Challenging Pediatric Respiratory Cases

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You've got this!!

Goal

To refine emergency department evaluation and management of pediatric respiratory distress, with a focus on high risk conditions.

Objectives

After attending this session, learners will be able to:

- Explain an algorithm for a pediatric difficult airway, utilizing common ED equipment.
- Summarize key aspects of the management of severe bronchiolitis presenting with respiratory distress.
- Discuss several high-risk factors of presentations of pediatric dyspnea and how to minimize malpractice risk.

Still, regretfully, remorsefully, no commercial or financial interests to disclose.

Case #1

A 3yo presents with stridor and respiratory distress.

84/56 164 50 88% on RA 38.2

Racemic epi, IV methylpred, oxygen
→ no improvement

WHAT NOW?

Case #1

RSI attempt: rocuronium and ketamine

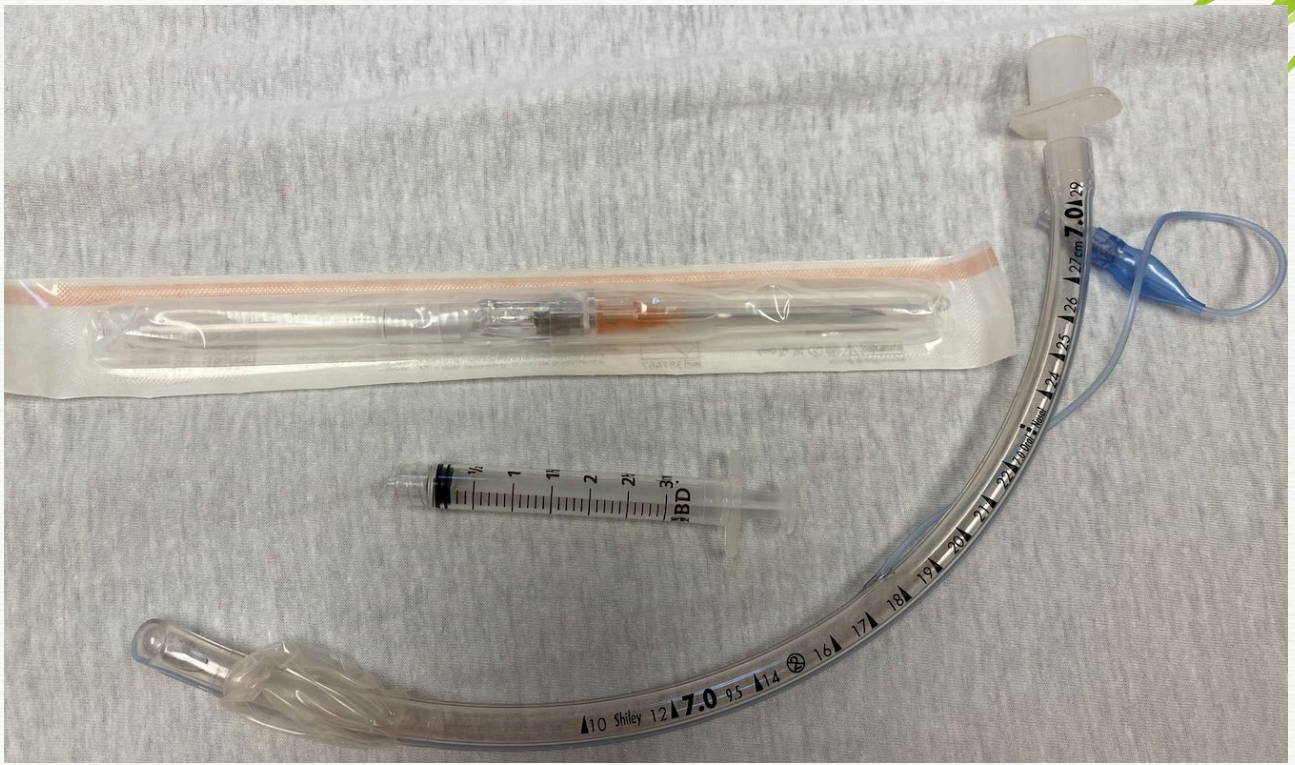
First look: giant **airway hemangioma** completely obscuring vocal cords

WHAT *NOW*?!?

