HSS COVID-19 Antibody Serology Among Surgeons & Anesthesiologists

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Study Design and Setting

A cross-sectional study of the seroprevalence of SARS-CoV-2 IgG antibodies among surgeons and anesthesiologists, with a survey assessing the presence of symptoms and risk factors associated with COVID-19 illness. The study was conducted at Hospital for Special Surgery, approved by the hospital's Institutional Review Board, and registered at ClinicalTrials.gov (NCT04389294). All participants provided written informed consent.

Hospital for Special Surgery is an orthopedic surgery specialty hospital in New York City. Prior to March 17, 2020 the hospital functioned as a comprehensive musculoskeletal care center. After March 17, 2020, the hospital was converted into a designated COVID-19 care facility and all elective surgical procedures were postponed.[13,14] Surgeons and anesthesiologists provided emergency orthopedic surgical care for COVID-19-positive and -negative patients and were additionally re-deployed from their usual roles to care for COVID-19 positive patients on the wards and Intensive Care Units (ICU). In parallel, the institution developed and implemented new local policies for telehealth, PPE, and infection control practices across all clinical settings.[13-14] These processes were fully implemented by early April, 2020.

Recruitment and participants

A recruitment email was sent to all attending surgeons, anesthesiologists, and trainees in both departments (orthopedic surgery fellows, anesthesiology fellows and orthopedic surgery residents) as identified via an institutional listserv. An electronic survey assessing COVID-19

illness and risk factors associated with SARS-CoV-2 exposure was provided, together with an invitation to self-schedule an appointment for SARS-CoV-2 serology testing. Inclusion criteria were defined as: a positive response to the recruitment invitation, completion of the survey, and/or scheduling an appointment for serology testing. Only those participants who completed both the survey and serology testing were included in the analyses. Participation was open between May 6, 2020 and June 5, 2020. A deadline was imposed for completing both elements (June 12, 2020).

Survey and SARS-CoV-2 IgG antibody testing

The survey retrospectively assessed demographics and factors of interest which occurred between January 1, 2020 – May 5, 2020 (Figure 2). The survey included 19 questions, separated into 3 domains: 1) demographics and co-morbidities, 2) practice role, residential location, working patterns before and after March 16, 2020, mode of commuting to work, and 3) COVID-19-like illness, specific symptoms, prior testing, and known close contacts with confirmed COVID-19 illness and their relationship to the participant.

Whole blood samples were obtained and tested for IgG antibodies to SARS-CoV-2, according to the manufacturer's instructions (Abbott Laboratories, ARCHITECT SARS-CoV-2 IgG. H14806RO1).[15] In studies of performance evaluation, the specificity of the assay was reported to be between 99.4–100% and sensitivity between 94.0–100% at 14 or more days after symptom onset.[15-17]

Outcomes and measurement

The primary outcome was defined *a priori* as the period prevalence of SARS-CoV-2 IgG antibodies by serology testing and the association with COVID-19 illness reported in the survey.

Secondary outcomes included differences in the remaining survey responses between IgG antibody-positive and -negative participants. These included demographics, comorbidities, practice patterns, professional role, training status, mode of commuting to work, known close contacts with confirmed COVID-19 and relationship, and prior SARS-CoV-2 testing.

Blinding

Due to the nature of the principle data collection tool (survey-based) participant blinding was not feasible. However, to minimize reporting bias – which may have been affected by knowledge of antibody status –the survey was sent in advance of serology testing. The research assistants responsible for data collection were blinded to individual serology testing results, and participants were advised they could check the results of their serology independently by contacting the hospital's Occupational Health Department.

Statistical Analyses

The period prevalence of SARS-CoV-2 IgG is expressed as a % of the total sample who met criteria for inclusion in the final analysis. Continuous variables are summarized as median (IQR) or mean (SD). Categorical variables are summarized as counts (%). The association between positive COVID-19 symptoms and SARS-CoV-2 IgG antibody status was measured by χ^2 testing. Univariate exact logistic regression analysis was conducted to estimate the odds ratio (95% CI) of differences on variables of interest between antibody-positive and -negative participants. For all tests, the α was set at 0.05. Statistical analysis was performed using SAS (version 9.4. SAS Institute, Cary, NC).