2.10 OXYGEN DELIVERY AND AIRWAY MANAGEMENT

Introduction

Respiratory distress and respiratory failure are encountered in a significant number of pediatric conditions in acute care and inpatient settings. Early identification and treatment of respiratory compromise remain critically important to the effective practice of pediatric hospital medicine. Pediatric hospitalists frequently encounter patients requiring oxygen and airway management and should be skilled in appropriate airway management and oxygen delivery in order to reduce respiratory related morbidity and mortality for hospitalized children.

Knowledge

Pediatric hospitalists should be able to:

- Describe the different modes of oxygen delivery, including nasal cannula, simple face mask, nonrebreather, and partial rebreather masks, and the approximate amount of oxygen delivered with each.
- Describe the indications for and uses of different types of airway equipment, including oropharyngeal, nasopharyngeal, laryngeal mask, and tracheal airways.
- Compare and contrast low flow and high flow oxygen delivery systems.
- Describe types of noninvasive ventilation such as continuous or bi-level pressure delivery systems, and discuss their indications for use, according to local practice.
- Describe the basic anatomy of the upper respiratory tract and the anatomic differences between infants, children, and adolescents.
- Discuss factors that may complicate airway management, including anatomic abnormalities of the face and oropharynx, neurologic impairment, and trauma.
- Distinguish between the use of oxygen delivery devices and airway management devices in the management of impending respiratory failure.
- Discuss the steps involved in assessing and securing a patient's airway, including proper airway positioning, suctioning, selection and use of the appropriate airway equipment, and the use of adjunctive medications.
- List the items essential to have available at the bedside or in an emergency supply cart in the event of respiratory compromise, including suction, oxygen, oxygen delivery systems, pediatric sizes of advanced airway equipment, and resuscitation medications.
- Identify the various forms of monitoring related to assessment of oxygenation and ventilation, including cardiorespiratory monitors, pulse oximetry, capnography, and blood gas sampling.
- Summarize commonly encountered complications and hospital-acquired conditions (HACs) associated with use of oxygen delivery and airway management devices, attending to potential harms to the skin, airway, and lung.
- Describe and interpret blood gas results, including arterial, venous, and capillary.
- Identify the indications for consultation with an otorhinolaryngologist, anesthesiologist, intensivist, surgeon, or other subspecialist regarding airway management.

Skills

Pediatric hospitalists should be able to:

- Identify patients needing or at risk for needing airway management devices or oxygen delivery and initiate appropriate use.
- Order appropriate monitoring for patients receiving oxygen or using airway devices and correctly interpret monitor data.
- Correctly use standard head tilt and jaw thrust maneuvers to open a child's airway.
- Select and use the appropriate method of oxygen delivery according to the clinical situation.
- Select the appropriate airway device and size and establish a secure airway when indicated.
- Utilize noninvasive ventilation when clinically indicated, according to local context.
- Use suction equipment to clear the airway as appropriate.
- Respond with appropriate corrective action when a tracheostomy tube becomes obstructed or dislodged in patients with mature tracts, according to local context.
- Wean oxygen proactively when the clinical situation allows.
- Implement a patient-specific plan for respiratory care in collaboration with nursing, respiratory therapy, subspecialists, and other healthcare providers.
- Implement a plan to ensure healthcare team awareness of a critical airway when present.
- Engage appropriate consultants to ensure proper airway management as appropriate.

Attitudes

Pediatric hospitalists should be able to:

- Exemplify responsible airway management and oxygen delivery when the clinical need arises.
- Acknowledge the importance of maintaining skills in airway management and oxygen delivery.
- Appreciate the importance of remaining current with relevant continuing education activities, including Pediatric Advanced Life Support (PALS).
- Exemplify and advocate for effective communication with the patient and the family/caregivers regarding the need for airway management, oxygen delivery, and the care plan.

Systems Organization and Improvement

In order to improve efficiency and quality within their organizations, pediatric hospitalists should:

- Collaborate with hospital administration to optimize appropriate utilization of oxygen therapies and oxygenation monitoring devices.
- Lead, coordinate, or participate in the development of hospital systems designed to detect patients with respiratory compromise early and provide an appropriate, rapid response.
- Lead, coordinate, or participate in educational opportunities and systems to improve airway skills and effective re-

sponse for healthcare providers, including PALS training, the use of mock codes, and simulation training where available.
- Collaborate with subspecialists and hospital administration to establish a system of appropriate identification and response to patients with atypical anatomy and the presence of a critical airway.
- Work with hospital administration to ensure that age and size-appropriate airway and emergency equipment is available for each patient room and care area.
- Collaborate to create and sustain practices to reduce potential harms from HACs associated with use of respiratory devices.

References

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2. Walsh BK, Smallwood CD. Pediatric oxygen therapy: A review and update. *Respir Care*. 2017;62(6):645-661. https://doi.org/10.4187/respcare.05245.