Airw

- Ca
- Mc
  -
  -
  -
  -
  -

14 gauge angiocath
3 cc syringe
7-0 endotracheal tube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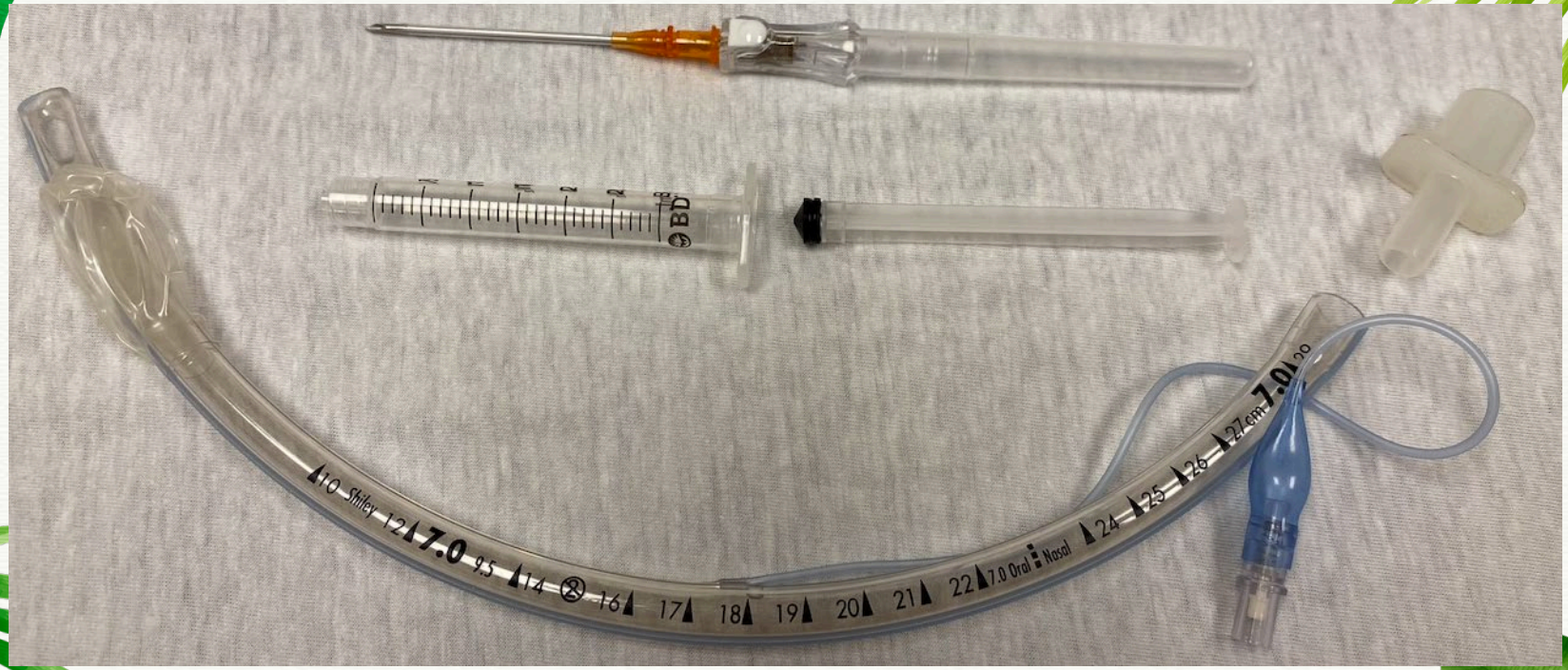
