## CHAPTERIntubation and Ventilation113of Infants and Children

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## REFERENCES

- 1. Mittiga MR, Geis GL, Kerrey BT, Rinderknecht AS: The spectrum and frequency of critical procedures performed in a pediatric emergency department: implications of a provider-level view. *Ann Emerg Med* 61: 263, 2013. [PMID: 22841174]
- Levitan RM, Everett WW, Ochroch EA: Limitations of difficult airway prediction in patients intubated in the emergency department. *Ann Emerg Med* 44: 307, 2004. [PMID: 15459613]
- Losek JD, Olson LR, Dobson JV, Glaeser PW: Tracheal intubation practice and maintaining skill competency: survey of pediatric emergency department medical directors. *Pediatr Emerg Care* 24: 294, 2008. [PMID: 18496112]
- Sakles JC, Laurin EG, Rantapaa AA, Panacek EA: Airway management in the emergency department: a one-year study of 610 tracheal intubations. *Ann Emerg Med* 31: 325, 1998. [PMID: 9506489]
- Luten R, Wears RL, Broselow J, Croskerry P, Joseph MM, Frush K: Managing the unique size-related issues of pediatric resuscitation: reducing cognitive load with resuscitation aids. Acad Emerg Med 9: 840, 2002.
- Benumof JL, Dagg R, Benumof R: Critical hemoglobin desaturation will occur before return to an unparalyzed state following 1 mg/kg intravenous succinylcholine. *Anesthesiology* 87: 979, 1997. [PMID: 9357902]
- Goldmann K: Recent developments in airway management of the paediatric patient. Curr Opin Anaesthesiol 19: 278, 2006. [PMID: 16735811]
- Davidovic L, LaCovey D, Pitetti RD: Comparison of 1- versus 2-person bag-valve-mask techniques for manikin ventilation of infants and children. *Ann Emerg Med* 46: 37, 2005. [PMID: 15988424]
- Bodily JB, Webb HR, Weiss SJ, Braude DA: Incidence and duration of continuously measured oxygen desaturation during emergency department intubation. *Ann Emerg Med* 67: 389, 2016. [PMID: 26164643]
- Joffe AM, Hetzel S, Liew EC: A two-handed jaw-thrust technique is superior to the onehanded "EC-clamp" technique for mask ventilation in the apneic unconscious person. *Anesthesiology* 113: 873, 2010. [PMID: 20808210]
- Moynihan RJ, Brock-Utne JG, Archer JH, Feld LH, Kreitzman TR: The effect of cricoid pressure on preventing gastric insufflation in infants and children. *Anesthesiology* 78: 652, 1993. [PMID: 8466065]
- Walker RWM, Ravi R, Haylett K: Effect of cricoid force on airway calibre in children: a bronchoscopic assessment. Br J Anaesth 104: 71, 2010. [PMID: 19942611]
- Pham TMT, O'Malley L, Mayfield S, Martin S, Schibler A: The effect of high flow nasal cannula therapy on the work of breathing in infants with bronchiolitis. *Pediatr Pulmonol* 50: 713, 2015. [PMID: 24846750]
- Hough JL, Pham TMT, Schibler A: Physiologic effect of high-flow nasal cannula in infants with bronchiolitis. *Pediatr Crit Care Med* 15: e214, 2014. [PMID: 24705569]
- Wing R, James C, Maranda LS, Armsby CC: Use of high-flow nasal cannula support in the emergency department reduces the need for intubation in pediatric acute respiratory insufficiency. *Pediatr Emerg Care* 28: 1117, 2012. [PMID: 23114231]
- Thia LP, McKenzie SA, Blyth TP, Minasian CC, Kozlowska WJ, Carr SB: Randomised controlled trial of nasal continuous positive airways pressure (CPAP) in bronchiolitis. *Arch Dis Child* 93: 45, 2008. [PMID: 17344251]
- Lee JH, Rehder KJ, Williford L, Cheifetz IM, Turner DA: Use of high flow nasal cannula in critically ill infants, children, and adults: a critical review of the literature. *Intensive Care Med* 39: 247, 2013. [PMID: 23143331]
- Williams AM, Abramo TJ, Shah MV, et al: Safety and clinical findings of BiPAP utilization in children 20 kg or less for asthma exacerbations. *Intensive Care Med* 37: 1338, 2011. [PMID: 21567114]
- Abramo T, Williams A, Mushtaq S, et al: Paediatric ED BiPAP continuous quality improvement programme with patient analysis: 2005–2013. *BMJ Open* 7: e011845, 2017. [PMID: 28093429]
- Newth CJ, Rachman B, Patel N, Hammer J: The use of cuffed versus uncuffed endotracheal tubes in pediatric intensive care. J Pediatr 144: 333, 2004. [PMID: 15001938]
- Weiss M, Dullenkopf A, Fischer JE, Keller C, Gerber AC: Prospective randomized controlled multi-centre trial of cuffed or uncuffed endotracheal tubes in small children. *Br J Anaesth* 103: 867, 2009. [PMID: 19887533]
- Passi Y, Sathyamoorthy M, Lerman J, Heard C, Marino M: Comparison of the laryngoscopy views with the size 1 Miller and Macintosh laryngoscope blades lifting the epiglottis or the base of the tongue in infants and children <2 yr of age. *Br J Anaesth* 113: 869, 2014. [PMID: 25062740]

