Supplementary information

Serosurvey of SARS-CoV-2 among Hospital Visitors in China

Methods

Since Jan 20th, the First Affiliated Hospital of Guangzhou Medical University required all inpatients and their companions to undergo chest CT, routine blood collection and viral RNA testing of respiratory swabs, with random samples selected for antibody testing using a chemiluminescence assay (YHLO, Shenzhen, Guangdong). The chemiluminescence assay provided by YHLO was in approval process in the Chinese Food and Drug Administration. Using a fully automated chemiluminescent assay on a YHLO Biotech analyzer, Qian and his colleagues processed the serum of patients with or without COVID-19 at 10 hospitals.[1] They tested for IgM and IgG to the nucleocapsid and spike proteins (both recombinant). Clinical sensitivity (in over 500 samples) of IgM was 85.9% and to IgG 96.6%, relative to RT-qPCR. They used over 900 samples from patients with diseases other than COVID-19, as well as over 500 non-hospitalized (healthy) patient samples to determine specificity. They found the specificity of test to be 97.3% for hospitalized patients. In order to minimize false positivity, we requested YHLO to recalculate the cut-off for achieving 100% specificity for both IgM and IgG; in this situation, the new sensitivity was 75% for IgM, 94.2% for IgG.

The Hubei Cancer Hospital began to readmit patients on March 9th, and required chest CT, blood routine and antibody tests by colloidal gold immunoassay (INNOVITA, Tangshan, Hebei) in the outpatient department to screen COVID-19. These tests use

blood samples from a finger prick, saliva samples, or nasal swab fluids. COVID-19 IgM +IgG Colloidal Gold Kit is based on a one-step lateral flow chromatographic immunoassay. The test line was precoated with anti-Human COVID-19 IgM + IgG antibodies. If the specimen contains COVID-19 antibodies, the "colloidal gold conjugated SARS-Cov-2 antigen, anti-human COVID-19 IgM+IgG" complex will bind to the capture antibody coated on the test line to develop a burgundy-colored band. This antibody assay was approved by the Chinese Food and Drug Administration and pended approval by US FDA. The reported sensitivity is 87.3% and specificity is 100% (https://www.centerforhealthsecurity.org/resources/COVID-19/serology/Serology-based-tests-for-COVID-19.html#sec1). Those patients with positive SARS-CoV-2 specific antibodies were screened for SARS-CoV-2 RNA in throat swabs by PCR.

Positive rate of each antibody was calculated by the positive number divided by the total number of individuals being tested. The trend curves were estimated by polymerization smoothing. Microsoft Excel 2013 was used for all calculation and data storage.

Reference

1. Qian CG, Zhou M, Cheng FM, et al. Development and Multicenter Performance Evaluation of The First Fully Automated SARS-CoV-2 IgM and IgG Immunoassays. *medrxiv.org* doi: https://doi.org/10.1101/2020.04.16.20067231

Table S1. Demographic and geographic characteristics

	Guangzhou cohort N (%)	Hubei cohort N (%)
Number of cases	8,782	8,272
Sex, males	4249 (48.3)	4140 (50.0)
Age	54 (IQR, 44-62)	55 (IQR, 38-67)
Patients/healthy caregivers	8,257 (94) /525 (6)	6,052 (73.2) /2,220 (26.8)
Inside Guangzhou	2,514 (28.6)	-
Inside Wuhan	-	4,153 (50.2)

IQR, interquartile range

Table S2. Distribution of antibody positivity against SARS-CoV-2 in Guangzhou and Wuhan cohort.

	Groups	Any positive	IgM+	IgG+	Types			Any positive	IgM+	IgG+	Types		
					IgM+ only	IgG+ only	IgM and IgG				IgM+ only	IgG+ only	IgM and IgG
		Guangzhou (N=8,782) N, (%)						Hubei (N=8,272) N, (%)					
Overall		52 (0.59)	39 (0.44)	14 (0.16)	38 (0.43)	13 (0.15)	1 (0.01)	177 (2.14)	71 (0.86)	123 (1.49)	54 (0.65)	106 (1.28)	17 (0.21)
	Total	52 (0.59)	39 (0.44)	14 (0.16)	38 (0.43)	13 (0.15)	1 (0.01)	177 (2.14)	71 (0.86)	123 (1.49)	54 (0.65)	106 (1.28)	17 (0.21)
Sex	Male	22 (0.22)	14 (0.33)	9 (0.21)	13 (0.31)	8 (0.19)	1 (0.02)	66 (1.59)	23 (0.56)	47 (1.14)	19 (0.46)	43 (1.04)	4 (0.10)
	Female	29 (0.65)	25 (0.56)	4 (0.09)	25 (0.56)	4 (0.09)	0 (0.00)	111 (2.69)	48 (1.16)	76 (1.84)	35 (0.85)	63 (1.52)	13 (0.31)
	Total	52 (0.59)	39 (0.44)	14 (0.16)	38 (0.43)	13 (0.15)	1 (0.01)	177 (2.14)	71 (0.86)	123 (1.49)	54 (0.65)	106 (1.28)	17 (0.21)
	0-9	1 (0.38)	1 (0.38)	0 (0.00)	1 (0.38)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	10-19	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
	20-29	1 (0.09)	1 (0.09)	0 (0.00)	1 (0.09)	0 (0.00)	0 (0.00)	4 (0.79)	0 (0.00)	4 (0.79)	0 (0.00)	4 (0.79)	0 (0.00)
	30-39	2 (0.15)	1 (0.07)	2 (0.15)	0 (0.00)	1 (0.07)	1 (0.07)	15 (1.39)	2 (0.18)	13 (1.20)	2 (0.18)	13 (1.20)	0 (0.00)
Age	40-49	9 (0.74)	4 (0.33)	5 (0.41)	4 (0.33)	5 (0.41)	0 (0.00)	28 (1.74)	11 (0.68)	19 (1.18)	9 (0.56)	17 (1.06)	2 (0.12)
	50-59	16 (0.97)	13 (0.79)	3 (0.18)	13 (0.79)	3 (0.18)	0 (0.00)	63 (2.61)	28 (1.16)	39 (1.61)	24 (0.99)	35 (1.45)	4 (0.17)
	60-69	15 (0.87)	12 (0.69)	3 (0.17)	12 (0.69)	3 (0.17)	0 (0.00)	56 (2.73)	23 (1.12)	39 (1.90)	17 (0.83)	33 (1.61)	6 (0.29)
	70-79	6 (0.73)	5 (0.61)	1 (0.12)	5 (0.61)	1 (0.12)	0 (0.00)	10 (1.98)	6 (1.19)	8 (1.58)	2 (0.40)	4 (0.79)	4 (0.79)
	80-89	2 (0.61)	2 (0.61)	0 (0.00)	2 (0.61)	0 (0.00)	0 (0.00)	1 (2.44)	1 (2.44)	1 (2.44)	0 (0.00)	0 (0.00)	1 (2.44)
	90-99	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	-	-	-	-	-	-