Management of Pediatrics Airway Foreign Bodies: *An Update*

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- A mother brings her 14 month old son into the urgent care clinic with complaints of choking and gagging after eating potato chips 2 days ago at his grandmother's house.
- His mother is unsure if he had eaten anything else with the potato chips and does not think the child turned blue during the choking and gagging episode.
- He returned to his normal activity shortly after the episode occurred, but since then, he has had a few intermittent coughing spells. The patient has two older siblings who are still at the grandmother's house.

- Exam: VS T 37.2, P 103, R 28, BP 98/55, O2 saturation 96% in RA, height/weight/head circumference are all 25-50%ile.
- He is walking around the exam room in no acute distress.
- He has a normal physical exam except for an occasional low-pitched, monophonic expiratory wheeze heard best over the sternal notch.

keywords

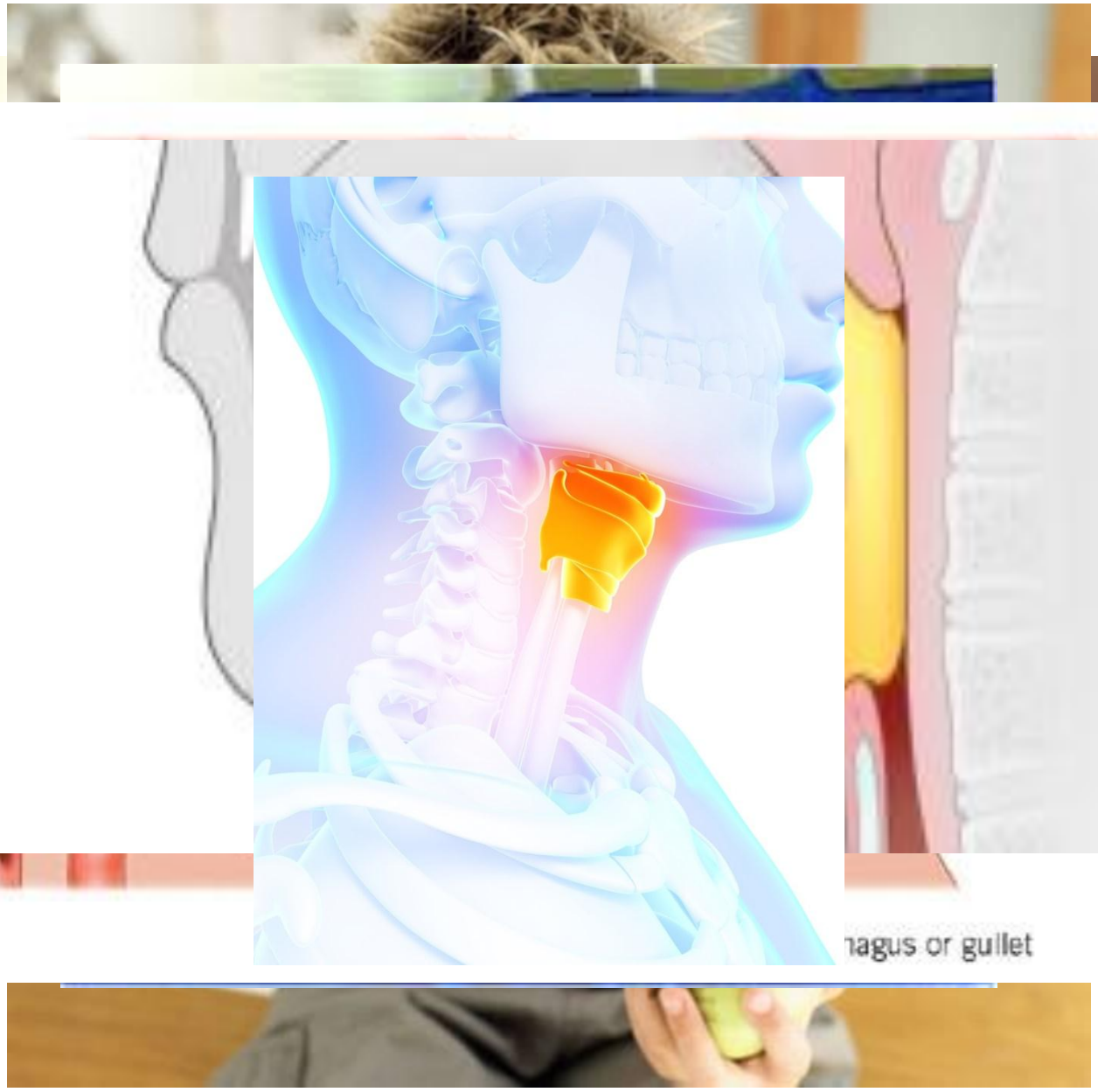
- 14 month old
- son
- choking
- after eating potato chips
- does not think the child turned blue during the choking and gagging
- returned to his normal activity shortly
- few intermittent coughing spells
- low-pitched, monophonic expiratory wheeze
- has two older siblings

- Foreign body aspiration is a very serious, often life-threatening, condition.
- FBA is the 5th leading cause of death in the United States and Hawaii for all age groups
- FBA are more common in toddlers (age 1-3 year)
- More common in boys

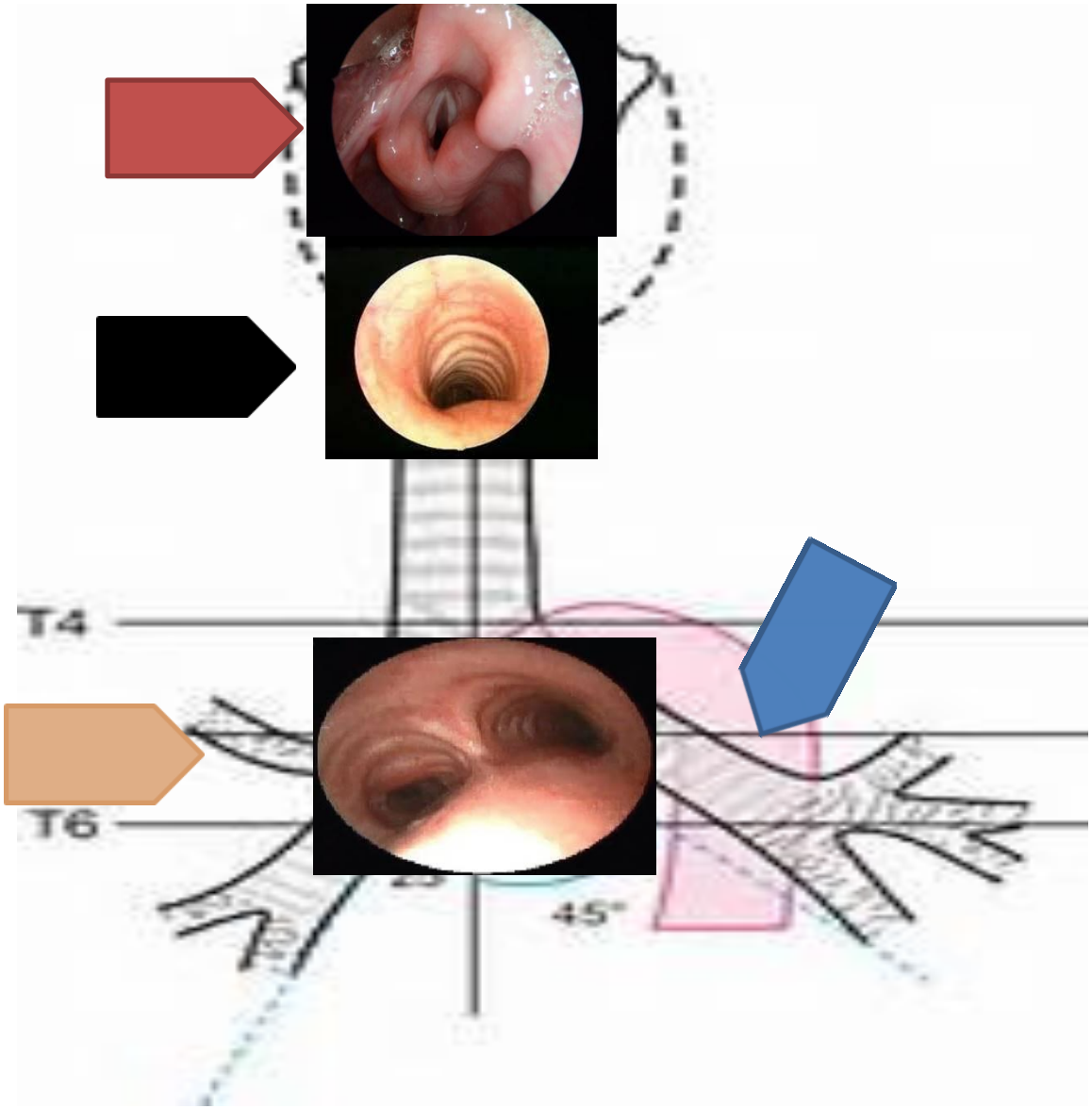
Reasons for this are

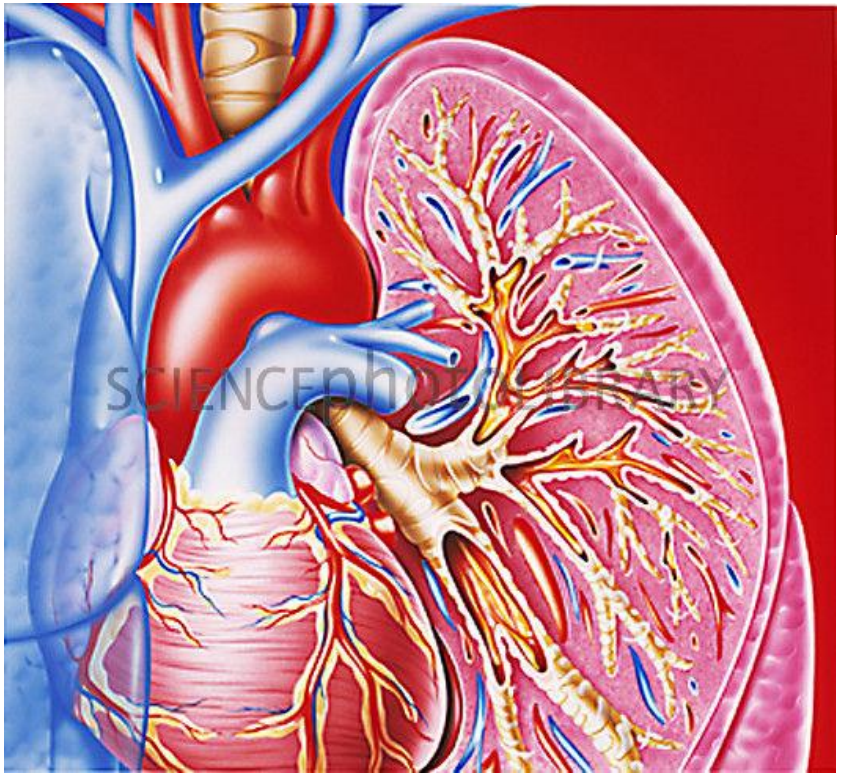
- 1) **Exploration** of their environment by putting objects into their mouths;
- 2) **Learning** to walk and run;
- 3) **Inadequate** dentition;
- 4) **Immature** swallowing coordination; and
- 5) **Supervision** by an older sibling

