EJA

Eur J Anaesthesiol 2021; **38:**1293–1306

SHORT SCIENTIFIC REPORTS AND CORRESPONDENCE

Estimate of exposure to SARS-CoV-2 and performance of high-risk interventions by European anaesthesiologists

A Pan-European cross-sectional survey

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Editor,

After the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic began to spread globally at the beginning of 2020, concerns arose that frontline healthcare workers might be at increased risk of infection. During earlier SARS outbreaks, the performance of aerosol-generating procedures (AGPs) had been suspected of being associated with markedly elevated risks of transmission from patients to healthcare workers.[1] In an effort to define these AGPs, a recent rapid review that reached high agreement amongst experts, compiled and classified high-risk procedures.[2] Many of these procedures are typically and frequently performed by anaesthesiologists, such as intubation, extubation, bronchoscopy and airway suction. For the ongoing SARS-CoV-2 outbreak, however, a causal link between high-risk interventions and SARS-CoV-2 transmission has not been established conclusively.[3,4] In order to estimate the extent of exposure to the novel coronavirus among European anaesthesiologists and their involvement in high-risk interventions in coronavirus disease 2019 (COVID-19) patients, we conducted a web-based survey among the members of the European Society of Anaesthesiology and Intensive Care (ESAIC) from 19 September 2020 to 18 October 2020. The survey was announced via the society's e-mailing list and additionally advertised on its website. The local ethics committee at the University of Würzburg was consulted and expressed no concerns regarding anonymous surveys in the context of the COVID-19 pandemic (Az 219/20-am). The complete questionnaire as well as additional information on the technicalities can be found in the online supplements, http://links.lww.com/EJA/A569.

Following the survey link either from the E-mail or from the ESAIC website, 2704 participants visited the survey site, 1852 entered the survey (68.5% recruitment rate; metrics according to the CHERRIES checklist for internet-based surveys)[5] and 1524 completed the full questionnaire (82.3% completion rate). With 37 602 active, associate and trainee ESAIC members by 10 November 2020, this corresponds to a 4.1% participation rate amongst ESAIC members. Median age of the participants was 46 (95% CI 45 to 47) and 42.8% were women. Although physicians from 38 European countries participated, 942 (61.8%) were from Germany. Direct work-related contact with at least one confirmed COVID-19 patient was reported by 1071 (70.3%) of anaesthesiologists. However, 926 (60.8%) stated that they had not always known of their patients' SARS-CoV-2 infection status beforehand and only 286 (18.8%) claimed that their respective institutions required SARS-CoV-2 screening for all nonemergency patients from the beginning of the pandemic. This suggests potentially higher rates of COVID-19 contacts. Later onset of mandatory screening was reported by 872 (57.2%) participants, whereas 311 (20.4%) worked at institutions where, at the time of the survey, still no mandatory screening was in place. With respect to AGPs, 852 (55.9%) physicians reported to have performed at least one of the tasks in question in a confirmed COVID-19 patient. Of those who performed any high-risk interventions, 263 (30.9%) declared they had not always worn appropriate (in accordance with local or regional guidelines at the respective time) personal protective equipment (PPE) during these interventions. This does not include participants who may have worn the appropriate, yet possibly ineffective PPE at the time. In the overall cohort, 763 (50.1%) reported a 'noticeable shortage in *PPE* in a way that posed a potentially avoidable risk to *them* or *their* patients'. To alleviate shortages in resources, pan-European co-ordination and re-allocation was recently suggested by an international group of critical care experts.[6] Community-related exposure to confirmed COVID-19 cases was reported by 615 (40.4%) anaesthesiologists, 633 (41.5%) did not recall any such exposure and 276 (18.1%) did not know. Previous reports from the UK,[7] Belgium[8] and the Netherlands[9] had this path of exposure to be associated with an elevated risk of infection.

