock
- And then finally, focused history and detailed PE
- And then "trending":
  - Ongoing, repeated assessment throughout transport

Pediatric Assessment Triangle

Appearance
ABNORMAL

Breathing
ABNORMAL

Circulation
ABNORMAL