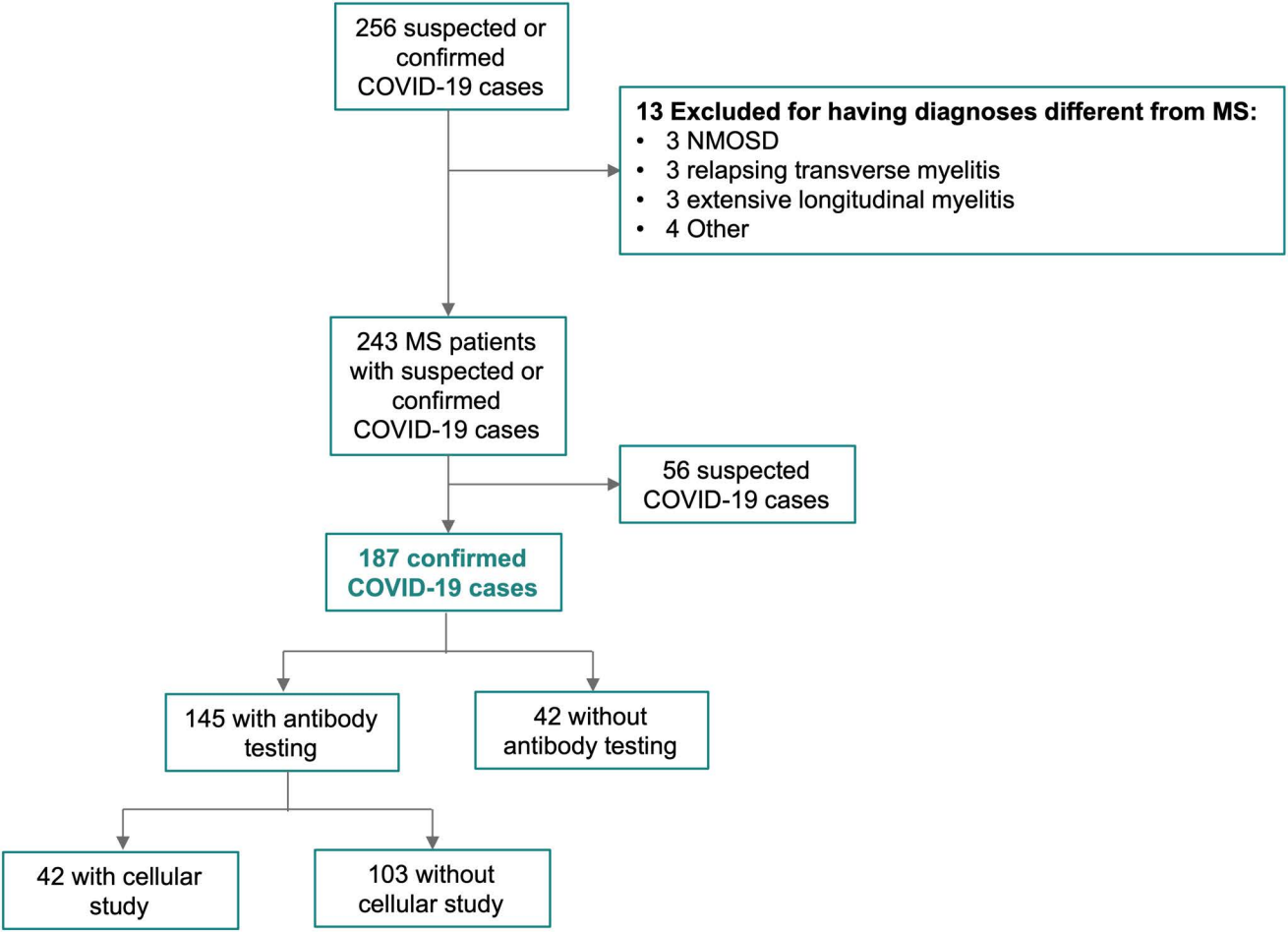
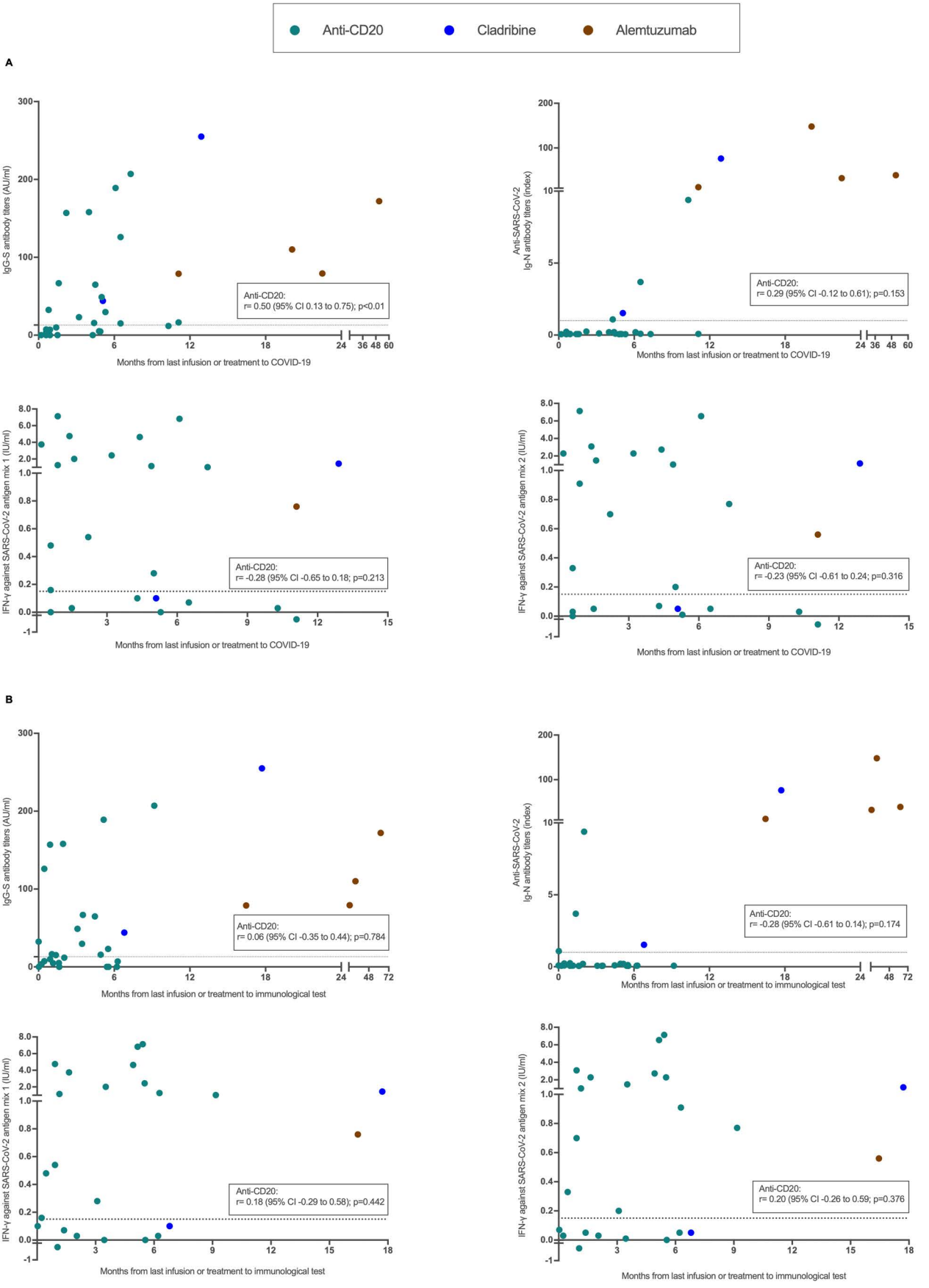
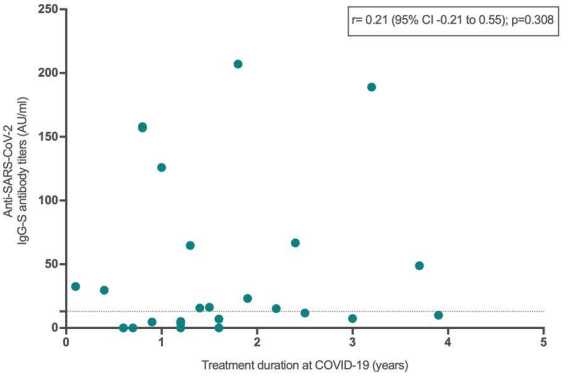
