

Role of Airway Anatomy in the Diagnosis and Emergency Management of Respiratory Obstruction: A Review Article

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Abstract

Airway obstruction is a life-threatening emergency requiring immediate recognition and intervention. Understanding the anatomical structures of the airway and their role in obstruction is essential for effective management. This article discusses the anatomical basis of airway obstruction and outlines evidence-based emergency management strategies. (1,2)

Keywords

Airway obstruction, upper airway, emergency management, hypoxia, intubation

Introduction

The airway is divided into upper airway (nose, pharynx, larynx) and lower airway (trachea, bronchi, lungs). Obstruction at any level can compromise oxygenation and ventilation, leading to hypoxia, brain injury, or death if not promptly treated. (2,3)

Aim The aim of this review is to discuss the anatomical basis of airway obstruction and to outline evidence-based emergency management strategies for clinicians.

Objects

- To identify the specific anatomical sites within the upper and lower airways prone to obstruction.
- To review the pathophysiology and clinical features associated with respiratory blockage.
- To detail the sequence of emergency interventions, from basic to advanced airway management.

Review of Literature:

Anatomical Basis of Airway Obstruction

1.Upper airway Obstruction

The upper airway is the most common site of obstruction due to its relatively narrow and collapsible structure. (2,4)

a. Nasal Cavity

Nasal cavity obstruction may occur due to foreign bodies, nasal polyps, or congenital anomalies such as choanal atresia. (4,5)

b. Pharynx

The pharynx is divided into nasopharynx, oropharynx, and laryngopharynx. Common causes of obstruction include tongue fall in unconscious patients, edema, and infections such as tonsillitis. (5,6)

Common causes:

- Tongue fall in unconscious patients
- Edema (e.g., anaphylaxis)
- Infections (e.g., tonsillitis)

c. Larynx

The larynx is particularly narrow in children at the level of the cricoid cartilage. Causes of obstruction include laryngospasm, epiglottitis, trauma, and foreign body aspiration. (8,14,15)

2. Lower Airway Obstruction

a. Trachea

Causes:

- Compression (tumor, goiter)
- Trauma
- Foreign body

b. Bronchi and Bronchioles

Causes:

- Bronchospasm (e.g., asthma)
- Secretions
- Inflammation (e.g., bronchitis)

Pathophysiology

Airway obstruction leads to reduced airflow, hypoxia, increased work of breathing, carbon dioxide retention,

respiratory acidosis, and eventually cardiac arrest if untreated. (1,12,18)

Clinical Features

- Stridor (upper airway obstruction)
- Wheezing (lower airway obstruction)
- Cyanosis
- Use of accessory muscles
- Altered consciousness
- Silent chest (severe obstruction) (10,12)

Emergency Management

Initial Assessment (ABC Approach) . (11,12)

A –Airway

- Check patency
- Look for obstruction (vomit, foreign body)

B –Breathing

- Assess respiratory rate, effort, oxygen saturation

C – Circulation

- Pulse, blood pressure

1. Basic Airway Management

- Basic airway management includes head tilt–chin lift, jaw thrust, suctioning, and foreign body removal. (10,20)
- Head tilt–chin lift (if no cervical injury)
- Jaw thrust (if trauma suspected)
- Suctioning of secretions
- Removal of foreign body.

2. Airway Adjuncts

- Oropharyngeal airway (OPA)
- Nasopharyngeal airway (NPA)

3. Advanced Airway Management

- Endotracheal intubation
- Laryngeal mask airway (LMA)
- Cricothyrotomy (emergency)
- Tracheostomy (definitive airway. (8,15,21)

4. Specific Management Based on Cause

Cause	Management
Foreign body	Heimlich maneuver, bronchoscopy
Anaphylaxis	IM adrenaline
Asthma	Bronchodilators, steroids
Infection	Antibiotics, airway support
Trauma	Stabilization + airway control

5. Oxygen Therapy

- High-flow Oxygen
- Ventilatory support if needed. (11,13)

Complications

- Complications include
- Hypoxic brain injury
- Cardiac arrest
- Aspiration pneumonia. (12,18)

Conclusion

Airway obstruction is a critical emergency requiring rapid identification and intervention. A strong understanding of airway anatomy enables clinicians to identify the site and cause of obstruction and provide timely management to reduce morbidity and mortality.

References

1. Hall JE. Guyton and Hall Textbook of Medical

Physiology. 14th ed. Philadelphia: Elsevier; 2021.

2. Standring S. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 42nd ed. London: Elsevier; 2020.
3. Moore KL, Dalley AF, Agur AMR. Clinically Oriented Anatomy. 8th ed. Philadelphia: Wolters Kluwer; 2018.
4. Snell RS. Clinical Anatomy by Regions. 10th ed. Philadelphia: Wolters Kluwer; 2019.
5. Tortora GJ, Derrickson B. Principles of Anatomy and Physiology. 15th ed. New York: Wiley; 2017.
6. Marieb EN, Hoehn K. Human Anatomy & Physiology. 11th ed. Pearson; 2018.
7. Ellis H. Clinical Anatomy: Applied Anatomy for Students and Junior Doctors. 14th ed. Wiley-Blackwell; 2018.
8. Rosenblatt WH, Sukhupragarn W. Airway management. In: Miller RD, editor. Miller's Anesthesia. 9th ed. Philadelphia: Elsevier; 2020.
9. Hagberg CA, Arttime CA. Airway management in the adult. N Engl J Med. 2015;373(15):1478-1488.
10. Walls RM, Murphy MF. Manual of Emergency Airway American Heart Association. Advanced Cardiovascular Life SupManagement. 5th ed. Philadelphia: Wolters Kluwer; 2018.
11. port (ACLS) Provider Manual. Dallas: American Heart Association; 2020.

12. Tintinalli JE. Tintinalli's Emergency Medicine: A Comprehensive Study Guide. 9th ed. New York: McGraw-Hill; 2020.
13. Marx JA. Rosen's Emergency Medicine: Concepts and Clinical Practice. 10th ed. Elsevier; 2022.
14. Cote CJ, Lerman J, Anderson BJ. A Practice of Anesthesia for Infants and Children. 6th ed. Elsevier; 2019.
15. Benumof JL, Hagberg CA. Benumof and Hagberg's Airway Management. 3rd ed. Philadelphia: Elsevier; 2013.
16. Stone CK, Humphries RL. Current Diagnosis & Treatment: Emergency Medicine. 8th ed. New York: McGraw-Hill; 2017.
17. Kumar P, Clark M. Kumar and Clark's Clinical Medicine. 10th ed. Elsevier; 2020.
18. Longo DL, Fauci AS, Kasper DL, et al. Harrison's Principles of Internal Medicine. 21st ed. New York: McGraw-Hill; 2022.
19. Parikh SR. Pediatric airway emergencies. Otolaryngol Clin North Am. 2019;52(5):779-792.
20. Aprahamian C, Thompson BM, Finger WA, Darin JC. Experimental cervical spine injury model and airway management. Ann Emerg Med. 1984;13(8):584-587.
21. Levitan RM. The Airway Cam Guide to Intubation and Practical Emergency Airway Management. 2nd ed. Wayne: Airway Cam Technologies; 2003.
22. Mason RA, Fielder CP. The obstructed airway in children. Anaesthesia. 1999;54(7):625-628.

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