Pediatric Office Emergencies

Seth Brown, MD, MSc, FAAP

Objectives

• Discuss deficiencies of pediatric office preparedness for emergencies
• Review the available recommendations for pediatric emergency preparedness in the outpatient office setting
• Discuss common pediatric emergency cases that you will see in your practice
Disclosures

• I have no financial disclosures or conflicts of interest

You can run, but you can’t hide

AVERAGE OF 2.1 PATIENTS REQUIRE EMERGENCY TREATMENT DURING AN AVERAGE WEEK.

Most frequently:

1. Asthma
2. Respiratory distress
3. Dehydration

From AAP®

Why are we suboptimally prepared?

- Some providers believe that emergencies are uncommon
- Some providers use EMS and proximity to the hospital as a crutch
- Some providers feel that having emergency equipment and medications on site increase their liability in an emergency
- Some cite prohibitive costs of maintaining the necessary equipment and medication


STAFF REQUIRED TO BE CPR CERTIFIED

- 25% of offices require secretaries/receptionists
- 31% of offices require office managers
- 77% of offices require nurses
- 89% of offices require physicians

EMERGENCY PREPAREDNESS OF OFFICE STAFF

32% of office-based pediatricians require their staff to participate in periodic mock drills of emergencies.

American Academy of Pediatrics. Periodic survey #57: Emergency readiness of pediatric offices

Preparation for Emergencies in the Offices of Pediatricians and Pediatric Primary Care Providers
Committee on Pediatric Emergency Medicine
_Pediatrics_ 2007;120;200
DOI: 10.1542/peds.2007-1109
In case you missed it, it made the news!

- "The best way to check readiness for a pediatric emergency is to pretend you have one"
- Lack of preparation can have a tragic outcome
- Children continue to be taken to primary care offices in an emergency
- Necessary skills: 1) Basic airway management, 2) Initiate treatment of shock
- Key recommendations were stressed and resources to help offices prepare were reviewed
• “The first step in addressing this issue is ensuring that pediatricians are aware of AAP recommendations and the supporting materials provided”
• “The PEM network will be designing a program to pair outpatient pediatricians with local pediatric emergency physicians to help reach their preparedness goals”

Pendleton AL, Stevenson MD.

@Author information

Abstract

OBJECTIVE: To determine outpatient pediatricians’ self-reported experience with and preparation for patient emergencies, and their awareness of the American Academy of Pediatrics (AAP) policy statement on outpatient emergency preparedness.

METHODS: A 34-question cross-sectional survey of outpatient pediatric faculty and faculty from the sole medical school in a metropolitan area was used to assess demographic information, training, and equipment for patient emergencies and familiarity with the AAP policy.

RESULTS: Of the 57 responses from 123 surveyed physicians (46% response rate), 23% worked in academics and 70% in private practice. At least 1 emergency per month was reported by 39%; 75% referred a patient to the emergency department or hospital at least monthly. Current Pediatric Advanced Life Support (PALS) certification was maintained by 21%, and 42% had current Basic Life Support (BLS). The majority (79%) agreed that respiratory emergencies were the most common. Almost all had bag-valve-mask (96%) in the office; however, only 65% had oropharyngeal airways. All reported feeling comfortable performing bag-valve mask ventilation, but only 68% reported the same comfort level with oropharyngeal airways. About half (44%) had intubation equipment, and about half (47%) had automated external defibrillators. Only 25% performed mock emergencies. About half of pediatricians (53%) reported awareness of the 2007 AAP policy guideline, and one quarter (23%) thought their office met guideline recommendations.

CONCLUSIONS: Although emergencies occur frequently in general pediatric offices, pediatricians may not have adequate emergency equipment and training. Variable preparedness reflects the need for greater awareness of and compliance with the AAP policy.

Frequency of Pediatric Emergencies in Ambulatory Practices.


@Author information

Abstract

BACKGROUND: Management of pediatric emergencies is challenging for ambulatory providers because these rare events require preparation and planning tailored to the expected emergencies. The current recommendations for pediatric emergencies in ambulatory settings are based on 20-year-old survey data. We aimed to objectively identify the frequency and etiology of pediatric emergencies in ambulatory practices.