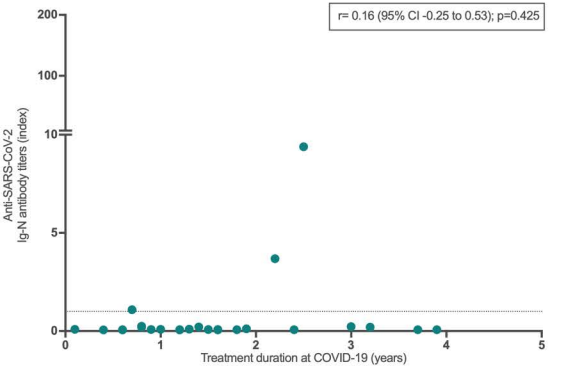
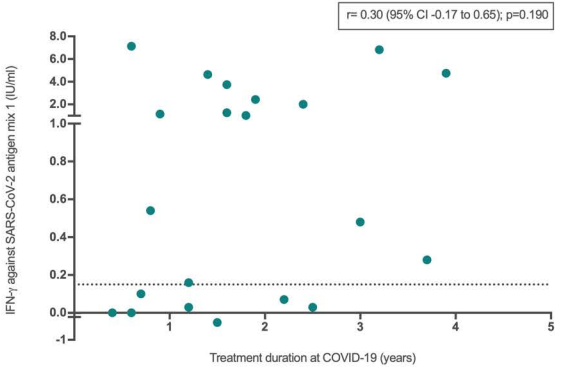
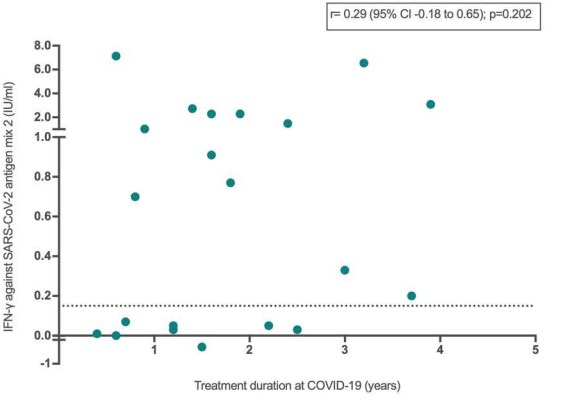