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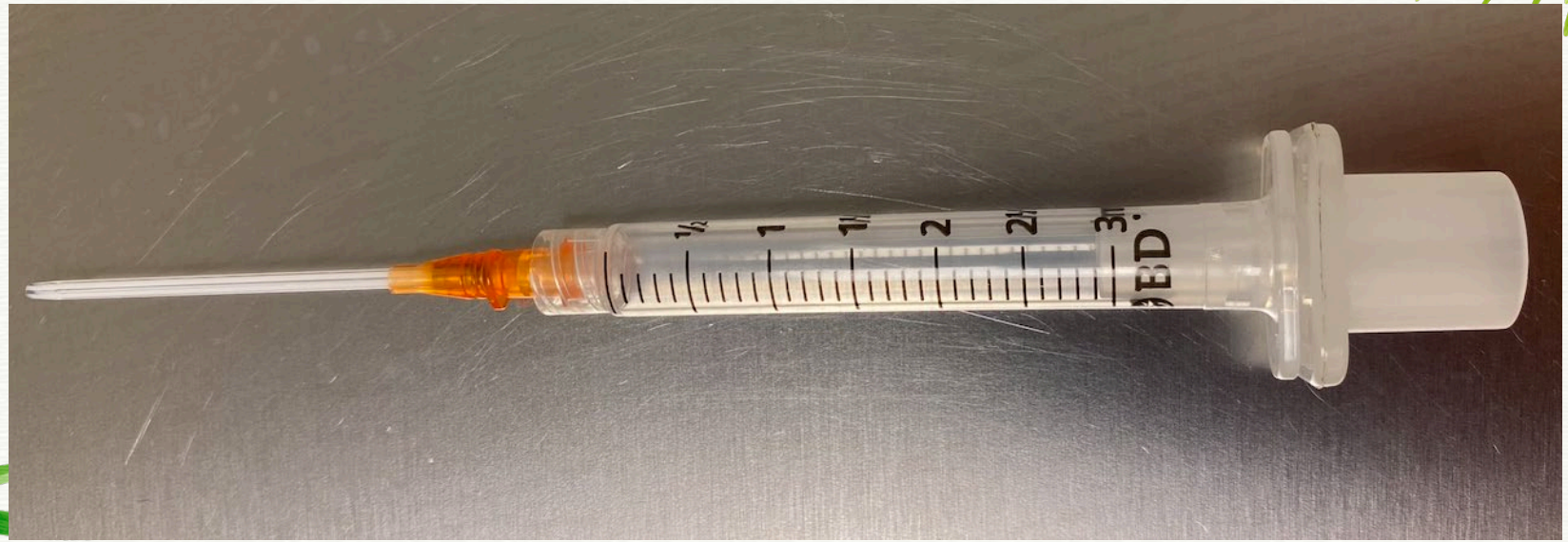
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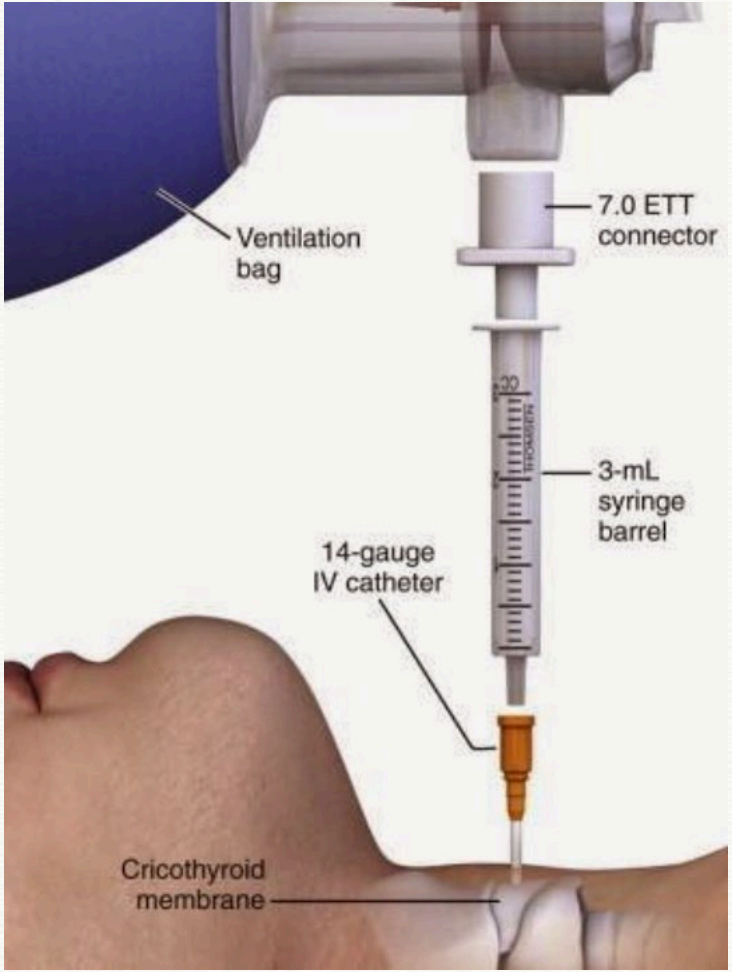