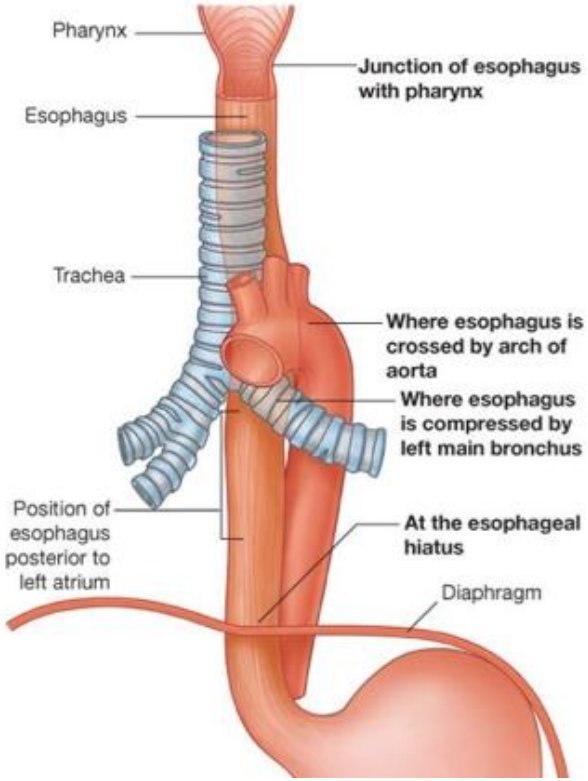



nagus or gullet

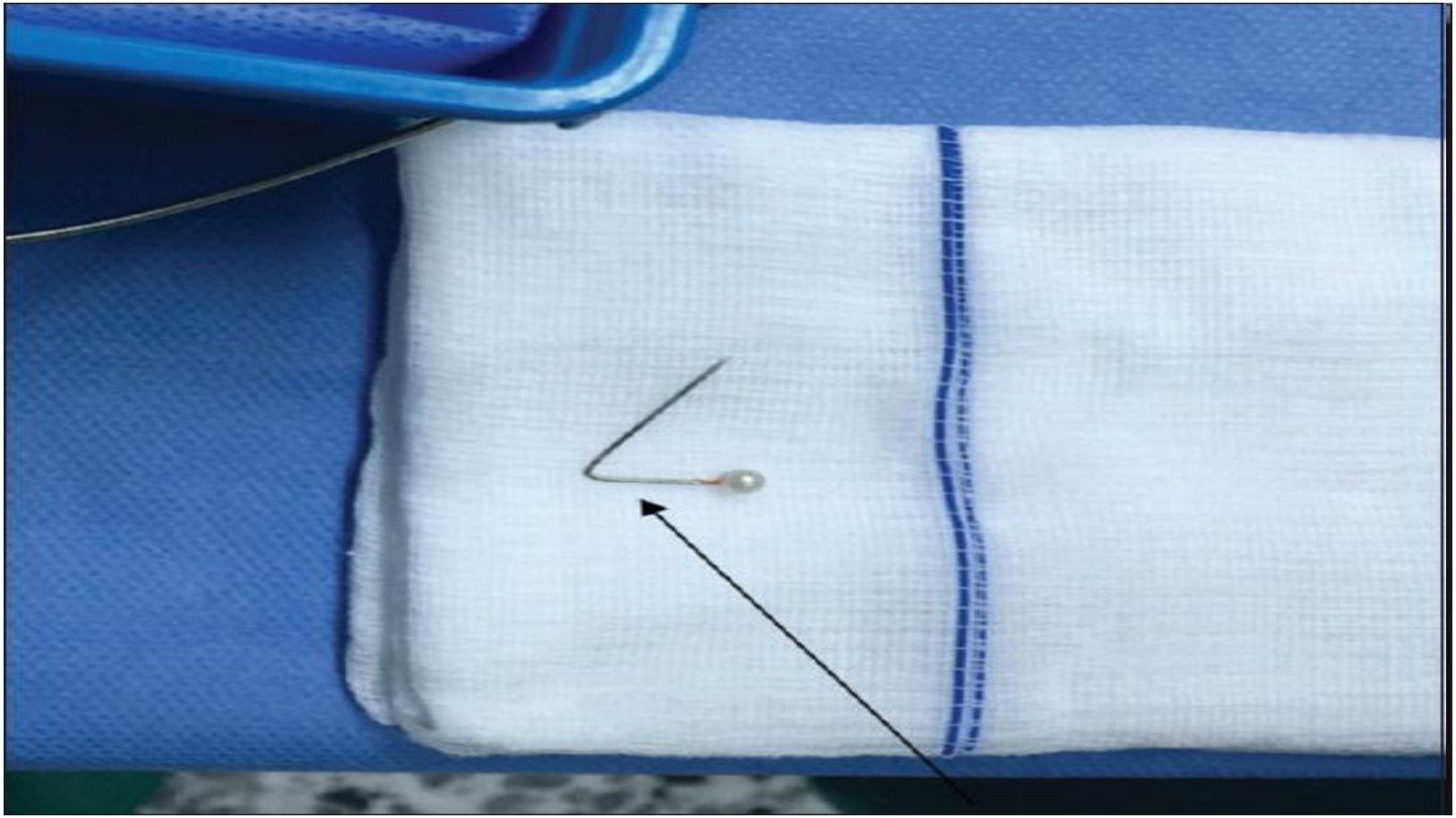
- 91% of foreign bodies aspirated by children (<8 years old) were organic in nature with peanuts
- Haven't a significant difference between the foreign body being found in the right or left bronchial tree.
- This may be explained by the fact that children have symmetric bronchial angles until about 15 years of age.
- At that time, the aortic knob has developed fully, causing the left mainstem bronchus to be displaced, which creates a more obtuse angle at the carina favoring the right mainstem for a foreign body


T4
T6
45°




Pharynx
Junction of esophagus with pharynx
Esophagus
Trachea
Where esophagus is crossed by arch of aorta
Where esophagus is compressed by left main bronchus
Position of esophagus posterior to left atrium
At the esophageal hiatus
Diaphragm

What Are the Most Lethal Hazards?



clinical phases

- The **first** phase occurs **immediately** following the incident. The patient will usually **experience** choking, gagging, coughing, wheezing, and/or stridor.

✓ *The occurrence of **death** is **very high** during this first phase .*

- The **second** phase is the **asymptomatic** period that **can last** from **minutes** to **months** following the incident.
- The **duration** of this period **depends** on the **location** of the foreign body, the **degree** of airway obstruction, and the **type** of material aspirated.

clinical phases

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Journal of Pediatrics and Neonatal Care

Silence Foreign Body Aspiration Syndrome

Editorial

Foreign body aspiration (FBA) can be a life-threatening emergency.Aspiration of foreign bodies results in significant morbidity and mortality in children. The majority of foreign body aspirations occur in children younger than 4 years of age. Immature dentition, poor swallowing coordination, physical activity specially laughing, crying, talking during feeding, and propensity to explore the environment orally all make children susceptible to foreign body aspiration [1]. Young children chew their food incompletely with incisors before their molars erupt. Objects or fragments may be propelled posteriorly, triggering a reflex inhalation.Also whom undergo oropharyngeal procedures, have various oral appliances, become intoxicated, receive sedatives, or may have neurological or psychiatric disorders are at increased risk of aspirating foreign bodies.