256 suspected or confirmed COVID-19 cases
13 Excluded for having diagnoses different from MS:
• 3 NMOSD
• 3 relapsing transverse myelitis
• 3 extensive longitudinal myelitis
• 4 Other
243 MS patients with suspected or confirmed COVID-19 cases
56 suspected COVID-19 cases
187 confirmed COVID-19 cases
145 with antibody testing
42 without antibody testing
42 with cellular study
103 without cellular study


Anti-CD20
Cladribine
Alemtuzumab
A
Anti-SARS-CoV-2 IgG-S antibody titers (AU/ml)
Anti-CD20:
r= 0.50 (95% CI 0.13 to 0.75); p<0.01
Months from last infusion or treatment to COVID-19
Anti-SARS-CoV-2 Ig-N antibody titers (index)
Anti-CD20:
r= 0.29 (95% CI -0.12 to 0.61); p=0.153
Months from last infusion or treatment to COVID-19
IFN-γ against SARS-CoV-2 antigen mix 1 (IU/ml)
Anti-CD20:
r= -0.28 (95% CI -0.65 to 0.18; p=0.213
Months from last infusion or treatment to COVID-19
IFN-γ against SARS-CoV-2 antigen mix 2 (IU/ml)
Anti-CD20:
r= -0.23 (95% CI -0.61 to 0.24; p=0.316
Months from last infusion or treatment to COVID-19
B
Anti-SARS-CoV-2 IgG-S antibody titers (AU/ml)
Anti-CD20:
r= 0.06 (95% CI -0.35 to 0.44); p=0.784
Months from last infusion or treatment to immunological test
Anti-SARS-CoV-2 Ig-N antibody titers (index)
Anti-CD20:
r= -0.28 (95% CI -0.61 to 0.14); p=0.174
Months from last infusion or treatment to immunological test
IFN-γ against SARS-CoV-2 antigen mix 1 (IU/ml)
Anti-CD20:
r= 0.18 (95% CI -0.29 to 0.58); p=0.442
Months from last infusion or treatment to immunological test
IFN-γ against SARS-CoV-2 antigen mix 2 (IU/ml)
Anti-CD20:
r= 0.20 (95% CI -0.26 to 0.59; p=0.376
Months from last infusion or treatment to immunological test