From https://www.emcurious.com/blog-1/2014/11/7/surgical-airway-part-2

Case #1 summary:

- Not all stridor is croup
  - Beware recurrent stridor, symptoms outside of croup season, severe “croup” in older child
  - Discuss with ENT
- Steroids make most things better… until they don’t.
- Three pieces of equipment for a pedi cric :
  - 14 gauge angiocath
  - 3 cc syringe
  - 7-0 endotracheal tube

Case #2

An 18 month old is BIBA in cardiac arrest after a witnessed aspiration event of a metal **bead**.

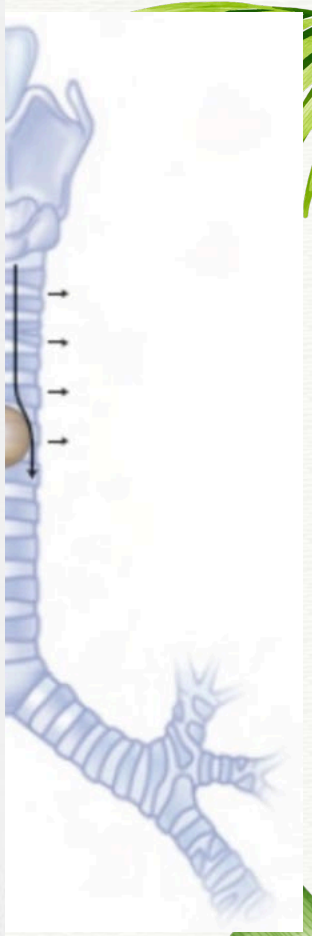
Apneic, pulseless, PEA on the monitor

Absent breath sounds with BVM ventilation

WHAT NOW?

A

-
-



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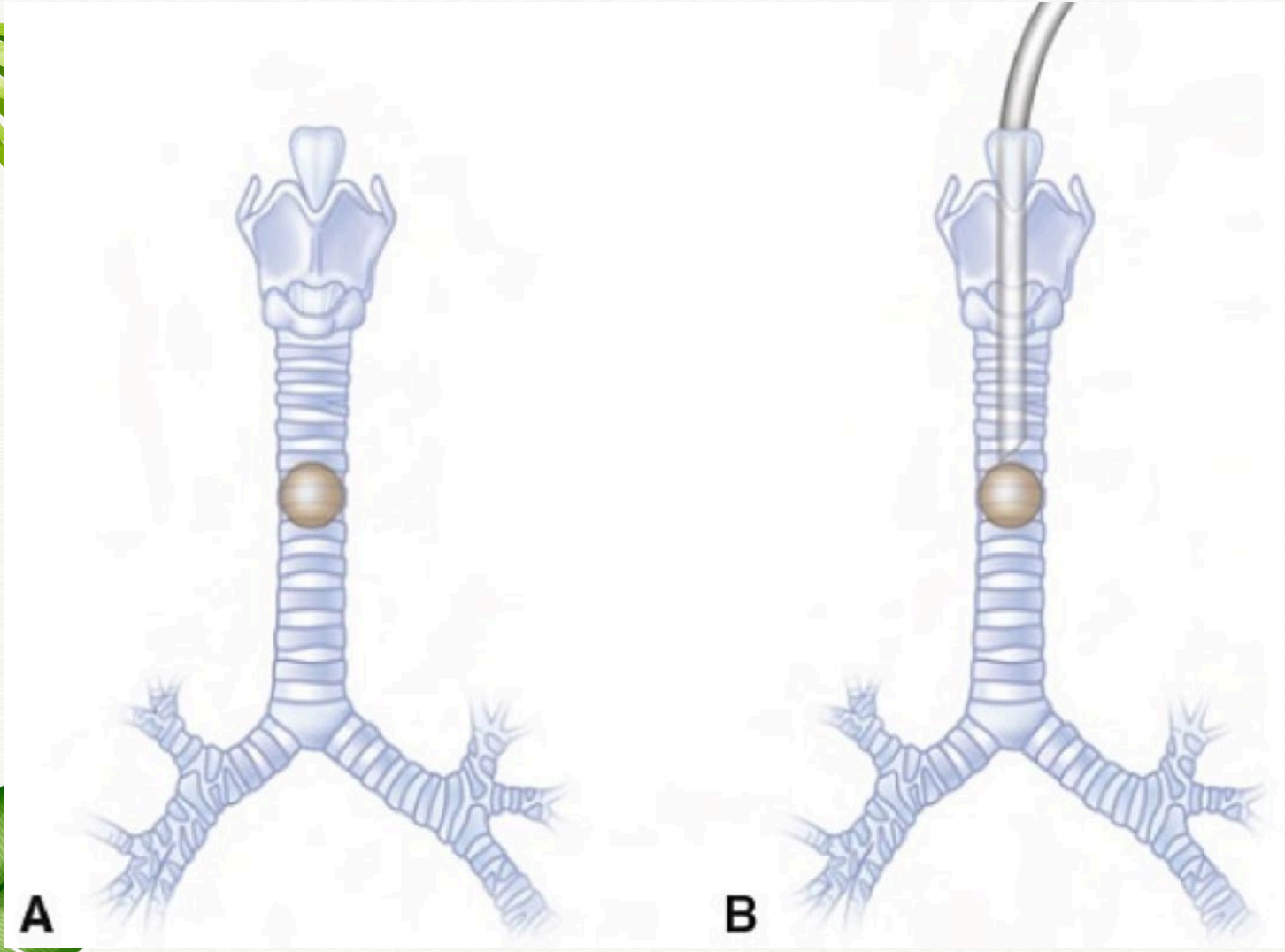

