COVID-19 Research Watch
October 5, 2020

PATHOPHYSIOLOGY

Change in Antibodies to SARS-CoV-2 Over 60 Days Among Health Care Personnel in Nashville, Tennessee

Patel et al. assessed the duration of antibody response to SARS-CoV-2 infection in health care personnel. A convenience sample of health care personnel at Vanderbilt University Medical Center was used. Participants were tested for seroprevalence between April 3 and April 13, 2020 (baseline) and June 2 and June 27, 2020 (60-day follow-up). A total of 249 participants were tested at baseline and 230 (92%) returned for the second test. Nineteen (7.6%) tested positive for anti-SARS-CoV-2 antibodies at baseline. Eight (42%) of these individuals remained seropositive throughout the 60 days with six (75%) reporting symptoms prior to the baseline visit. The other 11 (58%) tested negative at the follow-up test. Of these 11, five (45%) reported symptoms prior to the baseline visit. All 19 participants who tested positive at baseline showed a decrease in antibody concentration over the 60-day period. Those who remained seropositive over the 60-day period showed a higher signal-to-threshold ratio at baseline than those who initially tested positive, but then tested negative the second time (4.8 vs. 1.4). The findings suggest cross-sectional seroprevalence studies may not accurately assess rates of prior infection as antibody concentrations appear to decrease below the threshold of detection over time.

PHARMACEUTICAL INTERVENTIONS

Long-term hydroxychloroquine use in patients with rheumatic conditions and development of SARS-CoV-2 infection: a retrospective cohort study

Gentry et al. conducted a retrospective cohort study to investigate the effects of long-term hydroxychloroquine use in patients with rheumatological conditions on risk of developing SARS-CoV-2. The study was conducted across all US Veterans Affairs Medical Centers (VAMCs) and included participants that were 18 years or older, alive as of March 1, 2020, who have an ICD-10 diagnostic code entry for rheumatoid arthritis, systemic lupus erythematosus, or associated rheumatological conditions, and who have documented hydroxychloroquine prescription of at least four 90-day supplies. A total of 10,703 patients receiving hydroxychloroquine and 21,406 patients not receiving hydroxychloroquine were enrolled. Results indicated no difference in the incidence of active SARS-CoV-2 infection, leading to an overall rate of infection of 3.39 cases per 1,000 patients. Overall hospital admission did not differ either, but all-cause mortality was lower in patients receiving hydroxychloroquine. A post-hoc analysis demonstrated that a daily dose of hydroxychloroquine of more than 400 mg was not associated with decreased risk of developing SARS-CoV-2 infection (13 of 2928 for >400 mg daily vs 18 of 7775 for ≤400 mg daily, p=0.081).

CLINICAL PRESENTATION AND MANAGEMENT
Risk Factors for Hospitalization, Mechanical Ventilation, or Death Among 10131 US Veterans With SARS-CoV-2 Infection

Ioannou et al. aimed to determine the risk of hospitalization, mechanical ventilation, and death associated with infection using national data from the Department of Veteran Affairs (VA) health care system. A total of 88,747 VA enrollees were tested for SARS-CoV-2 using nasopharyngeal swabs between February 28 and May 14, 2020 and 10,131 (11.4%) tested positive. Older age, being Black, having obesity and living in states with a high COVID-19 burden were associated with testing positive. Furthermore, individuals who tested positive also had higher 30-day rates of hospitalization (adjusted hazard ratio: 1.13 [95% CI: 1.08-1.13]), mechanical ventilation (adjusted hazard ratio: 4.15 [95% CI: 3.74-4.61]), and mortality (adjusted hazard ratio: 4.44 [95% CI: 4.07-4.83]). In patients who tested positive, increasing age was most strongly associated with risk of hospitalization, mechanical ventilation, and death. In addition, Black patients were more likely to be hospitalized and placed on mechanical ventilation than White patients but were no more likely to die. While previous studies reported Black race as a risk factor for mortality, the lack of association in this study is likely due to the evaluation of mortality only in patients who tested positive and not in the general population.