r= 0.21 (95% CI -0.21 to 0.55); p=0.308
Anti-SARS-CoV-2
IgG-S antibody titers (AU/ml)
250
200
150
100
50
0
0
1
2
3
4
5
Treatment duration at COVID-19 (years)


r= 0.16 (95% CI -0.25 to 0.53); p=0.425
Anti-SARS-CoV-2
Ig-N antibody titers (index)
200
100
10
5
0
0
1
2
3
4
5
Treatment duration at COVID-19 (years)


r= 0.30 (95% CI -0.17 to 0.65); p=0.190
IFN-γ against SARS-CoV-2 antigen mix 1 (IU/ml)
8.0
6.0
4.0
2.0
1.0
0.8
0.6
0.4
0.2
0.0
-1
0
1
2
3
4
5
Treatment duration at COVID-19 (years)


r= 0.29 (95% CI -0.18 to 0.65); p=0.202
IFN-γ against SARS-CoV-2 antigen mix 2 (IU/ml)
8.0
6.0
4.0
2.0
1.0
0.8
0.6
0.4
0.2
0.0
-1
0
1
2
3
4
5
Treatment duration at COVID-19 (years)

Supplementary data. eTable 1. Univariable and multivariable analysis of SARS-CoV-2 positive humoral response in anti-CD20 treated patients

	OR (95% CI)	p-value
UNIVARIABLE ANALYSIS[c]		
Age – mean (SD)	0.98 (0.92-1.05)	0.652
Male sex – n (%)	2.13 (0.42-10.89)	0.348
Any comorbidity[a]– n (%)	0.40 (0.09-1.77)	0.215
Obesity – n (%)	14.64 (0.43-50.38)	0.165
Progressive MS[b] – n(%)	0.72 (0.17-2.99)	0.658
EDSS 1. – n(%)	0.87 (0.17-1.07)	0.061
Disease duration, years – median (IQR)	1.05 (0.19-4.02)	0.854
Corticosteroids last 3 months – n (%)	-	-
DMTs – n (% of the row)		
Ocrelizumab	REF	
Rituximab	0.48 (0.07-3.19)	0.438
Other anti-CD20	0.40 (0.03-6.22)	0.498
Treatment duration, years – median (IQR)	0.82 (0.42-1.59)	0.551
Time of COVID-19 since last infusion, months – median (IQR)	1.28 (0.96-1.69)	0.088
Time of serology since last infusion, months – median (IQR)	1.08 (0.86-1.34)	0.518
Previous lymphocyte count –median (IQR)	1.00 (0.99-1.00)	0.862
Previous IgG count – median (IQR)[1]	1.00 (0.99-1.00)	0.284
Previous IgM count – median (IQR)[1]	1.02 (0.98-1.04)	0.283
Previous IgA count –median (IQR)[1]	1.02 (0.99-1.04)	0.051
Negative RT-PCR – n (%)	REF	REF
Positive RT-PCR – n (%)	-	0.072
RT-PCR not performed – n (%)	-	-
COVID-19 symptoms – n (%)	4.90 (0.40-59.64)	0.166
COVID-19 severe-critical course – n (%)	2.78 (0.44-17.56)	0.259
Time of serologies after COVID-19 diagnosis, months– mean (IQR)	1.08 (0.92-1.27)	0.343
MULTIVARIABLE ANALYSIS[d]		
Age	0.98 (0.87-1.11)	0.843
Male sex	1.38 (0.19-10.21)	0.755
Any comorbidity	0.29 (0.04-2.28)	0.242
Progressive MS	2.41 (0.15-38.25)	0.433
EDSS ≥3.0	0.25 (0.01-4-55)	0.348
Treatment duration, years	0.52 (0.20-1.31)	0.162
Time of COVID-19 since last infusion, months	1.51 (1.01-2.24)	**0.042***
COVID-19 severe-critical course	14.06 (1.02--192.68)	**0.048***