Editorial

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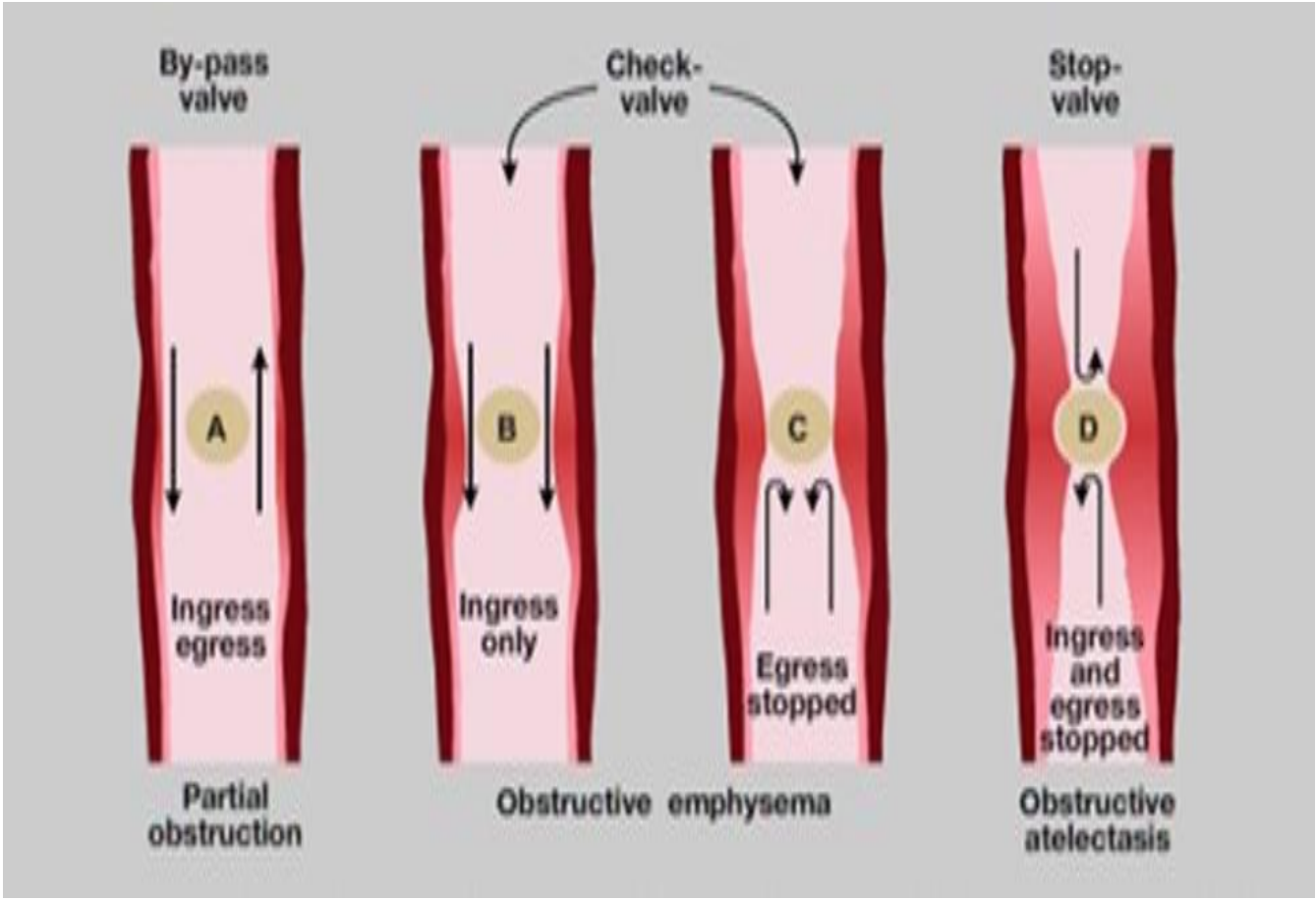
clinical phases

- The **third** clinical phase is the **renewed symptomatic** period.
- *Recurrent infections*
- *Abscess*
- *Bronchiectasis*

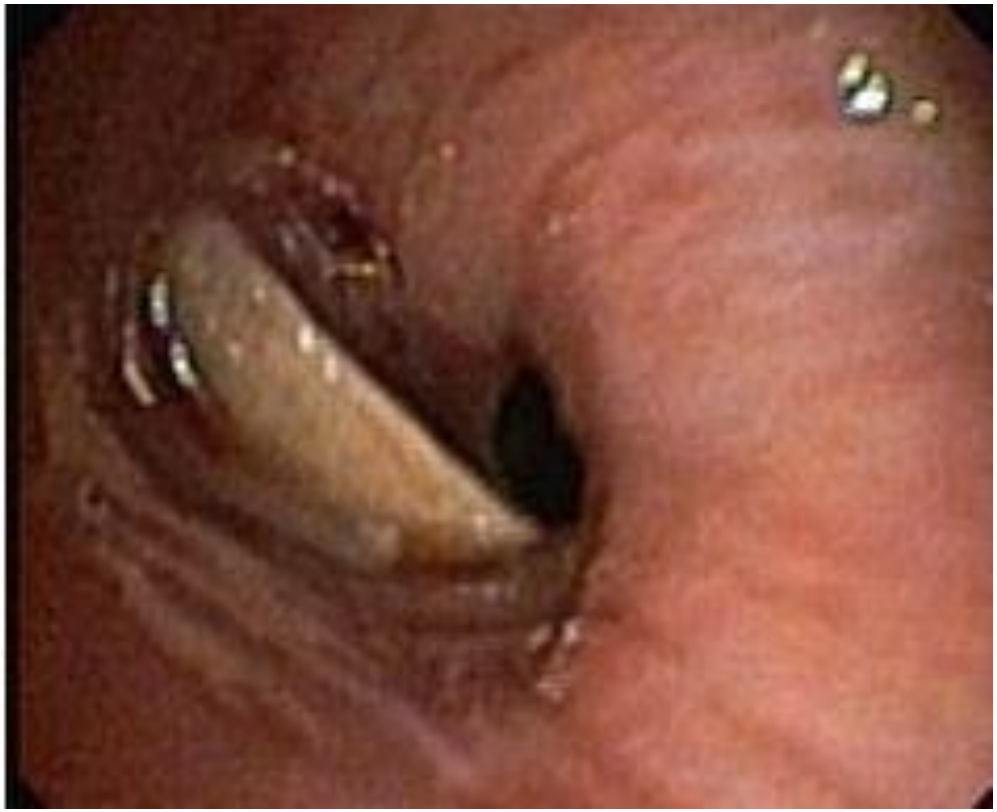
- **History**, as always, is the **best** determinant of how suspicious one should be of a potential aspiration.
- On **physical exam**, the **classic** findings consist of

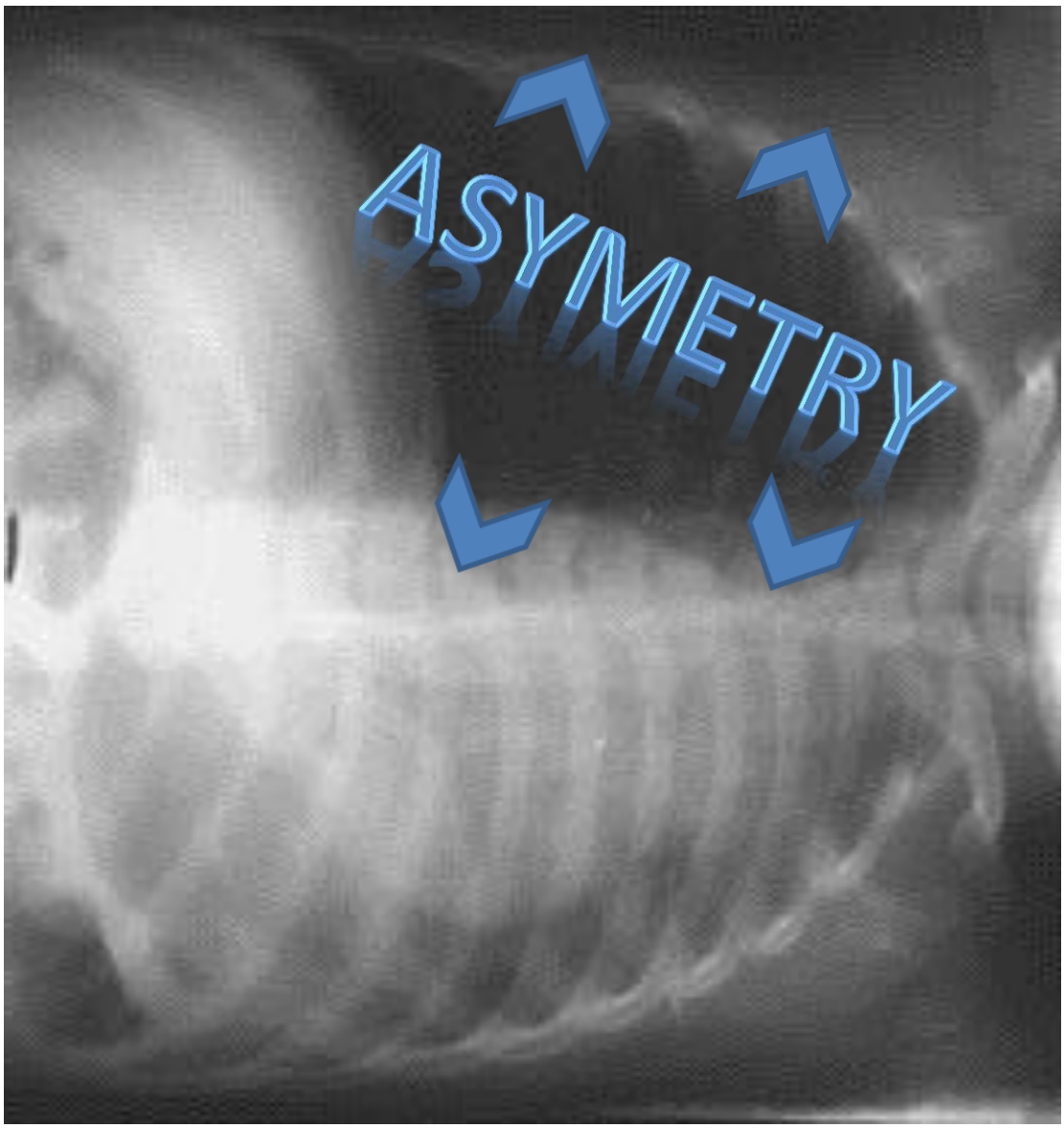
✓ *cough, unilateral decreased breath sounds, and unilateral monophonic wheezing.*

