7-28-2020

High flow nasal cannula in the surgical patient

Morta Lapkus
Beaumont Health

Paras Khandhar
Beaumont Health

Recommended Citation

Lapkus M, Khandar P. High flow nasal cannula in the surgical patient. Paediatric Surgery Essentials 2020 Jul 28; http://www.paediatricsurgeryessentials.com.

Posted on July 28, 2020 (http://paediatricsurgeryessentials.com/high-flow-nasal-cannula-in-the-surgical-patient/) by Nathan Novotny (http://paediatricsurgeryessentials.com/author/nathan/)

High Flow Nasal Cannula in the Surgical Patient

Morta Lapkus, MD and Paras Khandhar, MD

Beaumont Health, Royal Oak, MI, USA

No matter how much they want it, airway management and the decision to place a surgical patient on a ventilator should not just be for the PICU physicians to decide. The type of ventilation a patient receives can affect the surgical patient both positively and negatively. Could High Flow Nasal Cannula in the surgical patient be beneficial? Imagine a patient with an esophageal anastomosis that is extubated to CPAP. Now imagine the tears that would flow from the surgeon when they discover bilateral pneumothoraces and a blown-out anastomosis. Tragic. Therefore, we must weigh the risks and benefits of intubation versus the various respiratory adjuncts as a multidisciplinary group rather than territorial separatists.

It should come as no surprise that intubation and reintubation may result in significant consequences: prolonged care in the hospital, ventilator induced lung injury, ventilator associated pneumonia, increased use of sedatives, and an increased mortality. There are several adjuncts that can help prevent respiratory morbidity in children including blow-by or aerosol mask, nasal cannula, high-flow nasal cannula (HFNC), and noninvasive positive pressure ventilation (NIPPV), which is comprised of CPAP and BiPAP. All abbreviations aside, what these modalities do is to help provide a combination of oxygenation and ventilation without an endotracheal tube.

Seemingly one step up from nasal cannula, high flow nasal cannula (HFNC) is a type of noninvasive ventilation that provides patients with humidified, heated air at a high flow. HFNC, at approximately 0.5-2 L/Kg flow, reduces anatomic dead space, reduces airway resistance, maintains airway pressures, and increases mucus clearance.[1] It not only provides a constant flow of oxygen, but helps remove CO2 and keeps the airways open with a small amount of positive pressure.

HFNC is not all rainbows and unicorns, it has it disadvantages as well. HFNC can be detrimental in pediatric surgical patients if they cannot handle their secretions, are at risk for aspiration, or if they recently had gastrointestinal surgery – think about the "fictitious" esophageal anastomosis we discussed earlier. In spite of that, HFNC is much more comfortable and physically tolerable when compared to CPAP or BiPAP. Patients on HFNC can talk and sometimes even eat. The humidified air also decreases likelihood of dry mucous membranes that can become very sore. Two downsides: 1) there is no measurement of the pressure at the level of the airway[2] and 2) the pressure delivered can be decreased if a patient's mouth is open making the amount of pressure present quite variable.

Studies have shown that HFNC does indeed decrease intubation rate and therefore the associated complications listed above.[3] It has also been used in post-extubation respiratory failure in order to prevent reintubation. Instead of intubating a patient, you may be able to support them enough using this non-invasive technology. Already popular in adult ICUs, HFNC is gaining popularity on the pediatric side too.

Your take-home point? It is not as benign as nasal cannula but not as malignant as CPAP or BiPAP. HFNC: prevention of tears from esophageal surgeons and it might just save your patient a reintubation and all the risks associated.

References:

[1]Mikalsen, I. B., Davis, P., & Øymar, K. (2016, July 12). High flow nasal cannula in children: A literature review. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*. BioMed Central Ltd. https://doi.org/10.1186/s13049-016-0278-4

[2]Adjuncts in Respiratory Care. (2016). In Waldhausen, J., Powell, D., & Hirschl, R. (Eds.), *Pediatric Surgery NaT*. American Pediatric Surgical Association. Retrieved June 29, 2020, from https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829021/all/Adjuncts_in_Respiratory_Care (https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829021/all/Adjuncts_in_Respiratory_Care)

[3]McKiernan, C., Chua, L. C., Visintainer, P. F., & Allen, H. (2010). High Flow Nasal Cannulae Therapy in Infants with Bronchiolitis. *Journal of Pediatrics*, *156*(4), 634–638. https://doi.org/10.1016/j.jpeds.2009.10.039

Posted in Paediatric Intensive Care (http://paediatricsurgeryessentials.com/./paediatric-intensive-care/)

← Readiness for Extubation for Pediatric Patients

Gastroschisis silo →

Leave a Reply

Your email address will not be published. Required fields are marked *

Start typing...

You may use these HTML (HyperText Markup Language) tags and attributes:

<a href="" title=""> <abbr title=""> <acronym title=""> <b> <blockquote cite=""> <cite> <code> <del datetime=""> <i> <q cite=""> <s> <strike>

Name *

Email *

Website

Post Comment

(https://twitter.com/paediatricsurg3) (https://www.facebook.com/paediatricsurgeryessentials)