Participants were further asked about known SARS-CoV-2 infections in themselves. Out of all 1524 participating physicians, 65 (4.3%) self-reported at least one positive test for SARS-CoV-2 (PCR or immuno-assay); 958 (62.9%) had at least one test performed, but always tested negative; the rest (501, 32.9% of the total cohort) had never been tested at the time of the survey, although 280 (55.9% of those never tested) reported contact with COVID-19 patients. The test positivity rate in our cohort was 6.4% (65/1023 tested participants). Considering the markedly higher SARS-CoV-2 prevalence found in other studies in healthcare workers (5% in the Netherlands, March 2020, PCR[9]; 11.2% in the UK, June 2020, PCR and serology[7]; 24.4% in the UK, April 2020, PCR and serology[10]), this may be indicative of a substantial proportion of unidentified symptomatic and asymptomatic viral carriers among our sample. Additionally, differing SARS-CoV-2 incidence and prevalence in various European countries at the time of the study may have contributed to this finding. Out of the 65 infected physicians, 52 (80.0%) reported symptoms typically related to COVID-19 like dry cough, myalgia, fever, shortness of breath or anosmia. Due to their own COVID-19-like illness (independent of the suspected origin of infection), 85 physicians (5.6%) stayed off work at some point, and another 222 (14.6%) were forced to stay off work because of quarantine measures. Regardless of some probable sources for bias in this survey as discussed below, these numbers should still raise some concern. If in fact the virus is capable of compromising up to one-fifth of the anaesthetic workforce in such a way that they need to stay off work for a certain period of time, this may have relevant consequences with respects to patient care and safety as the pandemic continues, and new more contagious mutations of the virus begin to emerge.[11]

Positive test results in our cohort were not associated to a meaningful extent with either age (point-biserial correlation $r_{pb} = 0.013$, $P = 0.682$) or job experience (ordinal data; corrected Pearson's contingency coefficient $C_{corr} = 0.089$, $P = 0.043$). Moreover, no significant correlation between the performance of high-risk interventions and a positive SARS-CoV-2 test result was found (mean square contingency coefficient $\phi = 0.023$, $P = 0.516$). For endotracheal intubation, the absence of an association between procedure and infection has been suggested in a recent prospective study.[3]

As with any online survey, we appreciate a number of limitations to this study. At 4.1%, the response rate is rather low, although this is often the case in online surveys.[5] As the numbers above suggest, of those who visited the survey site, those who entered and completed the survey were at reasonably high rates. Thus, the low number of participants is best attributed to insufficient mobilisation of potential participants rather than drop-outs during the survey itself. Nevertheless, the included cohort of 1524 physicians cannot be considered to be representative of all European anaesthesiologists, regardless of whether the entirety of ESAIC members would have been, and should be interpreted as a convenience sample instead. In addition to that, some bias because of the self-selection of participants has to be assumed. Moreover, we relied on self-reported SARS-CoV-2 testing. Therefore, we cannot make any informed statements about the true prevalence of infection in the cohort, as one-third of the participants never underwent such testing.

With respect to high-risk interventions, the lack of a unified definition in the literature is a problem. And again, even when assuming the set of procedures described above was valid and complete, we rely on self-reporting of the participants on the extent to which they performed those procedures. It is conceivable that the accuracy of the reports in hindsight may be compromised.

Taking into account all shortcomings and sources of bias, this survey still provides some important messages: anaesthesiologists across Europe have extensive contact with SARS-CoV-2 positive patients; as our data may suggest, and other, prospective studies have started to confirm, the performance of aerosol-generating procedures (while wearing proper PPE, of course) may not pose the single highest threat to anaesthesiologists in the context of this pandemic. As the pandemic is still in full progress, physicians are affected by the ramifications of the spreading disease and need to be protected for their own and their patients' safety. Appropriate measures to maintain the proper functioning of the (anaesthetic) healthcare workforce will be of utmost importance.