- Mellick LB, Edholm T, Corbett SW: Pediatric laryngoscope blade size selection using facial landmarks. *Pediatr Emerg Care* 22: 226, 2006. [PMID: 16651910]
- Pallin DJ, Dwyer RC, Walls RM, Brown CA: Techniques and trends, success rates, and adverse events in emergency department pediatric intubations: a report from the National Emergency Airway Registry. Ann Emerg Med 67: 610, 2016. [PMID: 26921968]
- Grunwell JR, Kamat PP, Miksa M, et al: Trend and outcomes of video laryngoscope use across PICUs. *Pediatr Crit Care Med* 18: 741, 2017. [PMID: 28492404]
- Eisenberg MA, Green-Hopkins I, Werner H, Nagler J: Comparison between direct and video-assisted laryngoscopy for intubations in a pediatric emergency department. Acad Emerg Med 23: 870, 2016. [PMID: 27208690]
- Park R, Peyton JM, Fiadjoe JE, et al: The efficacy of GlideScope<sup>®</sup> videolaryngoscopy compared with direct laryngoscopy in children who are difficult to intubate: an analysis from the paediatric difficult intubation registry. *BJA Br J Anaesth* 119: 984, 2017. [PMID: 29028952]
- Burjek NE, Nishisaki A, Fiadjoe JE, et al: Videolaryngoscopy versus fiber-optic intubation through a supraglottic airway in children with a difficult airway: an analysis from the multicenter Pediatric Difficult Intubation Registry. *Anesthesiology* 127: 432, 2017. [PMID: 28650415]
- Frey B: Oxygen administration in infants. Arch Dis Child Fetal Neonatal Ed 88: 84F, 2003.
  Driver BE, Prekker ME, Kornas RL, Cales EK, Reardon RF: Flush rate oxygen for emergency airway preoxygenation. Ann Emerg Med 69: 1, 2017. [PMID: 27522310]
- McQuade D, Miller MR, Hayes-Bradley C: Addition of nasal cannula can either impair or enhance preoxygenation with a bag valve mask: a randomized crossover design study comparing oxygen flow rates. *Anesth Analg* 126: 1214, 2018. [PMID: 28759496]
- Hayes-Bradley C, Lewis A, Burns B, Miller M: Efficacy of nasal cannula oxygen as a preoxygenation adjunct in emergency airway management. *Ann Emerg Med* 68: 174, 2016. [PMID: 26747218]
- Olayan L, Alatassi A, Patel J, Milton S: Apnoeic oxygenation by nasal cannula during airway management in children undergoing general anaesthesia: a pilot randomised controlled trial. *Perioper Med* 7: 3, 2018. [PMID: 29484172]
- Vukovic AA, Hanson HR, Murphy SL, Mercurio D, Sheedy CA, Arnold DH: Apneic oxygenation reduces hypoxemia during endotracheal intubation in the pediatric emergency department. Am J Emerg Med 37: 27, 2019. [PMID: 29699900]
- Silva L, Oliveira JE, Cabrera D, Barrionuevo P, et al: Effectiveness of apneic oxygenation during intubation: a systematic review and meta-analysis. *Ann Emerg Med* 70: 483, 2017. [PMID: 28712606]
- Kerrey BT, Mittiga MR, Rinderknecht AS, et al: Reducing the incidence of oxyhaemoglobin desaturation during rapid sequence intubation in a paediatric emergency department. *BMJ Qual Saf* 24: 709, 2015. [PMID: 26183713]
- Ellis DY, Harris T, Zideman D: Cricoid pressure in emergency department rapid sequence tracheal intubations: a risk-benefit analysis. Ann Emerg Med 50: 653, 2007. [PMID: 17681642]
- Fastle RK, Roback MG: Pediatric rapid sequence intubation: incidence of reflex bradycardia and effects of pretreatment with atropine. *Pediatr Emerg Care* 20: 651, 2004. [PMID: 15454737]
- Puntervoll SA, Søreide E, Jacewicz W, Bjelland E: Rapid detection of oesophageal intubation: take care when using colorimetric capnometry. *Acta Anaesthesiol Scand* 46: 455, 2002. [PMID: 11952450]
- 40. Cheifetz IM, Myers TR: Respiratory therapies in the critical care setting: should every mechanically ventilated patient be monitored with capnography from intubation to extubation? *Respir Care* 52: 423, 2007.
- Apfelbaum JL, Hagberg CA, Caplan RA, et al: Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology* 118: 251, 2013. [PMID: 23364566]
- Sagarin MJ, Chiang V, Sakles JC, et al: Rapid sequence intubation for pediatric emergency airway management. *Pediatr Emerg Care* 18: 417, 2002. [PMID: 12488834]
- Templeton TW, Goenaga-Díaz EJ, Runyan CM, Kiell EP, Lee AJ, Templeton LB: A generalized multistage approach to oral and nasal intubation in infants with Pierre Robin sequence: a retrospective review. *Pediatr Anesth* 28: 1029, 2018. [PMID: 30284747]
- 44. Choi GJ, Kang H, Baek CW, Jung YH, Woo YC, Cha YJ: A systematic review and metaanalysis of the i-gel<sup>®</sup> vs laryngeal mask airway in children. *Anaesthesia* 69: 1258, 2014. [PMID: 24866320]
- 45. Maitra S, Baidya DK, Bhattacharjee S, Khanna P: Evaluation of i-gel<sup>®</sup> airway in children: a meta-analysis. *Pediatr Anesth* 24: 1072, 2014. [PMID: 25041224]
- Smith P, Bailey CR: A performance comparison of the paediatric i-gel<sup>®</sup> with other supraglottic airway devices. Anaesthesia 70: 84, 2015. [PMID: 25187212]
- Kim MS, Oh JT, Min JY, Lee KH, Lee JR: A randomised comparison of the i-gel<sup>®</sup> and the Laryngeal Mask Airway Classic<sup>®</sup> in infants. *Anaesthesia* 69: 362, 2014. [PMID: 24641642]
- Kamlin CO, O'Connell LA, Morley CJ, et al: A randomized trial of stylets for intubating newborn infants. *Pediatrics* 131: 198, 2013.