High-Velocity Nasal Insufflation In The Treatment Of Respiratory Failure: A Randomized Clinical Trial

SUMMARY

- High velocity nasal insufflation for respiratory distress is a technique that seems to be gaining popularity.
- We’ve discussed it previously on EMA as it relates to pediatric patients with bronchiolitis, however, it is being used in other age groups and for other indications as well.
- The basic idea is that the high flow, warmed, humidified oxygen can wash out the extra thoracic dead space of CO\(_2\) thereby allowing a higher fraction of O\(_2\) to reach the lungs.
- Recently, there has also been evidence to suggest this technique is able to increase the PEEP at the alveolar level and thus aid in the recruitment of additional alveoli. Therefore, it should help for people with hypoxemic respiratory failure.
- However, many or most patients with respiratory failure in the ED have either ventilatory failure or combined hypoxemic respiratory failure. Often you don’t know which they have thus BiPap helps but it is not clear that high flow insufflation should help.
- The authors here conducted a non-inferiority, RCT of High velocity Nasal insufflation vs. conventional BPAP for people in undifferentiated respiratory failure in 5 EDs. Essentially every patient who needed non-invasive positive pressure ventilation was included. The exclusion criteria were very reasonable (no aspiration risks, nobody who needed immediate intubation).
- The primary endpoint was treatment failure including the need to intubate the patient OR to cross them over to the other strategy (to go from NC to BiPap within 72 hours).
- 228 patients were randomized but 24 were excluded (which is > 10 %) after randomization, which is far from ideal. The reasons were that they did not need positive pressure, they met some exclusion criteria or the doctor saw the randomization chose to withdraw the patient and some did not consent (that’s ok).
- Ultimately they ended up with 204 patients (104 High-Flow NC and 100 NIPPV)
- The average age was 63 and about 40% had COPD, 15% CHF, and 40% with unexplained dyspnea on arrival.
- The primary outcome occurred in 26% of the High Flow Group and 17% of the NIPPV group which was not statistically significantly different. The intubation rate out of the High flow group was 7% vs. 13% in the NIPPV group.
- One additional finding was that the downward PaCO\(_2\) trend was similar between NIPPV and HF – suggesting that it does support ventilator function.

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EDITOR’S COMMENTARY: This randomized control trial of high velocity nasal insufflation versus BPAP for undifferentiated patients with respiratory failure found that patients who were more likely to require NIPPV but were less likely to get intubated. Ultimately the authors concluded that high-velocity nasal insufflation is noninferior to noninvasive positive-pressure ventilation. This study demonstrates that when we start with NIPPV and the patient doesn’t tolerate we move quickly to intubation. On the other hand, those patients may do well with High-Flow NC and those people who don’t do well, we can convert to NIPPV and they do well with that. There are, however, significant issues with this study- it wasn’t blinded and some of the cases were excluded because the patients were really sick (even after randomization) so it’s a little hard to tell who the ideal patient for this is. Overall, this is somewhat useful data showing us that High-Flow NC might be worth trying, especially for someone who is unlikely or unable to tolerate NIPPV – if it fails, just move over to NIPPV or if you’ve already failed that, intubation.