Acknowledgements relating to this article

Assistance with the letter: we would like the ESAIC Board of Directors (Radmilo Jankovic, Orit Nahtomi, Marcelo Gama de Abreu, Ilona Bobek, Andreas Hoeft, Serban Bubenek, Bazil Ateleanu, Edoardo De Robertis) for their support of the study.

Financial support and sponsorship: this work was supported by institutional funds of the Department of Anaesthesiology, Intensive Care, Emergency and Pain Medicine, University Hospital Würzburg.

Conflicts of interest: Stefan De Hert serves on the board of directors at ESAIC; Charles Marc Samama serves as the editor-in-chief of the European Journal of Anaesthesiology; Kai Zacharowski serves as president of ESAIC. Peter Kranke serves as chairman of the ESAIC guidelines committee.

In memory of the recently deceased Professor Andreas Hoeft, who dedicated considerable effort to build up and develop the European Society of Anaesthesiology and Intensive Care.

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DOI:10.1097/EJA.0000000000001541

Morbidity and mortality related to surgery in patients with bronchopulmonary dysplasia

A retrospective cohort study in a Dutch tertiary institution

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Editor,

Bronchopulmonary dysplasia (BPD) is the most common respiratory comorbidity in premature neonates.[1] Previous research in Level IIIC children's hospital neonatal ICUs (NICU) in the USA has shown that up to 71% of premature neonates with severe BPD require at least one operative procedure during their admission to a NICU. The type of surgery performed ranges from supportive care for BPD to treatment of other comorbidities associated with prematurity.[2] However, data regarding the effects of BPD on peri-operative outcome in premature neonates undergoing surgery are lacking. Therefore, our objectives were to determine whether the presence of BPD during surgery leads to a higher mortality in premature neonates than a cohort of premature neonates without BPD, and to compare the postoperative morbidity of premature neonates diagnosed with BPD to that of premature neonates without the disease. We hypothesised that the presence of BPD was associated with a higher postoperative mortality and an increased number of complications after surgery.

This retrospective cohort study included all neonates with a gestational age of less than 32 weeks who were born in the Radboud University Medical Centre, were admitted to the NICU from December 2013 to October 2019 and who underwent at least one operative procedure during their NICU admission. We opted to use a gestational age of less than 32 weeks as a cut-off for inclusion because recent literature suggests that BPD is far less prevalent in more mature neonates.[3]

The study protocol was reviewed and approved by the local Institutional Review Board (IRB). The requirement for written informed consent was waived by the IRB because patients were not subjected to actions and no rules of conduct were imposed on them in this study.

Following national guidelines, data were extracted anonymously from electronic patient records in Epic version December 2019 (Epic Systems Corporation, Verona, Wisconsin, USA) using Cliniquest version 3.2.1 (Speedwell Software, Cambridge, UK). The main investigator had no direct access to patient records or patients' personal data.

Premature neonates were classified as having BPD if they required treatment with more than 21% oxygen for at least 28 days. An additional classification of BPD severity was applied in accordance with the 2001 National Institute of Child Health and Human Development (NICHD) criteria.[4] Standard patient characteristics and information about operation and postoperative admission were collected (see Table, Supplemental Digital Content 1, http://links.lww.com/EJA/A492, which illustrates preoperative associated morbidity and Table, Supplemental Digital Content 2, http://links.lww.com/EJA/A493, which illustrates baseline patient characteristics).

Postoperative complications were divided into two categories: surgical (defined as any complication resulting from surgery, for example ileus, postoperative wound infection and fascial dehiscence) and nonsurgical complications (defined as complications that arose during postoperative admission and required prolongation of hospital stay or additional treatment other than standard postoperative therapy regimens; see Table, Supplemental Digital Content 3, http://links.lww.com/EJA/A494, which illustrates an overview of postoperative nonsurgical complications).

Patients with and without BPD were compared using χ^2 or Fisher exact tests for categorical variables as