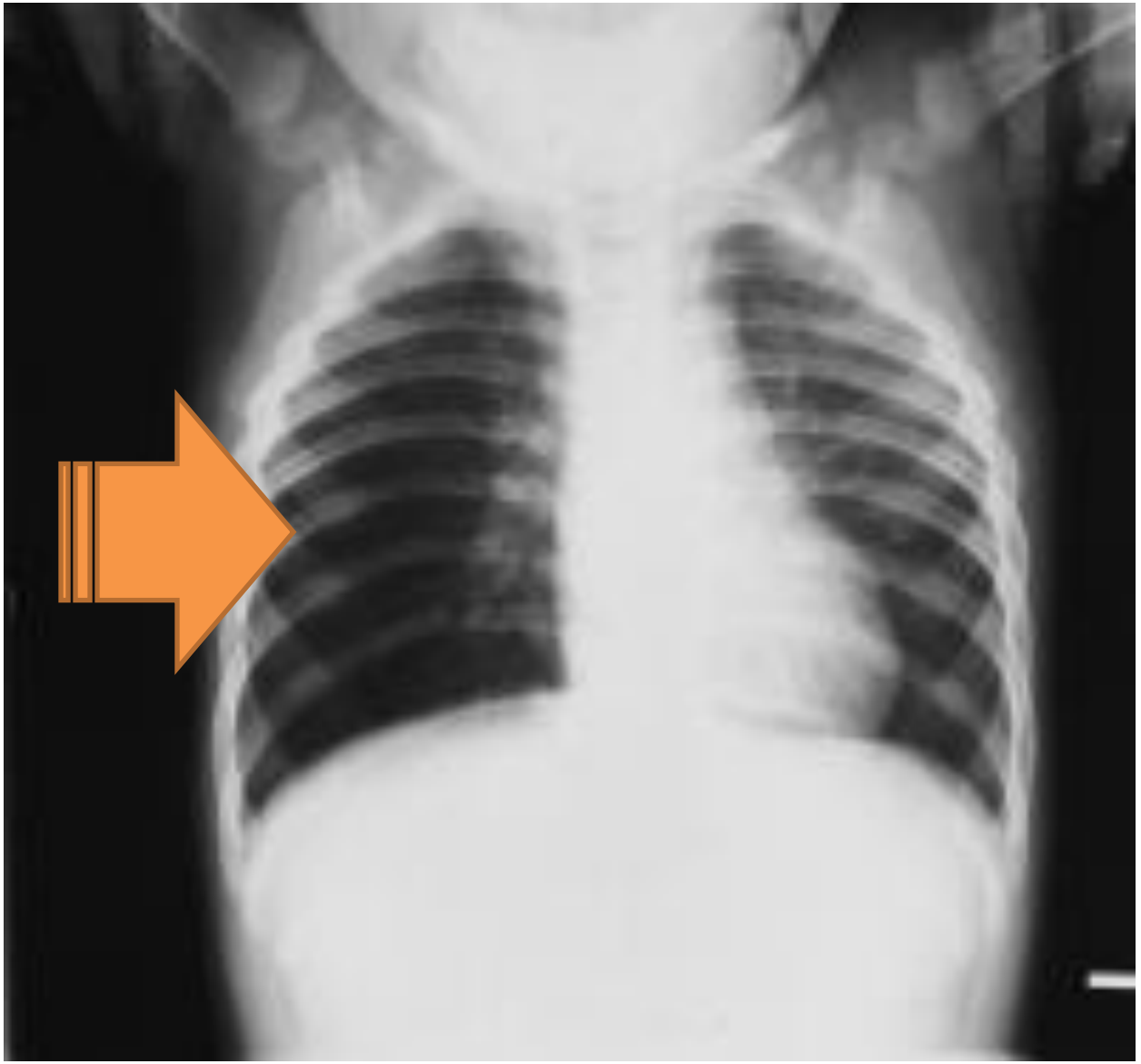
- If **stridor** (inspiratory and/or expiratory), **aphonia**, or **hoarseness** is present, the foreign body is most likely in the larynx or cervical trachea.
- Imaging studies have a **sensitivity** of 73% and a **specificity** of 45%
- up to **20%** of patients will **have both negative history and radiographic** evaluation

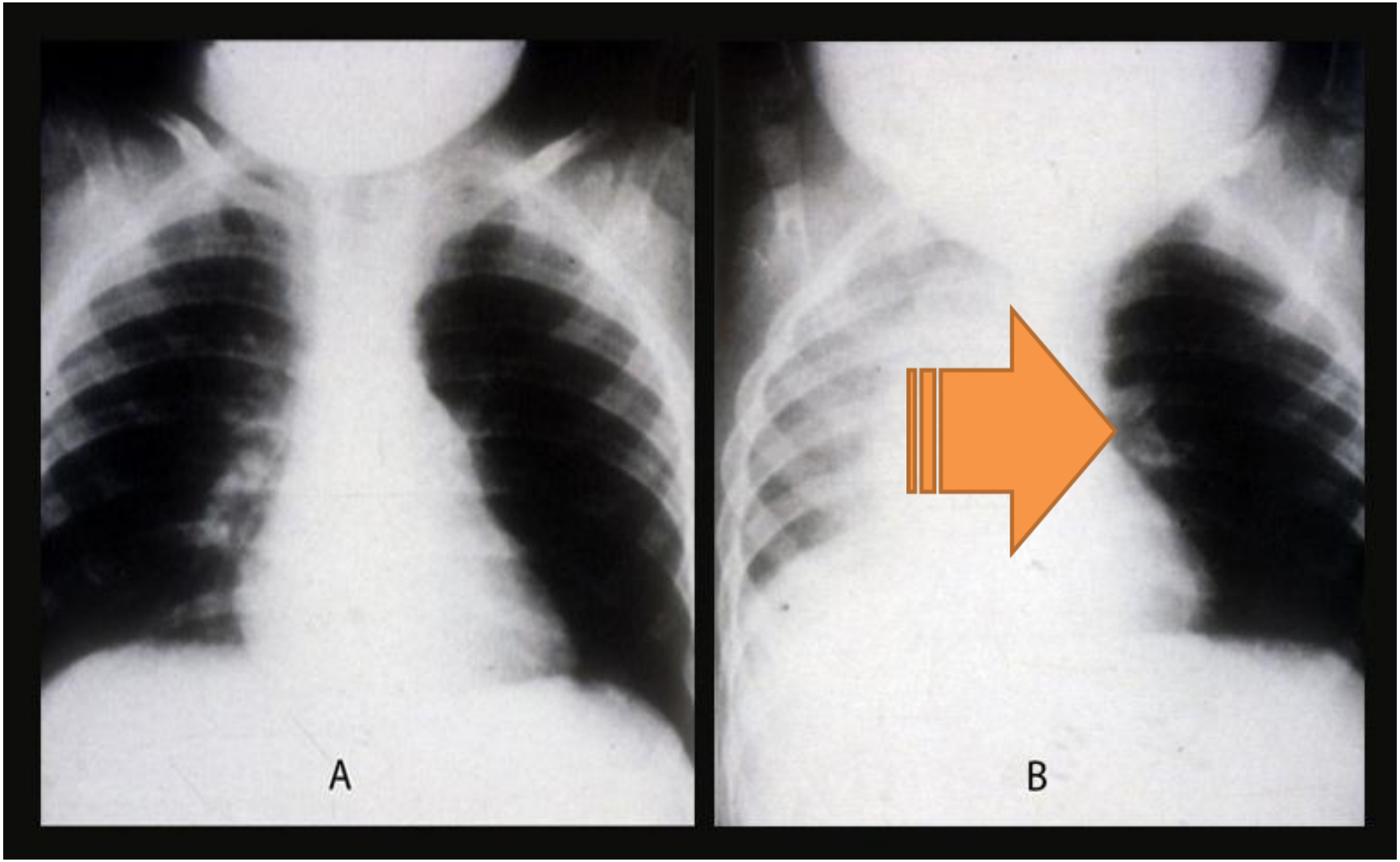

By-pass valve
Check-valve
Stop-valve
A
B
C
D
Ingress egress
Ingress only
Egress stopped
Ingress and egress stopped
Partial obstruction
Obstructive emphysema
Obstructive atelectasis

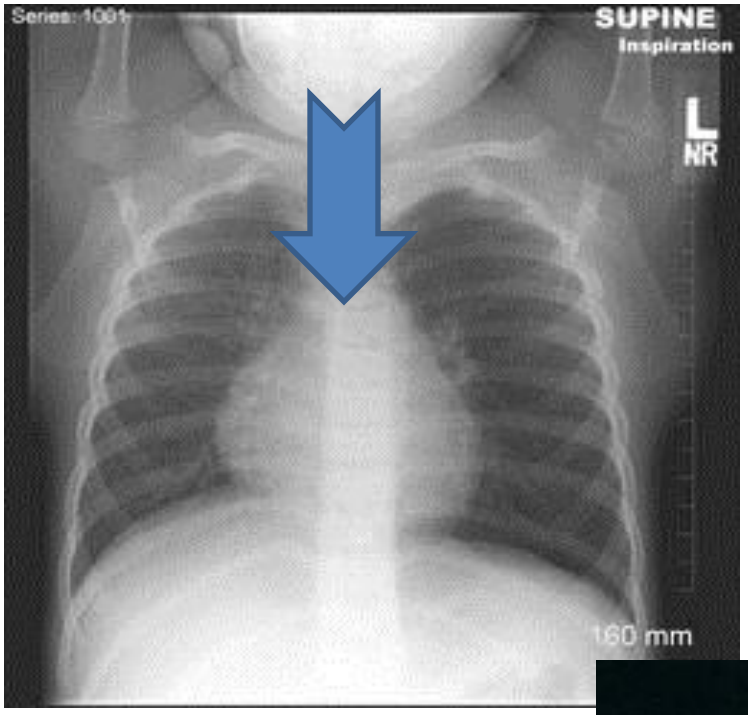
- For patients who present **early**, radiographic studies must look for evidence of **asymmetric air trapping**.
- Identification of **air trapping is the key**.
- However, many foreign body aspirations involve both main stem bronchi or the foreign body is in the **trachea**. Thus, asymmetry is **not** seen in these instances.
- If the expiratory view looks the **same** as the inspiratory view, this implies **bilateral air trapping**.
- Asymmetry suggests unilateral air trapping.