Total cases: 33; 14 (42.4%) with negative serology and 19 (57.6%) with positive serology. Count of total cases of variables with missing information: n[1]= 24. [a]Any comorbidity includes obesity, lung disease, cardiovascular disease, diabetes, hypertension, haematological benign disease, chronic kidney disease, liver disease, HIV or malignancy. [b]Progressive MS includes secondary progressive multiple sclerosis (SPMS) and primary progressive multiple sclerosis (PPMS). [c]Statistical analysis was performed using a not adjusted logistic regression model. [d]Statistical analysis was performed using a logistic regression model adjusted for age, sex, presenting any comorbidity, MS phenotype EDSS, DMTs, COVID-19 severity and months of the serology after COVID-19.. Abbreviations: MS: multiple sclerosis; SD: standard deviation; IQR: interquartile range; EDSS: Expanded Disability Status Scale: DMT: disease modifying therapy; IgG, IgM, IgA: immunoglobulin G, M or A; RT-PCR: reverse transcription-polymerase chain reaction. % is the proportion of patients of the column with that variable if not otherwise specified.

Supplementary data. eTable 2. Clinical and demographic characteristics of the cohort in relation to SARS-CoV-2 cellular response

	TOTAL n=42	NEGATIVE CELL RESPONSE n=17	POSITIVE CELL RESPONSE n=25	OR (95% CI)[c]	p-value[c]
Age – mean (SD)	47.86 (11.91)	46.64 (12.59)	48.69 (12.59)	1.02 (0.96-1.07)	0.580
Male sex – n (%)	17 (40.48)	7 (41.18)	10 (40.0)	0.95 (0.27-3.39)	0.940
Any comorbidity[a]– n (%)	21 (50.0)	6 (35.29)	15 (60.0)	2.75 (0.73-10.42)	0.120
Obesity – n (%)	8 (19.05)	3 (17.65)	5 (20.0)	1.17 (0.23-5.81)	0.851
Progressive MS[b] – n(%)	11 (35.48)	8 (47.06)	8 (32.00)	0.53 (0.14-1.94)	0.330
EDSS ≥3.0 – n(%)	25 (59.52)	10 (58.82)	15 (60.0)	1.05 (0.30-3.74)	0.940
Disease duration, years – median (IQR)	14.1 (11.9)	14.0 (14.3)	14.7 (9.7)	1.02 (0.95-1.10)	0.604
Corticosteroids last 3 months – n (%)	0	0	0	-	-
DMTs – n (% of the row)					
No treatment	5 (100)	2 (40.0)	3 (60.0)	REF	
Interferon β	4 (100)	1 (25.0)	3 (75.0)	2.00 (0.09-44.35)	0.655
Glatiramer acetate	2 (100)	2 (100)	0	-	0.074
Dimethyl fumarate	4 (100)	3 (75.0)	1 (25.0)	0.22 (0.01-5.83)	0.322
Teriflunomide	0	0	0	-	-
Fingolimod	2 (100)	1 (50.0)	1 (50.0)	0.67 (0.02-23.88)	0.823
Natalizumab	1 (100)	0	1 (100)	-	0.653
Alemtuzumab	1 (100)	0	1 (100)	-	0.655
Cladribine	2 (100)	1 (50.0)	1 (50.0)	0.67 (0.02-23.88)	0.527
Ocrelizumab	2 (100)	0	2 (100)	-	0.527
Rituximab	15 (100)	6 (40.0)	9 (60.0)	1.00 (0.12-8.33)	1.000
Other anti-CD20	4 (100)	0	4 (100)	2.00 (0.09-44.35)	0.655
Other DMTs	0	0	0	-	-
Anti-CD20	22 (100)	7 (33.33)	14 (66.67)	1.81 (0.51-6.51)	0.351
Treatment duration, years – median (IQR)	1.9 (2.9)	1.2 (2.1)	2.1 (2.3)	1.04 (0.92-1.17)	0.489
Time of COVID-19 since last infusion, months – median (IQR)[1]	4.3 (5.2)	5.2 (5.5)	2.2 (4.1)	0.88 (0.70-1.10)	0.259
Time of cellular determination since last infusion, months – median (IQR)[1]	3.01 (4.5)	2.74 (4.66)	3.09 (4.6)	1.08 (0.86-1.36)	0.505
Previous lymphocyte count –median (IQR)	1400 (1000)	1600 (900)	1400 (940)	1.00 (0.99-1.00)	0.637
Previous IgG count – median (IQR)[2]	869 (282.5)	869 (349)	863 (289)	0.99 (0.99-1.00)	0.683
Previous IgM count – median (IQR)[2]	86 (48.5)	90.5 (48)	79.5 (56)	0.99 (0.96-1.03)	0.901
Previous IgA count – median (IQR)[2]	193 (112)	173.5 (70)	194 (92)	1.01 (0.99-1.03)	0.350
Negative PCR – n (%)	1 (2.38)	1 (5.88)	0	REF	
Positive PCR – n (%)	30 (71.43)	12 (70.59)	18 (72.0)	-	0.239
RT-PCR not performed – n (%)	11 (26.19)	4 (23.53)	7 (28.0)	-	0.237
COVID-19 symptoms – n (%)	40 (95.24)	15 (88.24)	25 (100.0)	3.00 (0.16-55.56)	0.082
COVID-19 severe-critical course – n (%)	7 (16.67)	0	7 (28.0)	-	**0.018***
Positive SARS-CoV-2 antibodies – n (%)	32 (76.19)	12 (70.59)	20 (80.0)	1.67 (0.39-7.18)	0.487
Time of cellular study after COVID-19 diagnosis, months – mean (IQR)	6.95 (7.20)	6.21 (5.56)	10.78 (7.69)	1.05 (0.91-1.23)	0.475

