

Endonasal drilling may be employed safely in the COVID-19 era

We read with interest the study by Workman et al regarding aerosolization associated with endonasal instrumentation.¹ The authors are to be congratulated on a rigorous and well-designed study with thorough review of the literature. Although we share the concern of potential risk to surgeons performing endoscopic endonasal sinus and skull base surgery in the coronavirus disease 2019 (COVID-19) era, we were not able to replicate the findings of their study in the operative scenario with an intubated patient under general anesthesia. In such a situation, positive expiration of air under force is not expected and thus we made no attempt to evaluate aerosol generation during sneezing.

Using a similar model to the cleverly designed one described by Workman and colleagues, 2 cadaveric specimens were secured in a supine position; the nasal cavity was filled with fluorescein solution (BlueWater ChemGroup, Fort Wayne, IN) diluted 1:10 with water and the excess was suctioned. After performing bilateral sphenoidotomies with middle turbinate resection, the rostrum and clivus were drilled for >2 minutes with a 4-mm coarse diamond extended bur (Stryker TPS drill) at 60,000 rpm. A standard 2-surgeon, 4-handed technique was employed with 8-French suction in the nondominant hand. During drilling, irrigation of the nasal cavity with the fluorescein solution was performed as necessary to clear the surgical field using a 60-mL syringe with a curved suction tip. After drilling, the surgical field and personal protective equipment (PPE) of the surgeons were examined with an ultraviolet light. Even with repeated experiments on 2 cadaver heads, there was no evidence of droplets from drilling. Some contact contamination from removal of tissue and passage of instruments was noted.

It is of interest to note that the pattern of contamination in the Workman et al study was concentrated in the left field (relative to the patient), presumably on the side of the drill and in the direction of a spinning drill bit. It is possible that the use of a 5-mm cutting bur and proximity of the drill shaft to the nostril with drilling of the nasal beak may have contributed to the droplet pattern that they observed. The distribution of contamination with the drill exterior to the nasal cavity raises the possibility of partial exposure of the drill bit or continued spinning of the drill bit upon removal from the nasal cavity.

In an attempt to reproduce their results, the experiment was repeated with a 5-mm cutting bur and performance of a Draf III frontal sinusotomy. Identical results were observed with no significant contamination of the surgical field with drilling. The use of constant suctioning may have been a mitigating factor in our study and the moving drill was never removed from the nasal cavity. Counterintuitively, frequent irrigation during our trials did not contribute to droplet generation.

As noted by Kohanski et al, it is important to differentiate between a true aerosol and droplet spread.² The model discussed here is designed to measure droplet spread and contamination from direct contact (tissues and instruments). It is probable that there is generation of aerosol with smaller particles. Not all surgical factors that may increase or lessen aerosol generation during endoscopic sinus surgery have been characterized and this bears further study.

We agree with the recommendations of Workman et al regarding the use of PPE during all such surgeries regardless of COVID-19 status. However, based on our limited study, the use of high-powered drills is not contraindicated but may be employed safely with good technique that includes: use of a coarse diamond bur to minimize large particulate bone dust; frequent irrigation to clear particles and prevent burning of bone; and constant suctioning of the surgical field while drilling. Unnecessary drilling should be minimized, and the drill should not be removed from the nose while still activated. The operative team should avoid cross-contamination from removed tissues and instruments. Protective barriers between the surgical field and the surgical team should be used to further decrease risk. Even when operating on COVID-19–positive patients, it appears that infection of the surgical team can be avoided with proper PPE and protocols.³

We look forward to continued investigation of risk factors and efforts to minimize risks during endonasal surgery and thank the authors of the aforementioned study for their efforts and model that can be used to study these risks.

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