METHODS: We examined pediatric emergency medical services (EMS) runs originating from ambulatory practices in the greater Indianapolis metropolitan area between January 1, 2012, and December 31, 2014. Probabilistic matching of pickup location addresses and practice location data from the Indiana Professional Licensing Agency were used to identify EMS runs from ambulatory settings. A manual review of EMS records was conducted to validate the matching, categorize illnesses types, and categorize interventions performed by EMS. Demographic data related to both patients who required treatment and practices where these events occurred were also described.

RESULTS: Of the 38,841 pediatric EMS transports that occurred during the 3-year period, 332 (0.85%) originated from ambulatory practices at a rate of 42 per 100,000 children per year. The most common illness types were respiratory distress, psychiatric and/or behavioral emergencies, and seizures. Supplemental oxygen and albuterol were the most common intervention, with few critical care level interventions. Community measures of low socioeconomic status were associated with increased number of pediatric emergencies in ambulatory settings.

CONCLUSIONS: Pediatric emergencies in ambulatory settings are most likely due to respiratory distress, psychiatric and/or behavioral emergencies, or seizures. They usually require only basic interventions. EMS data are a valuable tool for identifying emergencies in ambulatory settings when validated with external data.

Copyright © 2016 by the American Academy of Pediatrics.
What Michelle found......

- Almost 40% of pediatricians handled at least 1 emergency/month
- 75% had referred a patient to the ED or hospital in the last month
- Only 21% of pediatricians were PALS certified
- 42% had BLS certification
- 53% reported awareness of the 2007 AAP policy guideline
- 23% thought their office met guideline requirements
- CONCLUSION: “Although emergencies occur frequently in general pediatric offices, pediatricians may not have adequate emergency equipment and training. Variable preparedness reflects the need for greater awareness of and compliance with the AAP policy

Recommendations

- 1) Perform a self-assessment of office readiness for emergencies based on a review of experiences of common emergent, urgent, and acute conditions treated in the office, including events involving children with special care needs.
- 2) Develop an organizational plan for emergency response in the office
  - Members MUST understand their roles/responsibilities in advance
  - Think about response when the office is not fully staffed
- 3) Maintain recommended emergency equipment
Top self assessment questions

- What emergencies have you experienced in the past?
- What is your office setting? Urban? Rural? Who can you call for backup?
- What are the high and low staffing points during the office hours? How about nights? Weekends?
- Have nonclinical staff been trained to recognize a potential or actual emergency?
- For parents, have you discussed recognition and response to emergencies during your routine anticipatory guidance?

Top self assessment questions

- Is your waiting room under direct observation or screened frequently by a clinical staff member?
- Is your waiting room childproofed?
- Does your practice have a written protocol for responding to an office emergency? Does that protocol cover times of low staffing?
- Do ALL staff members know how to access the EMS system?
- How far is your practice to the nearest ED?
- Is your practice easily found and accessible by EMS?
Top self assessment questions

- What is a typical EMS response time?
- What level of provider responds if you call 911? Do YOU know the difference in your state’s levels of prehospital training?
- Do ALL clinical staff members know where the oxygen is kept?
- Do YOU know how to turn on an oxygen tank using the key?
- What emergency dosing strategy do you use in the office?
- How do you document events during an office emergency?
- How do you and your staff maintain skills?
- What is your risk management company’s policy regarding emergency preparedness of your office?

