

EBM for COVID-19 and Aerosol Generating Procedures (AGP)

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There appears to be relatively little in the way of good quality evidence regarding the risk of transmission of COVID19 to Health care workers with regards to AGP. Those papers which are quoted regularly appear to be based on a small body of work by Hui, also a NZ paper by Roberts. I have attached full text or abstract depending on what I could find.

The decision to use AGP should be made in conjunction with a FACEM; each decision will be made on a case-by-case basis, and is likely to vary between patients.

Generally it appears that dispersed air by most of the aerosol generating procedures is in the order of < 1m from the patients face breathing at rest. Of note even HFNP 30-60L/min causes dispersion of air to <20cm, whilst poorly fitting low flow NP cause dispersion of air < 30cm. However forced exhalation (coughing / snorting) can significantly increase air dispersion upto 4.4M at (transient) flow rates of up to 600L/min. however the combination of forced exhalation whilst using HFNP did not increase gas dispersion ie the HFNP did not further propagate exhaled air. These studies are based on smoke models, and it is postulated that even small droplets generated by aerosolising procedures would not travel as far. What these smoke models cannot clarify is whether the aerosolisation could cause desiccation of virions nor whether these would be viable to cause infection if they were to come into contact with mucosal surfaces (ie the eyes) as to date there is no information available for COVID19. Further, the papers do talk about the fact that in an environment that is not a negative pressure space with 12 air exchanges per hour the environment does fill with smoke (simulating exhaled air) < 5 mins , however standard ward ventilation would lead to minimal significant exposure outside of the distance of air dispersion.

Some data which may provide clinically relevant information regarding risk of transmission is presented in the systematic review by Tran et al (attached) which looked at case-control studies of AGP during SARS epidemic evaluating risk of nosocomial infection of health care workers by procedure. Unfortunately like many systematic reviews the original papers were of low quality, hence it is difficult to rely upon this to guide practice. It is specifically noted by the author that it is unclear whether the infections were due to the AGP or due to contact with surfaces leading to self inoculation (though likely the AGP resulted in increase surface contamination). This paper appears to be the basis of the statement by Infection Prevention society describing Intubation, NIV, tracheostomy and manual BVM ventilation as increased risk, whilst HFNP / CPR are not an increased risk.

ANZICs and Surviving Sepsis guidelines for COVID state there is reasonable evidence that HFNP improves mortality outcomes for patients with COVID19 however if patients are unwell enough to require more aggressive support BiPAP offers no benefit over intubation. Hence for relevant patient intubation should not be delayed. However when ventilators are at capacity, BiPAP may be the only temporising therapy available, so in this context is a reasonable option.

Postulated in the online world of opinion is the option to provide HFNP with a face mask to mitigate increase gas dispersion created by coughing/forced exhalation. I think this has some face validity and is in keeping with studies that coughing/snorting is far more aerosolising than HFNP, and HFNP do not make this worse.

So my conclusion is that HFNP for suspected / confirmed COVID19 or background risk patients offers no increased risk above no HFNP therapy for the spontaneously ventilating patient, especially if they are actively coughing. There is evidence for patient benefit in moderate-severe hypoxia related to COVID(not for severe/critical cases requiring intubation). Hence it is not unreasonable to offer this therapy within the ED in either the green or red zone. Risk can be further mitigated by applying a surgical mask over the top to shield coughing.