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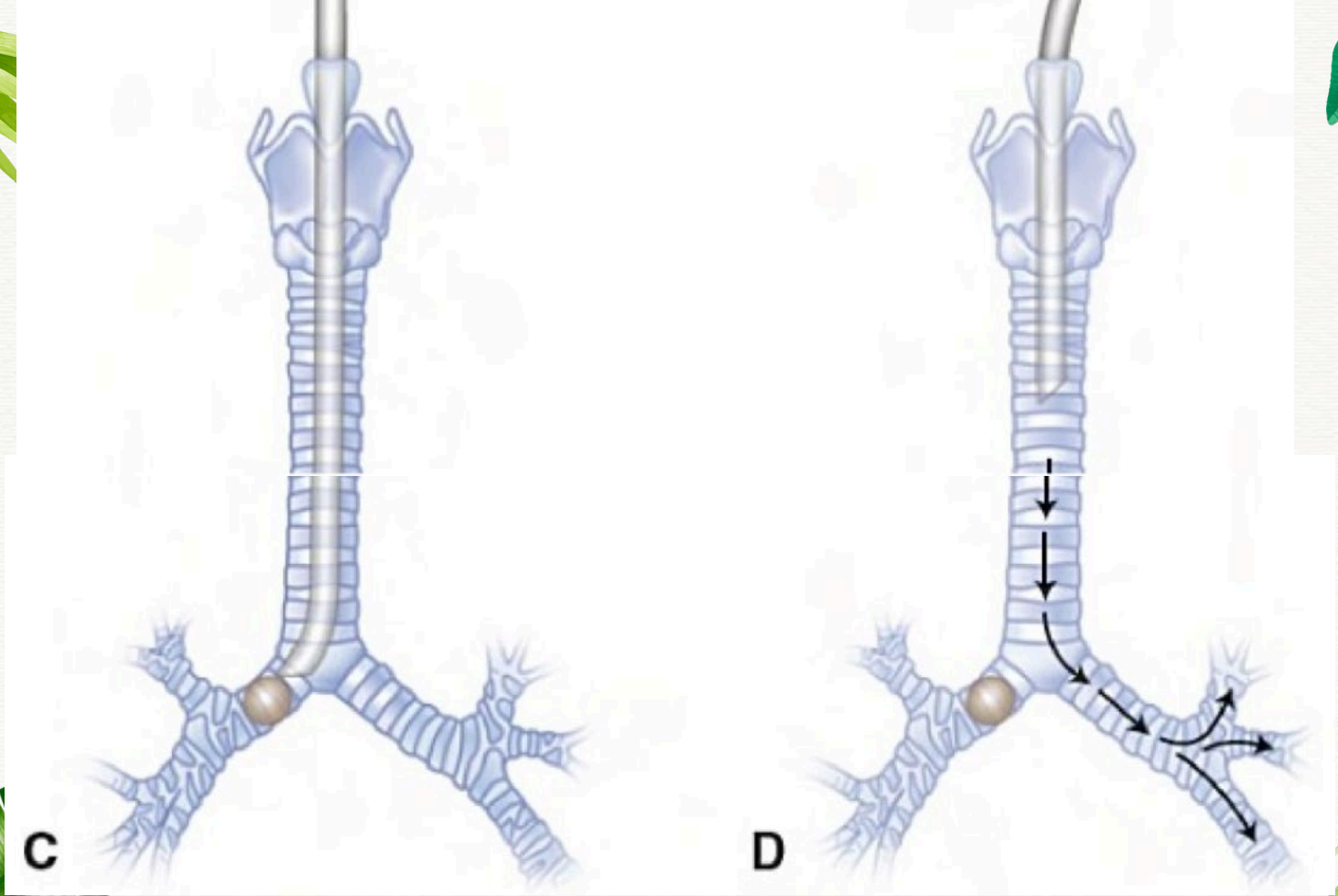