Airway Management

<table>
<thead>
<tr>
<th>ESSENTIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen-delivery system</td>
</tr>
<tr>
<td>Bag-valve-mask (450 mL and 1000 mL)</td>
</tr>
<tr>
<td>Clear oxygen masks, breather and nonbreather, with reservoirs (infant, child, adult)</td>
</tr>
<tr>
<td>Suction device, tonsil tip, bulb syringe</td>
</tr>
<tr>
<td>Nebulizer (or metered-dose inhaler with spacer/mask)</td>
</tr>
<tr>
<td>Oropharyngeal airways (sizes 00-5)</td>
</tr>
<tr>
<td>Pulse oximeter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRONGLY SUGGESTED*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasopharyngeal airways (sizes 12-30F)</td>
</tr>
<tr>
<td>Magill forceps (pediatric, adult)</td>
</tr>
<tr>
<td>Suction catheters (sizes 5-18F) and Yankauer suction tip</td>
</tr>
<tr>
<td>Nasogastric tubes (sizes 6-14F)</td>
</tr>
<tr>
<td>Laryngoscope handle (pediatric, adult) with extra batteries, bulbs</td>
</tr>
<tr>
<td>Laryngoscope blades (0-2 straight and 2-3 curved)</td>
</tr>
<tr>
<td>Endotracheal tubes (uncuffed, 2.5-5.5; cuffed, 6.0-8.0)</td>
</tr>
<tr>
<td>Stylets (pediatric, adult)</td>
</tr>
<tr>
<td>Esophageal intubation detector or end-tidal carbon dioxide detector</td>
</tr>
</tbody>
</table>
Vascular access and fluids

- IV Catheters (14-24 gauge)
- Arm boards, tape, tourniquet
- IO needles
- IV tubing

MISCELLANEOUS EQUIPMENT & SUPPLIES

**ESSENTIAL**
- Color-coded tape or preprinted drug doses
- Cardiac arrest board/backboard
- Sphygmomanometer (infant, child, adult, thigh cuffs)
- Splints, sterile dressings

**STRONGLY SUGGESTED**
- Automated external defibrillator with pediatric capabilities
- Spot glucose test
- Stiff neck collars (small/large)
- Heating source (overhead warmer/infrared lamp)
Recommendaions

4. Maintain recommended emergency medications and use a resuscitation aid or tool that provides suggested protocols with precalculated medication doses

<table>
<thead>
<tr>
<th>ESSENTIAL</th>
<th>STRONGLY SUGGESTED</th>
</tr>
</thead>
</table>
| - Albuterol for inhalation (metered-dose inhaler with spacer or mask may be substituted) | - Oxygen 
| - Oxygen | - Epinephrine (1:1000) |
| - Activated charcoal | - Epinephrine (1:10 000) |
| - Antibiotics | - Atropine sulfate (0.1 mg/mL) |
| - Anticonvulsant agents (diazepam, lorazepam) | - Naloxone (0.4 mg/mL) |
| - Corticosteroids (parenteral/oral) | - Sodium bicarbonate (4.2%) |
| - Dextrose (25%) | - Normal saline solution or lactated Ringer solution (500-mL bags) |
| - Diphenhydramine (parenteral, 50 mg/mL) | - 5% dextrose, 0.45 normal saline (500-mL bags) |

Recommendaions

5. Develop a plan to provide education and continuing medical education for all staff
   - Front-office staff must be able to recognize an emergency and initiate the response plan
   - Practice mock codes in the office on a regular basis (quarterly or biannually)
   - Educate families about what to do in an emergency
   - Partner with EMS and hospital-based emergency providers to ensure optimal emergency care and emergency/disaster readiness for children
Respiratory Distress case #1

• 6 year old African American male with known history of asthma
• Arrives for a scheduled acute care appointment, CC=“cough”
• Your nurse pulls you out of a well child check due to the child’s respiratory distress
• You find:
  • Awake, alert, but agitated
  • Only speaks in one word replies
  • Intercostal, subcostal, suprasternal retractions
  • “Very tight” – end expiratory wheezes
• Oh by the way, he was intubated last month for asthma
• T=99.9, RR 36, wont cooperate with BP, 88% on RA

Asthma exacerbation

• High flow O2 through non-rebreather initially
• Albuterol neb – do you remember the dosing if a RT isn’t around?
• Early steroids – oral or IM

• Fast forward 5 minutes later – increasingly tired and altered
• What now? EMS has not arrived
• IM epi (1:1000; now called 1mg/1ml) at anaphylaxis dosing
  • May get you out of a tight spot with an asthmatic
Asthma exacerbation