TRANSMISSION PATTERNS

SARS-CoV-2 antibody prevalence in Brazil: results from two successive nationwide serological household surveys

Hallal et al. conducted two nationwide seroprevalence surveys from May 14-21 and June 4-7, 2020, in 133 sentinel cities to investigate SARS-CoV-2 antibody prevalence in Brazil. Rapid, point of care antibody tests were conducted with blood from finger prick samples. In the first survey, 347 (1.39%) out of 24,995 participants tested positive, and 746 (2.4%) out of 31,128 participants tested positive in the second survey. While prevalence and changes in prevalence between the two surveys were different in every city, few cities saw a decrease in prevalence with the second survey and the highest prevalence was found in cities along the Amazon river. After adjusting for region, family members, and household wealth, the prevalence odds ratio for Indigenous people relative to White participants was 1.87 (1.18-2.96). At the time, this was the largest geographical population-based study of the prevalence of SARS-CoV-2 antibodies. The authors suggest that this provides counterevidence to the argument that higher ambient temperatures in tropical regions may protect against COVID-19 and highlights the increased risk to Indigenous Brazilians. Hallal et al. emphasize the interpretation of the results given the controversial management of the pandemic by the Brazilian government.

Surveillance of COVID-19 school outbreaks, Germany, March to August 2020

Authors analyzed national mandatory surveillance data on over 60,000 laboratory-confirmed COVID-19 cases reported in 8,841 outbreaks between January 28 to August 31, 2020, to describe school-related outbreaks in Germany over the course of the pandemic. Forty-eight (0.5%) of all reported outbreaks between these dates occurred in schools. The majority of cases occurred among individuals 21 years old or over (102/216), and the fewest (30/216) occurred among those aged 6-10. Prior to school closures, an average of 3.3 outbreaks
were reported per week, with six cases per outbreak. After schools partially reopened with control measures in place, average number of outbreaks per week reduced to 2.2 with four cases per outbreak. Authors suggest that effective containment measures, increased surveillance capability, and rapid contact tracing may allow to safely open schools without spillover into the community.

MODELS

Routine childhood immunisation during the COVID-19 pandemic in Africa: a benefit–risk analysis of health benefits versus excess risk of SARS-CoV-2 infection

To understand the effects of suspending mass vaccination campaigns, Abbas et al. conducted a benefit-risk analysis of childhood immunization during the pandemic, utilizing data from all 54 countries in Africa. Specifically, the study compared vaccine-preventable deaths averted through scheduled childhood immunization to deaths due to SARS-CoV-2 contracted through visiting vaccine sites for routine vaccination. Modelling efforts focused on the delivery of childhood immunizations at five points throughout infancy during a six-month period and utilized health impact estimates to calculate an annual number of deaths averted per 1000 vaccinated children. Results of the modelling efforts showed that, in a high impact situation, for every death due to SARS-CoV-2 exposure during routine childhood immunization programs, these programs would prevent 84 (95% UI 14-267) deaths in children under 5 years of age. One third of the 702,000 averted deaths, in children up to 5 years of age in Africa over a six-month period, were attributed to measles and pertussis, followed by DTP, hepatitis B, and S pneumoniae, and others. Excess deaths due to SARS-CoV-2 infections primarily occurred among parents, adult caregivers, and older adults in the household of the vaccinated child. In low impact scenarios, the benefit-risk ratio for the majority of countries in Africa as greater than one. This indicates the overall benefits of continuing childhood vaccination programs during the pandemic, granted that vaccination centers continue with implementing infection prevention and control measures.

COVID-19 among people experiencing homelessness in England: a modelling study

This study investigated the incidence of COVID-19 among people experiencing homelessness in England through modelling daily interactions of individuals who were susceptible to, exposed to, infectious with, or recovered from COVID-19 in community settings (hostels, night shelters, and sleeping outside), COVID-19 related accommodations, or hospitals. The study formulated a number of scenarios that differed based on timeline of the pandemic (first-wave or future) as well as lockdown measures implemented. The model estimated that in the first wave of infections, preventative measures avoided 21,092 (19,777-22,147) infections and 266 (266-301) deaths among the homeless population. These measures included infection control, hotel accommodations, and any mixing with the general population. Upon continuation of these measures and a second wave, the model predicted an increase in excess cases with 1,754 infections (1543–1960) and 31 deaths (21–45) in the general population. Without preventative measures, numbers of infections, deaths, and hospital and ICU admissions would largely increase, regardless of a low COVID-19 incidence rate in the general population.
UNIVERSAL SCREENING AND TESTING

Performance characteristics of five immunoassays for SARS-CoV-2: a head-to-head benchmark comparison