Airway FB Nightmare

- Attempt laryngoscopy
  - *Minimize* PPV
- Endotracheal intubation
  - Use a stylet
  - Attempt to advance the FB
  - **Keep going**
- Surgical airway unlikely to be effective
  - Caudal needle cric as last ditch

Case #2a

An 18 month old is BIB parent after sudden onset dyspnea without other symptoms.

Normal VS, unilateral R sided wheezes with normal WOB

WHAT NOW?

Airway FB

- High index of suspicion!
- CXR
  - Sensitivity 45.3%, specificity 88% [4]
  - Consider lateral decubitus films
- Straight to bronch ?
- **Low dose CT**
  - Sensitivity 91-100%, specificity 85-100%[1,4]
  - Decreased negative bronch rate from 37%to 17%[1]

Case #2 summary:

- Suspect FB aspiration in sudden onset respiratory distress!
- CXR first if stable
  - **Low dose CT** a promising next step
- Direct visualization
  - Magills ready
  - Minimize PPV
- Endotracheal intubation
  - **Impossible to go too deep**
  - Pull back and ventilate

Case #3

A 3-month-old presents with worsening nasal congestion, cough, and respiratory distress over 6 days.

72/40 184 65 89% on RA 38.1

Alert, crying, copious nasal congestion and rhinorrhea, diffuse rhonchi and crackles with scattered wheezes, intercostal/ subcostal retractions, belly breathing, head bobbing