- The responding ambulance was struck in an intersection by someone who was texting and driving.....now what?
- Why are IV fluids so important in a critically ill asthmatic patient?
- We try to never intubate an asthmatic unless we are pushed to do so
- Intubation switches from negative pressure ventilation to positive pressure ventilation
- If you have poor preload, this can cause peri-intubation cardiac arrest
- SO......bolus bolus bolus (20ml/kg “push pull”)

Asthma exacerbation – in the ED

- MgSO₄ – bolus, then drip
- Ketamine and BiPAP
- Discharged home 4 days later
- STRONG WORK!
Respiratory Distress Case #2

- 2 year old male arrives for morning acute visit with chief complaint of cough
- You actually heard his cough from the next exam room down the hall – typical barking seal type of cough
- Nurse pulls you out of your current visit and said “this kid’s sick”
- As you walk in the patient’s room, you find the patient in obvious distress with inspiratory stridor at rest
- Drooling, tripod position
- Won’t cooperate with O2 sat probe
- Transmitted upper airway sounds, strong peripheral pulses

Croup

- Nebulized epinephrine
- Decadron
  - In this case, IM (since in such extremis)
  - Could do oral if distress is milder
- Avoid agitating maneuvers
- Supplemental O2 by nonrebreather or even blow-by if needed
- Always consider upper airway foreign body if stridor is acute and not preceded by URI symptoms
**But Seth, I don’t have racemic epi!**

<table>
<thead>
<tr>
<th>ESSENTIAL</th>
<th>Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albuterol for inhalation (metered-dose inhaler with spacer or mask may be substituted)</td>
<td>Epinephrine (1:1000)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRONGLY SUGGESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activated charcoal</td>
</tr>
<tr>
<td>Antibiotics</td>
</tr>
<tr>
<td>Anticonvulsant agents (diazepam, lorazepam)</td>
</tr>
<tr>
<td>Corticosteroids (parenteral/oral)</td>
</tr>
<tr>
<td>Dextrose (25%)</td>
</tr>
<tr>
<td>Diphenhydramine (parenteral, 50 mg/mL)</td>
</tr>
</tbody>
</table>

**Nebulization (alternative to racemic epinephrine):** 0.5 mL/kg of 1:1000 solution diluted in 3 mL NS. **Max. doses:** ≤4 yr, 2.5 mL/dose; >4 yr, 5 mL/dose

---

**Observation in the ED after racemic**

- Indications for discharge home from the Emergency Department include:
- Good air entry and no respiratory distress
- After at least 2 hours of observation after a single dose of nebulized epinephrine and a single steroid dose

Source: PEMSoft
Case #3

- 3 year old, WCC
- Quick scan of previous visits – fairly unremarkable
- Mom states that patient started with vomiting yesterday, multiple times, NB/NB
- Then developed diarrhea – “too many times to count”
- Patient is sleepy, but arousable, laying in mom’s lap
- T=101.6, HR 142, RR 30, BP 88/50, O2 sat 95% on RA
- Your 25 year veteran nurse comes in with a glucometer
  - BGL 38

Case #3

- Mom has apple juice and child can drink
- Blood glucose comes up to 99
- Two minutes later, generalized seizure
Seizure treatment

- Move them gently into the floor and place them on their side
- Go ahead and prepare any benzo, any benzo
- Administer supplemental O2 via nonrebreather – OPEN THE AIRWAY
- Positive pressure ventilation if necessary

Drugs used to stop seizures

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Max Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorazepam</td>
<td>0.05-0.1mg/kg</td>
<td>IV</td>
<td>4mg</td>
</tr>
<tr>
<td>Diazepam</td>
<td>0.05-0.3mg/kg</td>
<td>IV</td>
<td>10mg</td>
</tr>
<tr>
<td></td>
<td>0.5mg/kg</td>
<td>PR</td>
<td></td>
</tr>
<tr>
<td>Midazolam</td>
<td>0.05-0.3mg/kg</td>
<td>IV/IM</td>
<td>10mg</td>
</tr>
<tr>
<td></td>
<td>0.2mg/kg</td>
<td>IN</td>
<td></td>
</tr>
</tbody>
</table>
Case #4