This study aimed to identify the sensitivity and specificity of four commercial SARS-CoV-2 antibody immunoassays. The same samples were also assessed with the novel 384-well format ELISA, which targets antibodies against trimeric spike proteins (Oxford immunoassay). Healthy participant blood samples were collected from September 4th, 2014 to Oct 4th, 2016 among individuals at least 18 years of age. Laboratory-confirmed SARS-CoV-2 infection blood samples were collected from patients admitted to hospitals or surveillance on health-care workers. Assay sensitivity and specificity were assessed on 976 of the 1000 pre-pandemic healthy participant blood samples. Assay sensitivity and specificity were assessed on 536 samples from RT-PCR-confirmed COVID-19 patients. Results show that the DiaSorin assay sensitivity was 95.0% and specificity was 98.7%, Oxford immunoassay sensitivity was 99.1% and specificity was 99.0%, Roche assay sensitivity was 97.2% and specificity was 99.8%, Abbott assay sensitivity was 92.7% and specificity was 99.9%, and the Siemens assay sensitivity was 98.1% and specificity was 99.9%. All tests achieved a specificity of 98% on samples taken 30 days or more post symptom onset and reached a sensitivity of 98%. For all assays, antibody responses increased throughout the first 3-4 weeks after symptom onset. This study informs the selection and use of serological testing, and provides benchmarks for additional comparative assessments.

REGION-SPECIFIC LESSONS LEARNED

Strengthening the UK primary care response to Covid-19

This report highlights the need for additional primary care involvement in the COVID-19 response to improve patient outcomes, especially in the context of recent case increases. Data suggests that 30% of registered COVID-19 deaths occurred outside hospitals, reinforcing a need for care at home and in outpatient health services. Primary care is faced with new challenges as they must provide care for initial COVID-19 cases and the accumulation of other diseases. Therefore, the UK general practice is implementing new models of care to help patients with complex health. The GPs must be a part of a strategy that prepares the NHS for COVID-19 outbreaks, deferring management of other conditions and simultaneous epidemics. Communication and integration of primary care providers with public health and secondary care decision-makers is critical. Primary care allows for early interventions to reduce the risk of adverse outcomes, enhance system resilience in response to health challenges arising from COVID-19, and continuity of care. Therefore, greater investment in primary care research and stakeholders is urgent to improve the care of vulnerable patients.

NON-CLINICAL TRENDS

Association of race and ethnicity with comorbidities and survival among patients with COVID-19 at an urban medical center in New York

This retrospective cohort study explored characteristics of 5902 patients from a large academic medical center in the Bronx, New York who tested positive for COVID-19 between
March 14 and April 15, 2020 to demonstrate whether there are differences between different ethnic and racial groups regarding comorbidities and case fatality rates associated with COVID-19. The death rates among racial and ethnic groups in this study were as follows: Hispanic (16.2%), non-Hispanic Black (17.2%), non-Hispanic White (20%), and Asian (17%). Non-Hispanic Black patients (39.5%) and Hispanic patients (34.3%) had a higher prevalence of two or more comorbidities compared to non-Hispanic White patients (28.9%). Once risk-adjusted for age, sex, socioeconomic status and comorbidities, non-Hispanic Black and Hispanic patients exhibited similar outcomes to their non-Hispanic White counterparts. This study suggests diminished disparities with COVID-19 outcomes from access to comprehensive health care in urban areas with large academic health systems, but the authors note that these results do not directly speak to the high disease burden in minority groups.

Diagnosis of physical and mental health conditions in primary care during the COVID-19 pandemic: a retrospective cohort study

This report highlights the effect of the COVID-19 pandemic on diagnoses of physical and mental health conditions by examining electronic health records for a socioeconomically disadvantaged urban population in the United Kingdom. Comparison was made to counts from previous years and expected cases accounting for potential missed diagnoses by extracting monthly counts of first diagnoses and first prescriptions for the conditions and medications of interest and using negative binomial regression models fitted on the monthly counts for the period. Nearly 50% of the 241,458 individuals in this study identified as women, and the mean age was 35 years. The results showed that 1073 first diagnoses of comment mental health problems between March 1 and May 31, 2020 compared with 2147 expected cases based on preceding years, representing a 50·0% reduction. Additionally, there was a 43% reduction for diagnoses of cardiovascular conditions and a 49% reduction in diagnoses for type 2 diabetes compared to their respective expected case count. The results suggest a need for primary and secondary care services to prepare for the large number of patients with delayed or undiagnosed medical conditions.

ADDITIONAL RESOURCES
UCSF Library COVID-19 Research and Information Resources
UCSF Institute for Global Health Sciences COVID-19 Resources
UC Davis One Health Institute COVID-19 FAQs
Harvard Viswanath Lab Myths vs Facts

Note on this Document: This document was assembled by graduate and doctoral students attending the University of California, San Francisco with the intent of facilitating the rapid dissemination of information to the global community in order to help during this time. Alyssa Bercasio, James Feng, Shivali Joshi, Sigal Maya, and Micaela Reyna contributed to these summaries. This work is volunteer based.

References:


