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Navigating surgical safety in the COVID-19 crisis

In mid-March 2020, an email chain began to circulate amongst otolaryngologists and neurosurgeons in the western world. The chain appeared to originate in North America with comments from major centres on the east and west coasts, and made its way to Australia, the UK and western Europe. It described a case from Wuhan, in which an endoscopic transnasal pituitary surgery was performed on a patient who was later found to be COVID-19 positive. All 14 people who had been in the operating theatre subsequently became infected. In some versions of the story, all 14 staff eventually died despite wearing N95 masks. The case was commented on by the mayor of Wuhan, described in mainstream media articles^{1,2} and published in a peer-reviewed journal.³ The working theory was that high-speed drilling within the nose aerosolized a high viral load in theatre, and viral load was thought to be directly proportional to morbidity from COVID-19.

In response, the Neurosurgical Society of Australasia (NSA) and the Australian Society of Otolaryngology, Head and Neck Surgery (ASOHNS) considered the available evidence and consulted with the equivalent peak organizations in the UK and North America. A strong recommendation was made on 24 March 2020 to suspend all transnasal surgery unless deemed absolutely urgent as it was considered a high-risk aerosol-generating procedure (AGP).

Then, on 1 April 2020, Zhu *et al.* from the Department of Neurosurgery at Union Hospital in Wuhan published the facts of the case. The patient in question developed fever post-operatively and was investigated for COVID-19 which resulted positive. Fourteen staff members contracted COVID-19, four of whom were in direct contact with the patient and 10 of whom were not. None of the infected staff had been in the operating theatre, and none of the four staff who were in contact with the patient were wearing appropriate personal protective equipment at the time.⁴

The NSA and ASOHNS then consulted with the Department of Health and considered the fact that the new case rate in Australia was declining. Public health data as of 23 April 2020 showed that the prevalence of COVID-19 in the Australian community was less than six per 100 000.⁵ The advice from the office of the Chief Medical Officer was to triage patients based on symptoms, and that the probability of an asymptomatic patient having COVID-19 based on those prevalence figures was extremely low. The recommendation was revised on 24 April 2020 to allow transnasal surgery after triaging for COVID-19 symptoms.

This story illustrates the difficulty of navigating surgical safety in the rapidly evolving COVID era. How do you make important decisions when the data are impossible to verify, the time window is short and the consequences of inaction are serious? As surgeons, we face this scenario not infrequently in the operating room. However, we are not accustomed to this scenario when making policy decisions. Decision-making with unreliable data has been extensively studied in other fields. In environmental science, the precautionary principle states when a serious threat to health exists, scientific uncertainty should not be used to postpone preventative measures. In military and corporate strategy literature, solutions include seeking more data, reducing probability distributions to binary statements, reverting to ideology and acting incrementally.⁶ In combat decision-making, the OODA loop of observe, orient, decide and act is often referenced. In aviation psychology, the FORDEC model of facts, options, risks and benefits, decision, execution and check is applied.⁷ In medical decision-making, we often fall back on the four ethical principles proposed by Beauchamp and Childress: autonomy, non-maleficence, beneficence and justice.⁸

Non-maleficence dictates that we cannot expose patients or colleagues to potential harm if an alternative exists. In functioning pituitary tumours such as Cushing's disease or acromegaly, the alternative is temporizing medical therapy. In pituitary apoplexy with visual failure, the alternative is a craniotomy to decompress the optic apparatus. The only reasonable decision then was to suspend transnasal surgery to avoid potential harm. Then, when reliable data became available, the NSA and ASOHNS responded by reopening transnasal surgery incrementally and with safeguards.

At the time of writing this article, recommencing transnasal surgery seems like the right thing to do given the presumed low community prevalence of COVID-19 in Australia. Sampling of asymptomatic populations in the coming weeks will hopefully confirm this. If we can provide standard of care treatments with minimal potential harm to patients and staff, then we should. But there are still concerns about the safety of transnasal surgery. There are reports that Iran and Italy have a disproportionately high number of otolaryngologists who are infected.⁹ It may take months before we can verify these reports and it is hard to know what to do with that information in the meantime. There is evidence in other fields that AGPs may be associated with increased rates of COVID-19 transmission. For example, tracheal intubation has been shown to be an AGP¹⁰ and a recent study noted that

one in 10 proceduralists may develop symptoms or test positive to COVID-19 within 14 days of intubating COVID-19 patients.¹¹ Meanwhile, major centres in the UK and North America are still deferring transnasal surgery unless absolutely urgent. COVID-19 is a rapidly evolving crisis and our response has to be agile.

Author Contributions

Rana S. Dhillon conceived the study. Rana S. Dhillon and Sarah Olson wrote and proofread the manuscript.

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