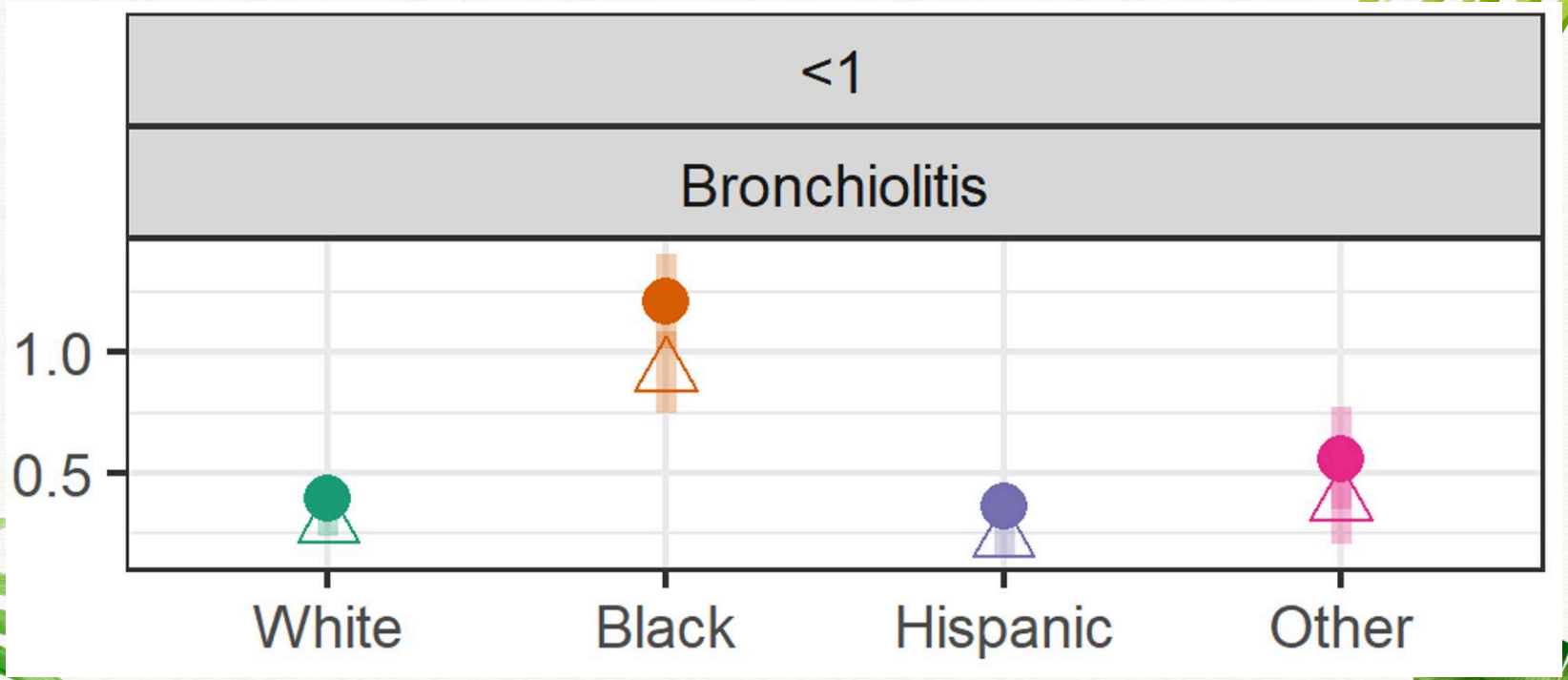
WHAT NOW?

Bron

- Nas
- Anti
- Rea
- High
  - 0
  - 3
  - E
- Tha

Case #3 summary:

- Nasal suction with olive tip
- Antipyretic
- High flow nasal cannula



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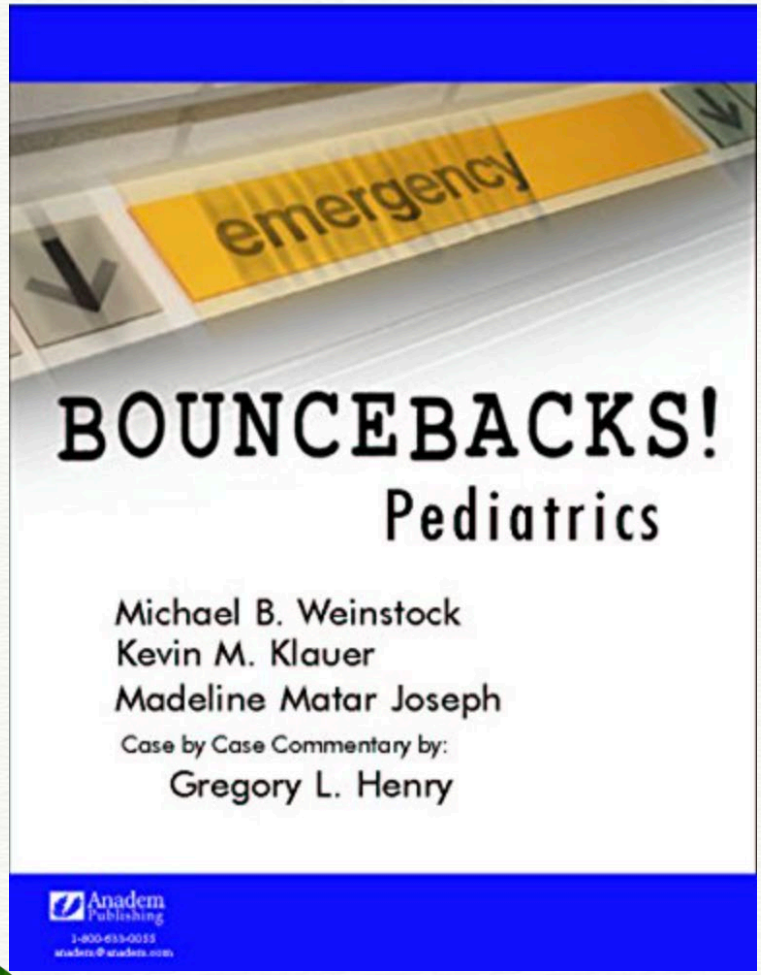
emergency
BOUNCEBACKS!
Pediatrics
Michael B. Weinstock
Kevin M. Klauer
Madeline Matar Joseph
Case by Case Commentary by:
Gregory L. Henry
Anadem Publishing