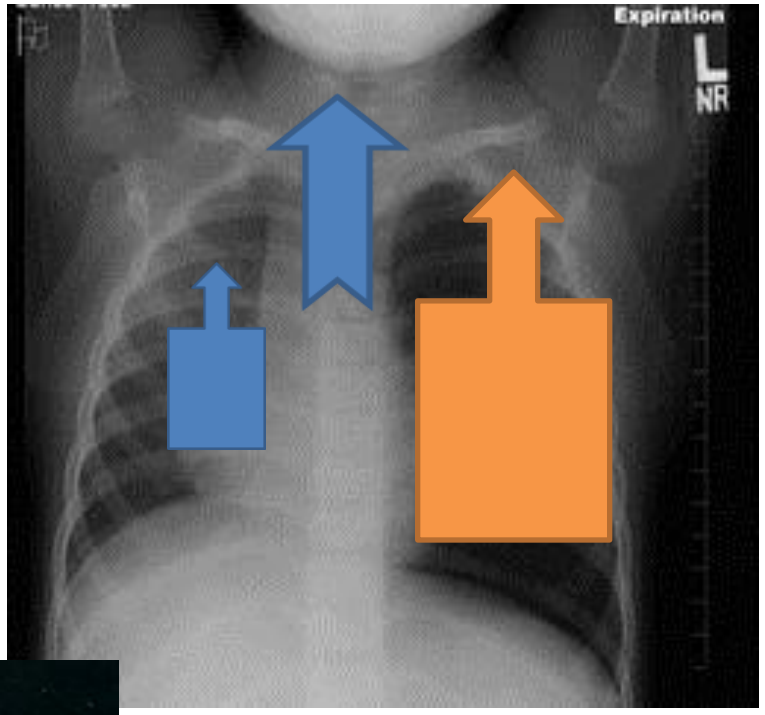


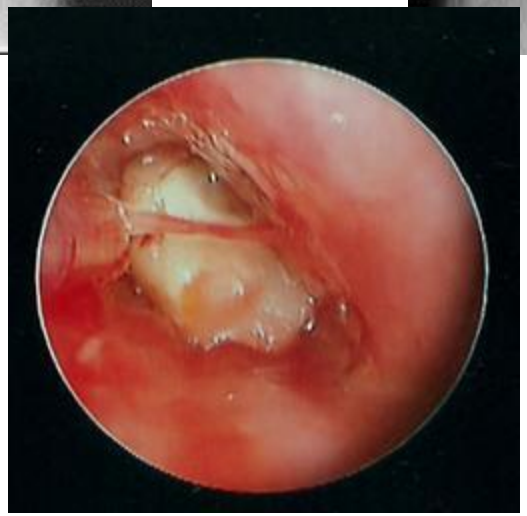

ASYMETRY



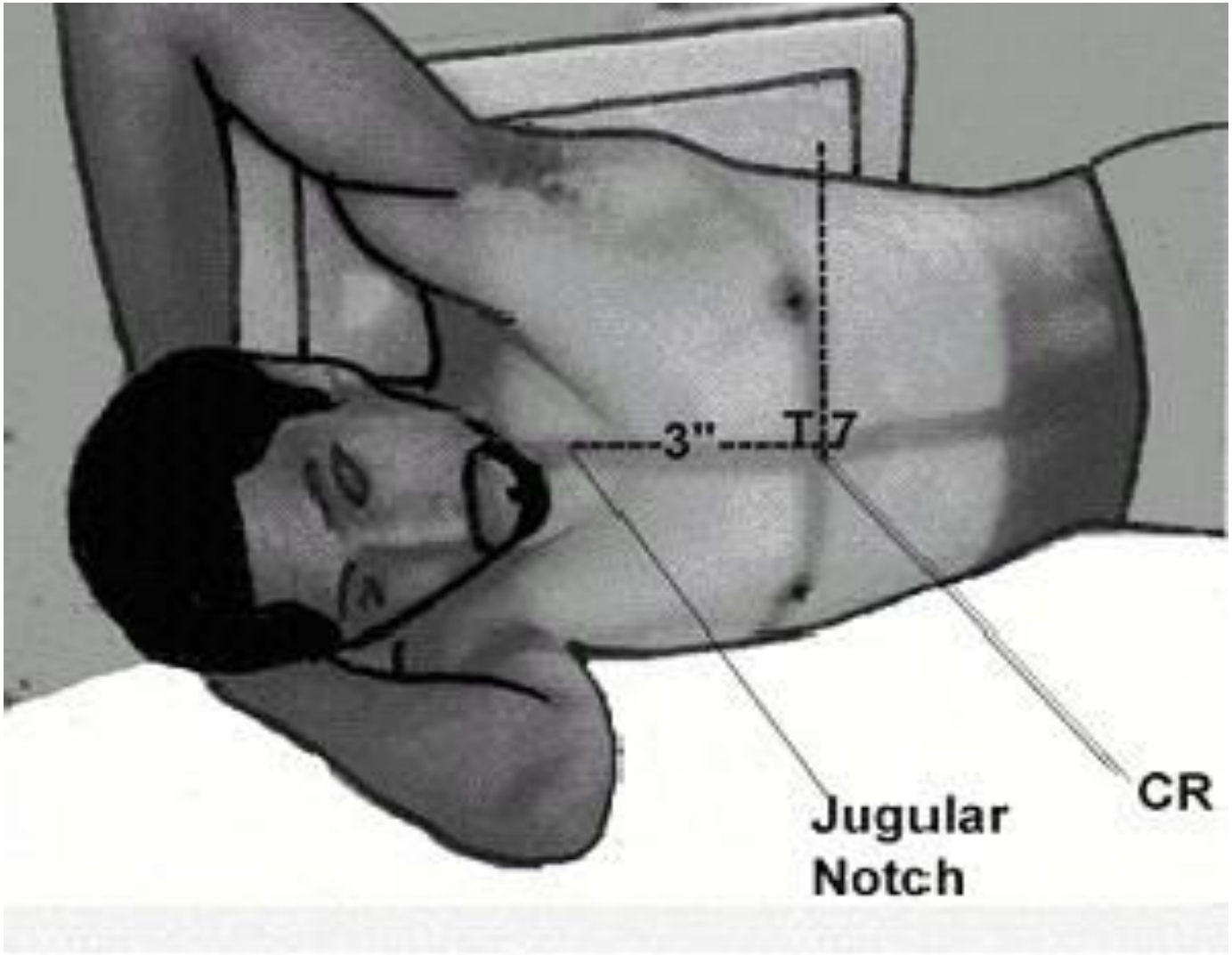

A
B


Series: 1001
SUPINE
Inspiration
L
NR
160 mm

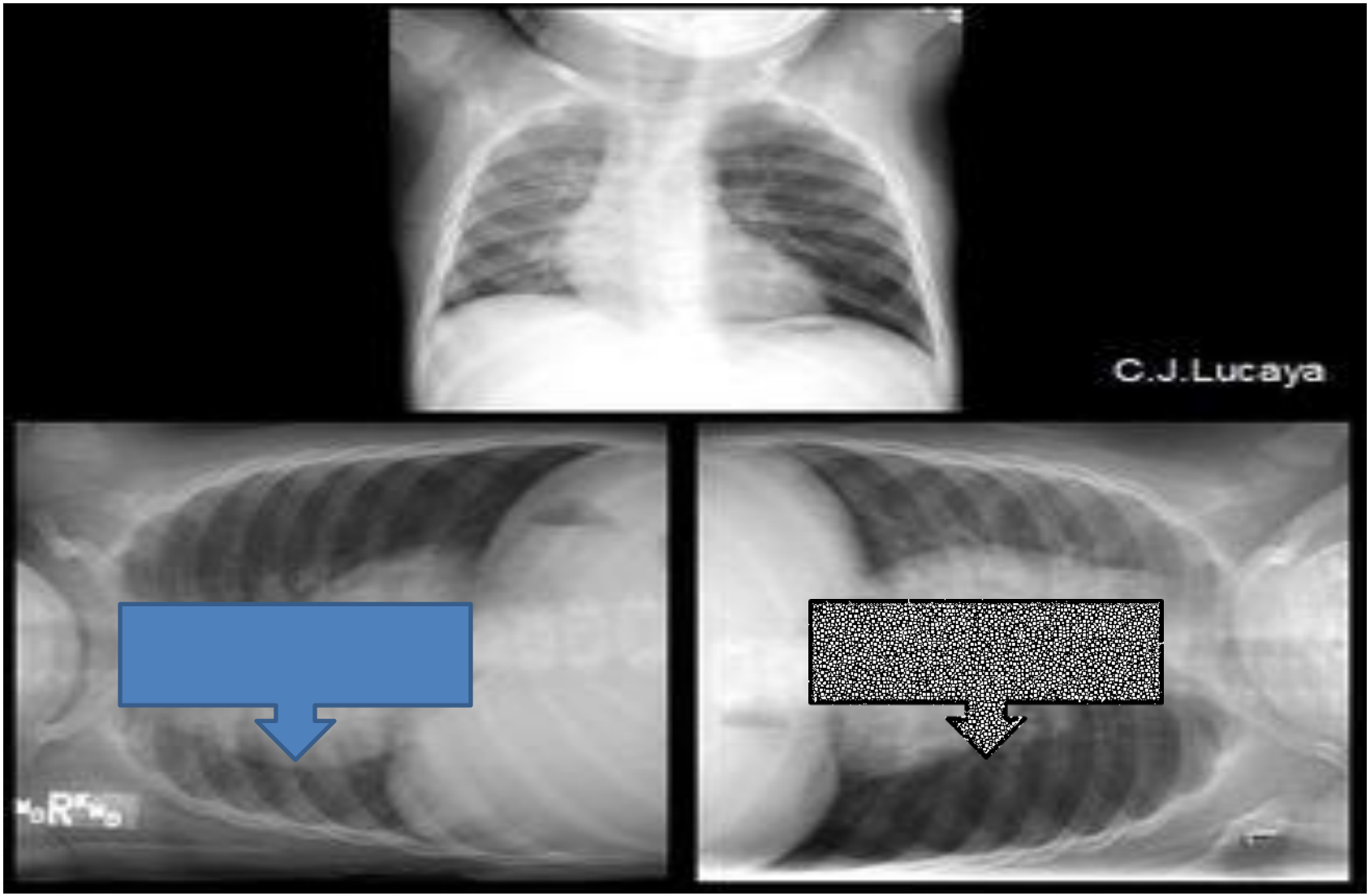

Expiration
L
NR



- **Decubitus** views may be **more** reliable
- In a lateral decubitus view, the mediastinum should shift downward toward the dependent side. Failure to see this implies air trapping on the dependent side.
- Thus, **if a decubitus view looks the same as an upright inspiratory view**, this suggests air **trapping on the dependent side**.