- 3 year old, WCC – still in waiting room
- Patient is playing with another child across the waiting room
- Mother of another child offers 3 year old a cookie
- Within 2 minutes, edema to the tongue, face, and lips
- Audible wheezing
- Hives
Anaphylaxis Treatment

- High flow O2
- IM Epi
  - Either Epi-pen or Epi-pen Jr autoinjector (30kg is your weight cutoff)
  - Lateral thigh, IM, NOT SubQ
  - 1:1000 (new name – 1mg/ml) 0.01 mg/kg
  - EVERY 3-5 minutes as necessary
  - Don’t delay!!!
- Steroids (IM)
- Benadryl (IM)
- IV fluid bolus (normal saline)
- Albuterol neb

Biphasic Anaphylaxis

- Incidence is highly variable
- Reported median time from initial reaction to biphasic reaction is around 9 hours (can occur as far as 72 hours out)
- No clear consensus that predicts a secondary response, but...
  - > 1 dose epi needed
  - Hypotension
  - Laryngeal edema
  - History of previous biphasic reaction
  - Delay in the administration of epi (or insufficient dose)
  - If any of the above, consider observation admission

Source: PEMSoft
Case #5

- 18 month old WCC – already complete and discharged
- Your nurse was distributing anticipatory guidance papers to the mom when the patient tripped
- Was stepping off of the exam table foot rest and fell forward, striking forehead on exam room cabinet
- Immediate hematoma to the forehead
- No LOC
- No emesis
- No seizures
Case #6

- 3 year old male with known mitochondrial disorder – on home vent
- Presents to CPM due to increased tracheal secretions
- Mom frantically screams into the hallway – my baby’s blue!!
- You walk in, patient is completely cyanotic
- You attempt to suction with flexible French catheter – no success
- You then remove the tracheostomy (after deflating the cuff)
- Mom forgot her backup trach
- Now what???

Case #6

- You place a 4.0 ETT into the tracheostomy site
  - How deep do you go?
- What if you can’t get any tube to pass?
- Remember, the child still has a mouth, and you have a BVM
- Occlude the tracheostomy site (gloved hand), and either intubate orally, or ventilate mouth via BVM
Tracheostomy Obstruction and Decannulation

• Younger children are more likely to experience accidental decannulation because of the short length of the trachea and tracheostomy tube
• Any child with an artificial airway and respiratory distress is assumed to have an obstruction

Tracheostomy Obstruction and Decannulation

• Always determine whether the tracheostomy tube appears to be in place, recognizing that a tube in the stoma does not necessarily indicate a tube in the trachea
• If a cannula change was attempted before the child’s arrival in the ED, a false passage into the paratracheal soft tissues may have occurred
• Auscultation for the presence and symmetry of bilateral breath sounds should be performed and the quality of the patient’s respiratory effort should be assessed
• Immediate suctioning is appropriate in an attempt to assess tube patency and to clear the airway of secretions
Tracheostomy Obstruction and Decannulation

- Do not hesitate to change the cannula!
- Suctioning alone may not clear an obstruction caused by thick secretions
- All the necessary equipment for the change should be present, including a replacement tracheostomy tube, an endotracheal tube one-half size smaller, and a bag-valve-mask ventilation circuit with oxygen flow, scissors, and tracheostomy ties
- Remember to deflate the cuff prior to removal, if one exists
- Residents – do this with a RT before you graduate!!

Tracheal vs Paratracheal Placement

[Image of tracheal and paratracheal placement]
Last case

- 4 year old female, G tube fed due to cystic fibrosis related FTT
- Presents for a 2pm acute care visit – CC: “G tube out”
- Mom states that patient awoke this AM with tube out
- She brought a backup G tube – 12F, 2.5cm
Enteral Tube Displacement

- Place a Foley catheter until a permanent placement can be obtained
- The interval since dislodgement is crucial
- As post-dislodgement time increases, the risk of the stoma constricting and closing increases