Count of total cases of variables with missing information: n^1= 25, , n^2= 16

[a]Any comorbidity includes obesity, lung disease, cardiovascular disease, diabetes, hypertension, haematological benign disease, chronic kidney disease, liver disease, HIV or malignancy. [b]Progressive MS includes secondary progressive multiple sclerosis (SPMS) and primary progressive multiple sclerosis (PPMS). [c]Statistical analysis was performed using a not adjusted logistic regression model. Abbreviations: MS: multiple sclerosis; SD: standard deviation; IQR: interquartile range; EDSS: Expanded Disability Status Scale: DMT: disease modifying therapy; IgG, IgM, IgA: Immunoglobulin G, M or A; RT-PCR: reverse transcription-polymerase chain reaction % is the proportion of patients of the column with that variable if not otherwise specified.

Supplementary data. eTable 3. Humoral and cellular response of the cohort in relation to treatment and COVID-19 severity

		NEGATIVE SEROLOGY		POSITIVE SEROLOGY		
		Negative cell response	Positive cell response	Negative cell response	Positive cell response	TOTAL
Untreated	Mild-moderate	1	0	1	2	4
	Severe-critical	0	0	0	1	1
	Total- n (% row)	**1 (20)**	**0**	**1 (20)**	**3 (60)**	**5**
Anti-CD20s	Mild-moderate	2	4	5	5	16
	Severe-critical	0	1	0	4	5
	Total- n (% row)	**2 (9.5)**	**5 (23.8)**	**5 (23.8)**	**9 (42.9)**	**21**
Other DMTs	Mild-moderate	2	0	6	7	15
	Severe-critical	0	0	0	1	1
	Total- n (% row)	**2 (12.5)**	**0**	**6 (37.5)**	**8 (50)**	**16**
TOTAL	Mild-moderate - n (% row)	5 (14.3)	4 (11.4)	12 (34.3)	14 (40)	35
	Severe-critical - n (% row)	0	1 (14.3)	0	6 (85.7)	7
	Total- n (% row)	**5 (11.9)**	**5 (11.9)**	**12 (28.6)**	**20 (47.6)**	**42**

COVID-19 severity is categorized as (1) mild–moderate disease if patients had no signs or symptoms of pneumonia or a mild pneumonia and (2) severe–critical disease if they presented dyspnoea, or a respiratory rate of ≥30 breaths per minute or a blood oxygen saturation of ≤93%, or a ratio of the partial pressure of arterial oxygen to the fraction of inspired oxygen of <300 mmHg, or infiltrates in >50% of the lung field within 24–48 h from the onset of symptoms and/or organ or multiple organ failure