AP projection lateral decubitus position.
Image courtesy of Dr. Naveed Ahmad.


C.J.Lucaya

Rx

- **Blind finger** sweeps should never be performed in infants or children since this may push the foreign body further downward into the airway.
- **Infants** with complete airway obstruction should have back blows and chest thrusts performed
- **children** with complete airway obstruction should have abdominal thrusts performed in either the supine position or by the Heimlich maneuver.
- Once the patient is brought to the hospital, the patient will require **rigid** bronchoscopy

For a baby (approx. birth to one)

1. If they are unable to cough up the obstruction, give back blows

- Lay the baby face down along your forearm (head low), and support their body and head.
- Give up to five back blows between the shoulder blades with the heel of your hand.
- Check the baby's mouth. Turn them face up along your other forearm, supporting their back and head. Check the mouth. Pick out any obvious obstructions. **If the baby is still choking, proceed to 2.**

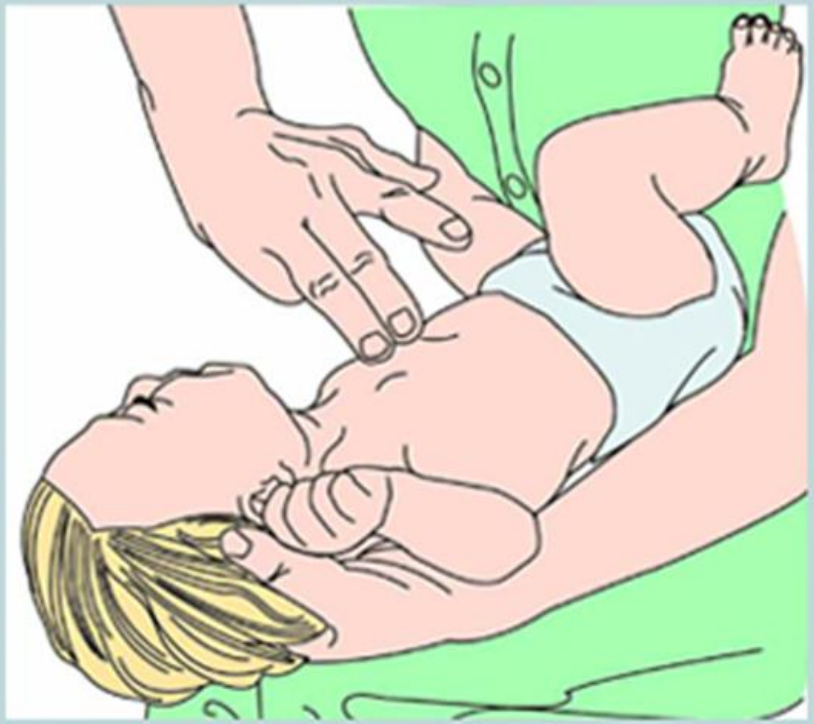
2. If they are still choking, give up to five chest thrusts

- Place two fingertips on the lower half of the baby's breastbone, a finger's breadth below the nipples.
- Give up to five sharp thrusts, pushing inwards and towards the head. Re-check the mouth.
- Give three full cycles of back blows and chest thrusts, checking the mouth after each cycle.
- Call an ambulance if the baby is still choking and repeat cycles of back blows and chest thrusts until medical help arrives. If they lose consciousness, give CPR.

STEP 1

1. Support baby's neck with one arm.
2. Position baby face down with head lower than body.
3. Apply 5 back thrusts between shoulder blades with one hand.

STEP 2



1. Turn baby over. Support neck.
2. Apply 5 chest thrusts, using 2-3 fingers.
3. Compress about 1" deep.
4. Repeat process until object is removed.

For a child (approx. one year to puberty)

1. If they are unable to cough up the obstruction, give back blows

> Bend the child forward.

> Give up to five sharp blows between the shoulder blades with the heel of the hand.

> Check the mouth for dislodged objects. **If the child is still choking, proceed to 2.**

2. If they are still choking, give abdominal thrusts

> Place a clenched fist above the belly button.

> Grasp your fist with your other hand. Pull inwards and upwards up to five times.

> Check the mouth for dislodged objects.

> If they are still choking, give three full cycles of back blows and abdominal thrusts, checking the mouth after each cycle.

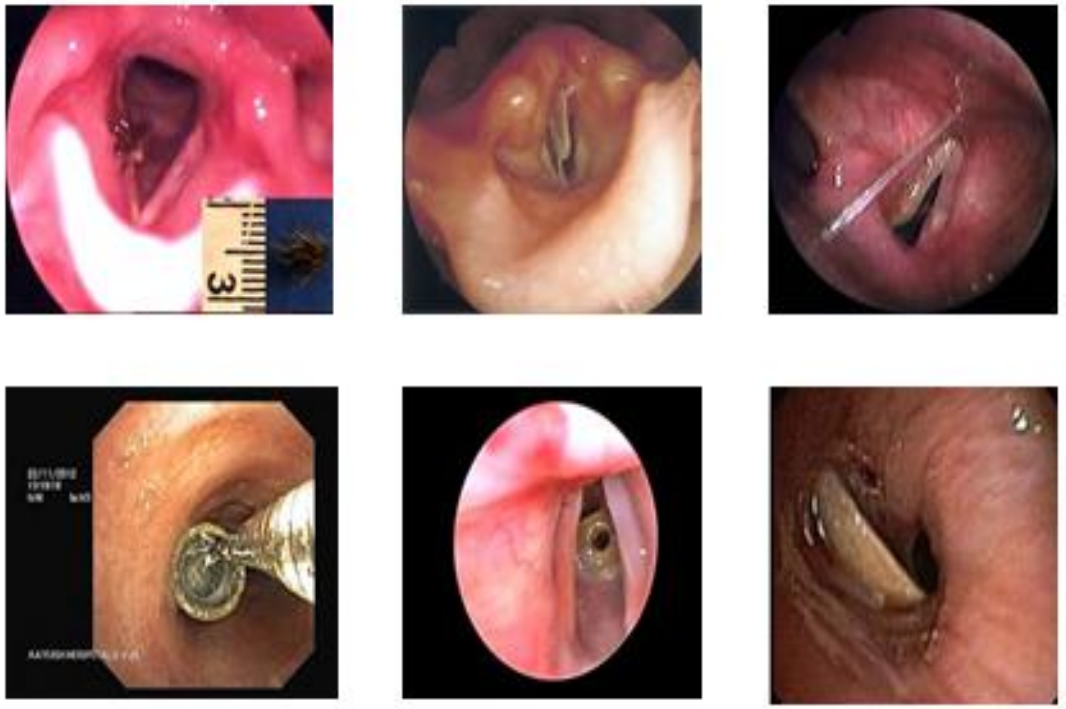
> Call an ambulance if they are still choking and repeat cycles of back blows and abdominal thrusts until medical help arrives. If the child loses consciousness, give CPR.