Case

- CC: Shortness of Breath
- A 15yo with a history of migraines presents with sore throat and cough x 3 days. + occasional throat tightening and dyspnea. + hoarse voice, bilateral ear pain, shoulder pain, myalgias, headache.
- BP 116/72 HR 104 RR 22 O2 sat 100% on RA T 37.4
- Exam significant for: **ill-appearing** , erythematous pharynx, submandibular lymphadenopathy, clear lungs with normal work of breathing
- Ddx: bronchitis, Strep, pneumonia, laryngitis; less likely croup; likely **viral syndrome**
- Received acetaminophen, had negative rapid Strep, normal XR soft tissue neck → discharged

Select Risk Management Issues

- **Triage cueing**
  - Anchoring bias, diagnostic momentum
  - Big problem in pediatrics!
- Abnormal VS not addressed!
  - At least *mention* tachycardia in the note (and in real life!)
- No repeat VS documented
  - *Especially* after an intervention you expect will help

Select Risk Management Issues

- Incomplete workup for Ddx
  - CXR, or why you're not getting one
  - "No focal findings or hypoxia"
- Nonspecific discharge instructions
  - *"…instructions to call pediatrician or clinic, or return to ED if struggling to breathe or symptoms worsen ."*

Bounceback

- Two days later calls PCP with R chest pain and worse dyspnea → referred to ED
- Three days later returns to ED:
  - BP 125/64 HR 162 RR 62 O2 78% on RA T 38.2
  - R crackles, CXR with pneumonia, admitted
  - Viral swab positive for **influenza A** , blood culture positive for MRSA
  - Placed on BiPAP and admitted to PICU → intubated
  - ECMO the next day → death by evening of day 4
- Final diagnoses: bilateral necrotizing MRSA pneumonia, s/p influenza A infection, multiple pulmonary abscesses, DIC

Important universal lessons

- Don’t be tricked by low acuity assigned at triage!
- **Respect the chief concern.**
- Get a chest X-ray if you’re worried about pneumonia in a dyspneic patient.
- Explain and address abnormal vital signs, and repeat them prior to discharge.
- An “ill-appearing” patient needs documented reassessment and a specific, clear follow-up plan.

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Thank you!

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References

1. Ahmed OG, Guillerman RP, Giannoni CM. Protocol incorporating airway CT decreases negative bronchoscopy rates for suspected foreign bodies in pediatric patients. *Int J Pediatr Otorhinolaryngol*. 2018;109:133-137. doi:10.1016/j.ijporl.2018.03.016
2. Luten RC, Bin S, Magill CF. Foreign Body in the Pediatric Airway. In: Brown CA, Sakles JC, Mick MW, Mosier JM, Braude DA, eds. *The Walls Manual of Emergency Airway Management.* 6th ed. Wolters Kluwer.
3. Russi BW, Roberts AR, Nievas IF, Rogerson CM, Morrison JM, Sochet AA. Noninvasive Respiratory Support for Pediatric Critical Asthma: A Multicenter Cohort Study. *Respir Care*. Published online January 30, 2024. doi:10.4187/respcare.11502.
4. Truong B, Luu K. Diagnostic clues for the identification of pediatric foreign body aspirations and consideration of novel imaging techniques. *Am J Otolaryngol*. 2023;44(4):103919. doi:10.1016/j.amjoto.2023.103919.
5. Hansen CL, Viboud C, Chaves SS. The Use of Death Certificate Data to Characterize Mortality Associated With Respiratory Syncytial Virus, Unspecified Bronchiolitis, and Influenza in the United States, 1999-2018. *J Infect Dis*. 2022;226(Suppl 2):S255-S266. doi:10.1093/infdis/jiac187.