Natural humoral immunity per year after SARS-CoV-2 infection in hospitalized patients☆

Inmunidad humoral natural al año tras infección por SARS-CoV-2 en pacientes hospitalizados

The immune response to SARS-CoV-2 virus infection continues to be a poorly understood topic. Its understanding and evaluation could be important, both in the field of vaccination strategies and in the use of specific treatments with neutralising antibodies.

After SARS-CoV-2 infection, an adaptive response is launched, both humoral, with specific neutralising antibodies directed mainly against the spike (S) glycoprotein, and cellular, mediated by CD4+ T cells and CD8 T cells.[1] We carried out a prospective study in order to analyse the natural humoral response after SARS-CoV-2 infection in hospitalised patients, as well as to try to determine if there is any factor that can predict a greater humoral immune response during patient follow-up. The study included a total of 207 serological samples from 69 patients, all of them diagnosed with SARS-CoV-2 pneumonia and requiring hospital admission during the months of March and April 2020, with a minimum follow-up of 12 months. We analysed, among other variables, circulating humoral immune memory, both IgM and IgG against the nucleocapsid protein, and IgG against the S glycoprotein for SARS-CoV-2 (06S61 SARS-CoV-2 IgG II Quant; 06R90 SARS-CoV-2 IgG and Architect CoV2 IgM; Abbott Ireland) at 3, 6 and 12 months.

Of the sample studied, the mean age was 62 years (51-73), and 51% were women Some 75% had associated comorbidities, the most prevalent being hypertension (39%), obesity (33%) and dyslipidaemia (28%). Regarding the determination of humoral immunity, 207 serological samples were analysed after hospital discharge. Table 1 shows the results regarding circulating humoral immunity at 3, 6 and 12 months. The absence of circulating antibodies was 3% during the first months without major changes after one year. The percentage of circulating antibodies against anti-nucleocapsid IgG was reduced by up to 40% at 12 months. However, the values of IgG against the spike (S) glycoprotein remained stable and present in >96% of the patients during the first 12 months after infection. In the sample studied, there were no readmissions or symptomatic reinfections during follow-up. Similarly, no predictive factors were found for a greater humoral response at 12 months.

In recent months, there have been numerous studies in the literature in which the duration of humoral response to the S glycoprotein is debated. The results are heterogeneous. Studies such as those published by Roddan LB, et al.[2], Ibarrondo FJ, et al.[3] and Ripperger TJ, et al.[4] show an approximate duration of three months, but in general terms, most have found that neutralising antibodies remain stable for the first six months[5–7]. There are fewer published studies evaluating a greater durability of humoral immunity[1,8], and in a recently published article, an estimated time of 11 months is established[9]. In the literature reviewed, there are no data on humoral immunity evaluated after one year of follow-up. In our series of patients, no predictive factors were found for a greater humoral response at 12 months. This contrasts with other studies in which it is evident that the specific antibody response seems to be higher in those patients with severe and moderate disease compared to mild or asymptomatic cases[5,6,10].

There are several limitations in our study: (1) the small sample size, which is why studies with a larger number of cases are needed to confirm our findings, (2) the exclusive evaluation of the humoral response without considering the cellular response, and (3) the sample studied corresponds entirely to patients with pneumonia who required admission, while asymptomatic patients or patients with mild involvement were not included.

Table 1
Circulating humoral immunity against SARS-CoV-2.

SARS-CoV-2 serology			
	3 months	6 months	12 months
No circulating antibodies	3%	3%	3.7%
IgM+ and IgG+	30.8%	40.6%	18.5%
IgG+	95.6%	91.3%	55.5%
IgG spike+	97%	97%	96.4%

In summary, our data demonstrate the presence of natural humoral immunity in >96% of the patients studied 12 months after SARS-CoV-2 infection, with no symptomatic reinfections at follow-up or readmissions.Circulating humoral immunity is the tip of the iceberg visible to clinicians, but more complex studies evaluating cellular immunity are required to understand the immune memory against SARS-CoV-2 infection, and to help in both vaccination strategies and in the use of specific treatments with neutralising antibodies or convalescent plasma.

Conflicts of interest

Luis Cabanes López has received speaker fees from AstraZeneca and OrionPharma.

Elsa Naval declares has received speaker fees from AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Janssen, Novartis, Roche and Teva, and consultancy fees from Esteve Laboratories.

All other authors declare that they have no conflicts of interest.

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