Management

- Bronchoscopy

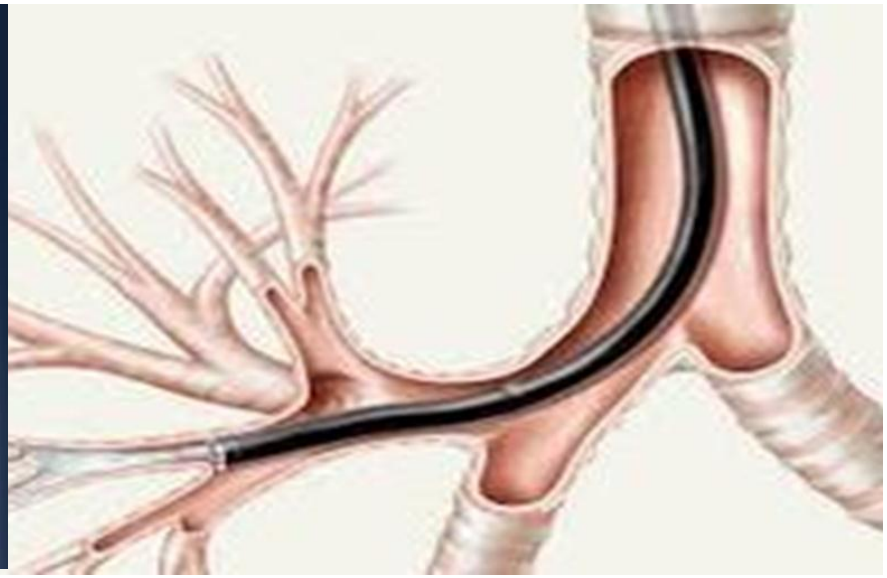
✓ Rigid

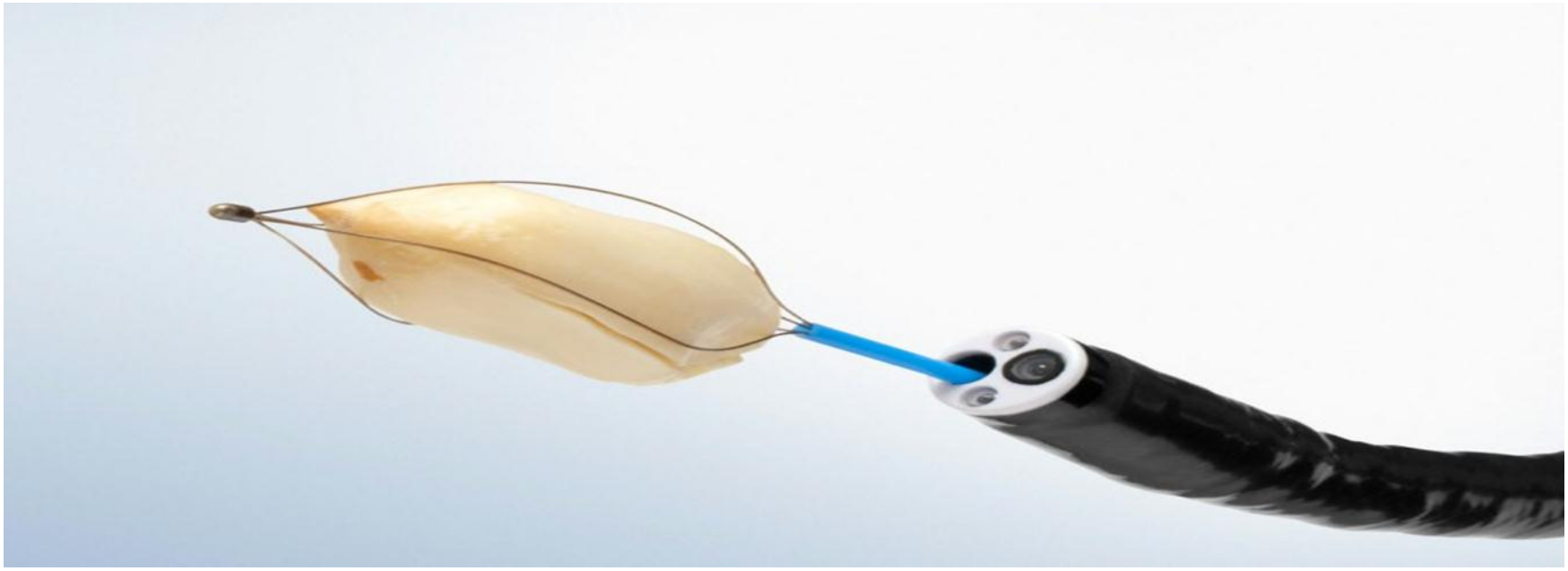
✓ Flexible

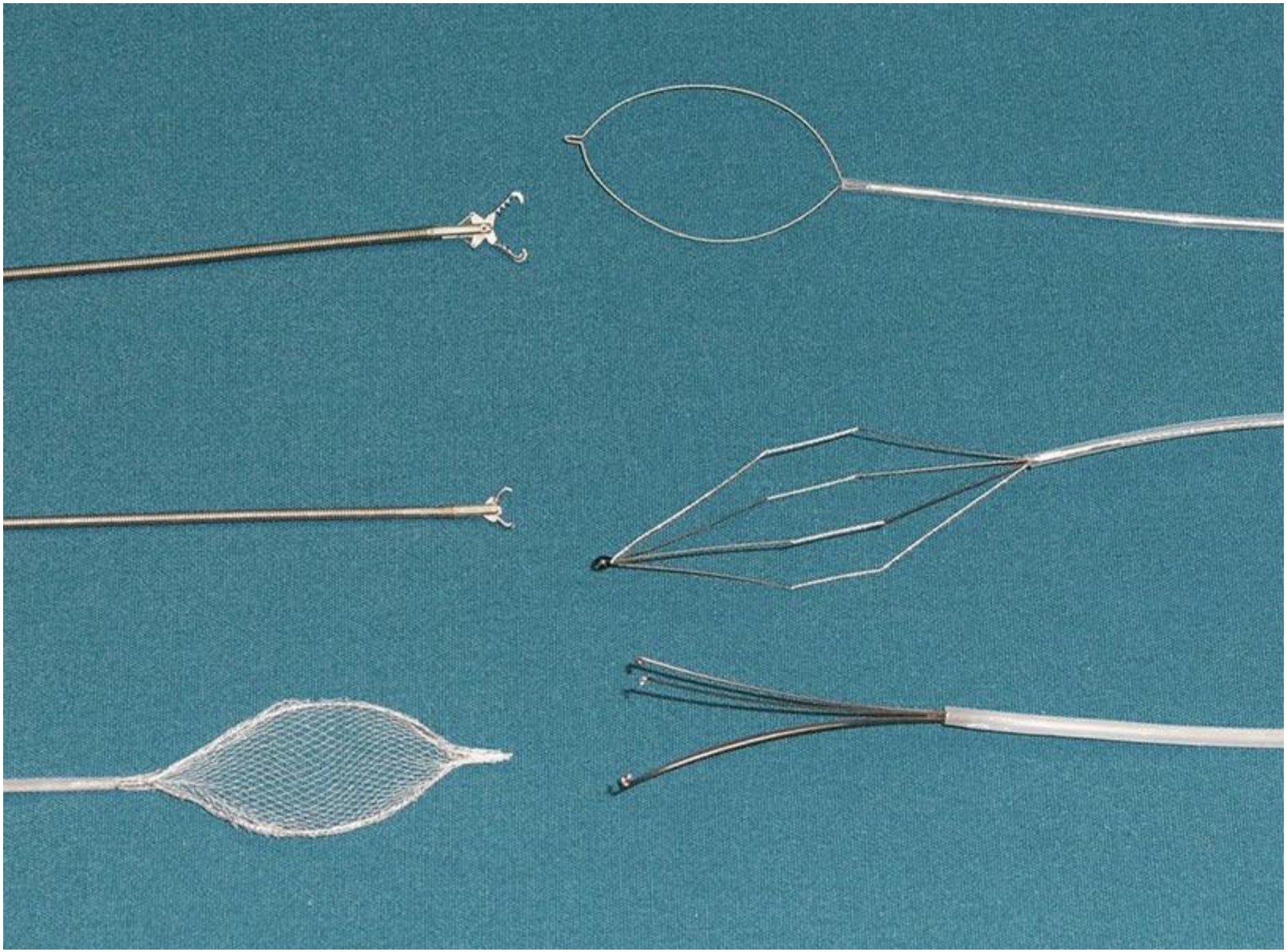


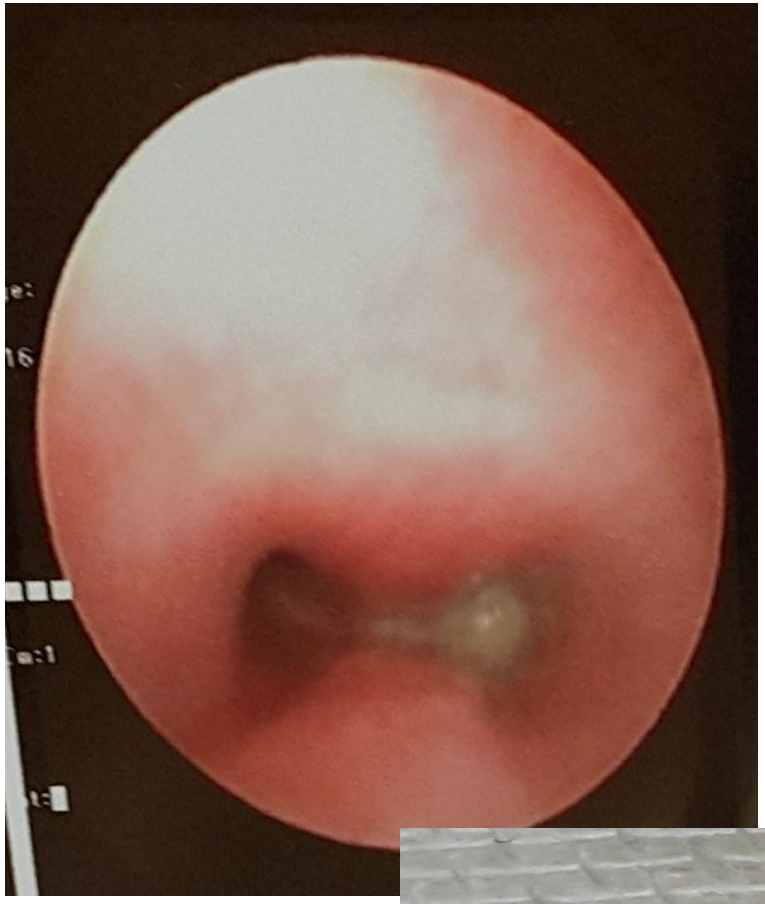
Fibroptic Bronchoscope

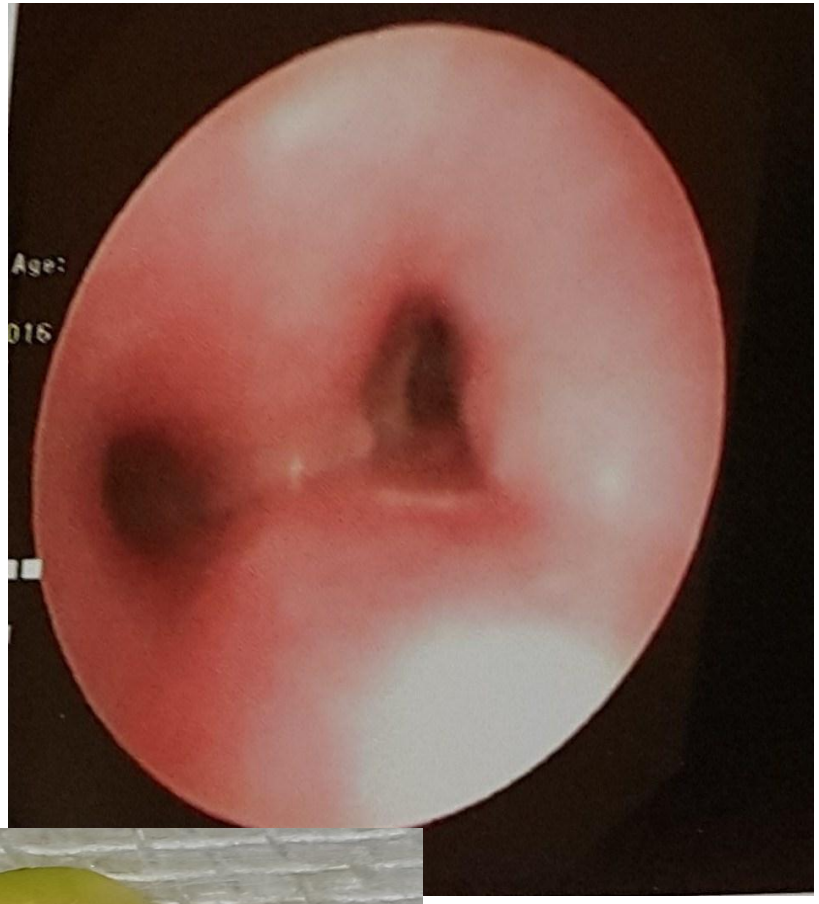
- Positive points
- *Less invasive*
- *More finding details*
- *More accurate position*
- *More extraction instruments*
- *More quickly*
- Negative points
- *Less airway control for oxygenation*
- *Less control for airways bleeding*
- *Some weak instruments*

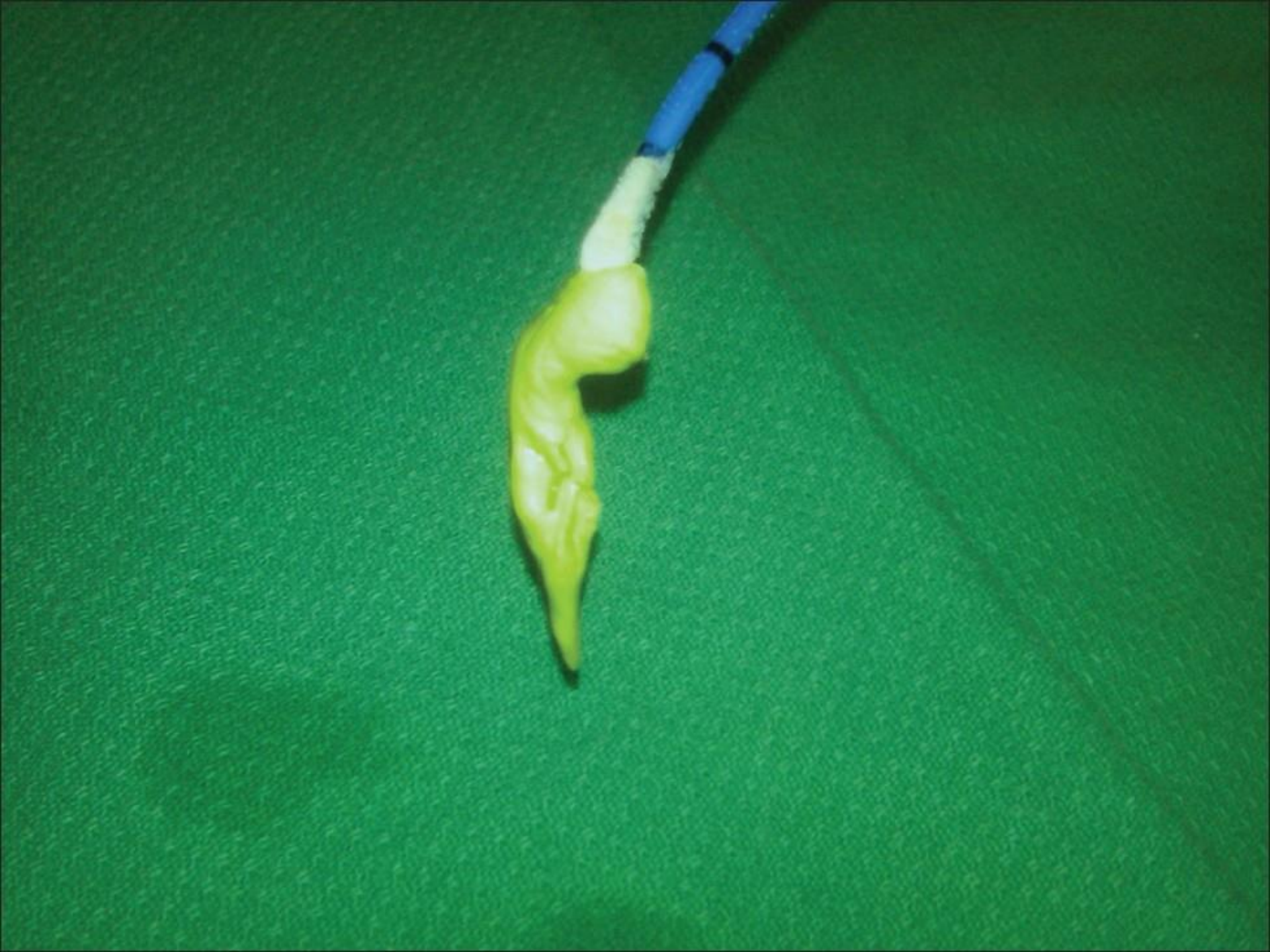


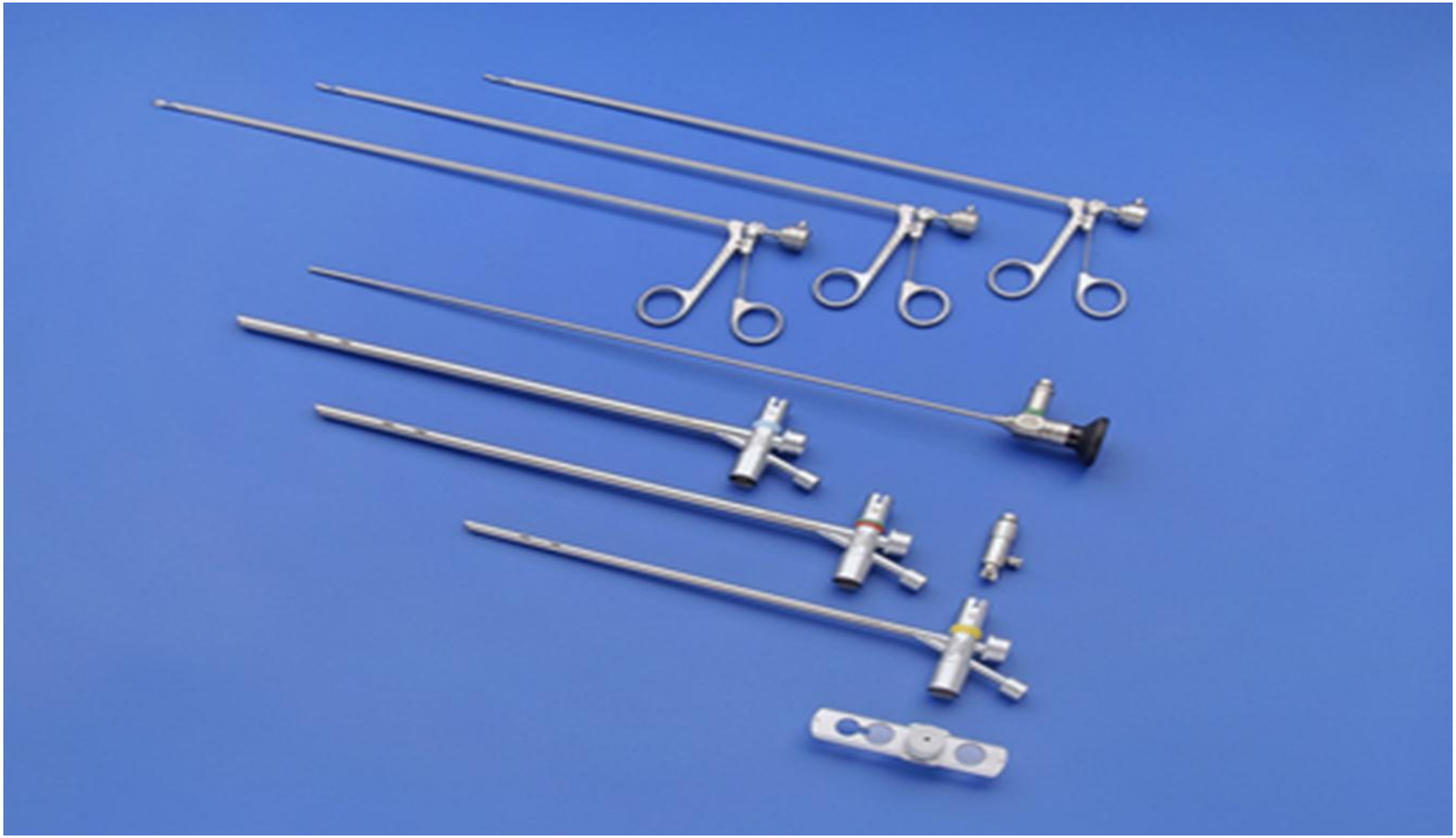







Age:





Preventing Others from Choking

- Never purchase (or consume) gel candies
- Never give a raw carrot to an infant as a “soother” for “teething”
- don’t give nuts or crispy fruits or vegetables to children until they are at least 3 years old
- Cut hot dogs lengthwise *twice*, until children are at least 5 years old
- Be careful when preparing and eating fish

Preventing Others from Choking

- Please “childproof” homes and daycares’
- *Don’t let children play with disc batteries*
- Extra caution should be used during birthday parties


Thanks