Supplementary data. eTable 4. Clinical and demographic characteristics of the cohort in relation to SARS-CoV-2 humoral persistence 6 months after COVID-19

	TOTAL n=53	NO PERSISTENCE n=10	PERSISTENCE MORE THAN 6 MONTHS n=43	OR (95% CI)[c]	p-value[c]
Age – mean (SD)	46.75 (12.15)	44.09 (10.60)	47.37 (12.51)	1.02 (0.96-1.09)	0.440
Male sex – n (%)	24 (45.28)	3 (30.00)	21 (48.84)	2.22 (0.49-10.08)	0.286
Any comorbidity[a] – n (%)	10 (33.96)	4 (40.00)	14 (32.56	0.72 (0.17-3.04)	0.658
Obesity – n (%)	7 (13.21)	0	7 (16.28)	-	0.175
Progressive MS[b] – n (%)	12 (22.64)	4 (40.0)	8 (18.60)	0.34 (0.07-1.56)	0.149
EDSS≥3.0 – n (%)	21 (100)	5 (50.0)	16 (37.21)	0.59 (0.15-2.41)	0.461
Disease duration, years – median (IQR)	14.7 (10.0)	16.2 (12.2)	14 (9.0)	0.98 (0.90-1.07)	0.693
Corticosteroids last 3 months – n (%)	0	0	0	-	-
DMTs – n (% of the row)					
No treatment	12 (100)	0	12 (100)	REF	
Interferon β	9 (100)	3 (33.3)	6 (66.7)	-	**0.035**
Glatiramer acetate	3 (100)	0	3 (100)	-	-
Dimethyl fumarate	4 (100)	1 (25.0)	3 (75.0)	-	0.083
Teriflunomide	3 (100)	0	3 (100)	-	-
Fingolimod	4 (100)	1 (25.0)	3 (75.0)	-	0.083
Natalizumab	2 (100)	0	2 (100)	-	-
Alemtuzumab	2 (100)	0	2 (100)	-	-
Cladribine	0	0	0	-	.
Ocrelizumab	3 (100)	0	3 (100)	-	.
Rituximab	9 (100)	4 (44.4)	5 (55.6)	-	**0.012**
Other anti-CD20	2 (100)	1 (50.0)	1 (50.0)	-	**0.013**
Other DMTs	0	0	0	.	**.**
Anti-CD20	11 (100)	5 (35.7)	9 (64.3)	0.26 (0.06-1.19)	0.063
Treatment duration, years – median (IQR)	2.8 (4.3)	2.1 (4.1)	3.0 (3.8)	1.09 (0.90-1.31)	0.383
Time of COVID-19 since last infusion, months – median (IQR)[1]	4.4 (5.2)	0.9 (4.0)	4.5 (8.3)	1.27 (0.84-1.92)	0.248
Time of cellular determination since last infusion, months – median (IQR) [1]	4.30 (6.9)	4.21 (1.74)	4.40 (7.92)	1.08 (0.88-1.33)	0.460
Previous lymphocyte count –median (IQR)[2]	1480 (1200)	1200 (100)	1715 (685)	1.00 (1.00-1.00)	**0.048**
Previous IgG count – median (IQR)[3]	842 (378)	772 (96)	1065 (320)	1.01 (0.99-1.03)	0.090
Previous IgM count – median (IQR)[3]	61 (46)	74 (78)	60 (30)	0.98 (0.95-1.02)	0.406
Previous IgA count –median (IQR)[3]	216.5 (103)	188 (118)	239 (92)	1.01 (0.99-1.02)	0.428
Negative RT-PCR – n (%)	5 (9.43)	1 (10.0)	4 (9.30)	REF	
Positive RT-PCR – n (%)	20 (37.74)	4 (40.0)	16 (37.21)	1.00 (0.08-12.19)	1.000
Not performed RT-PCR – n (%)	28 (52.83)	5 (50.0)	23 (53.49)	1.15 (0.10-13.10)	0.910
COVID-19 symptoms – n (%)	51 (96.23)	9 (90.0)	42 (97.67)	4.67 (0.25-87.20)	0.226
COVID-19 severe-critical course – n (%)	8 (15.09)	2 (20.00)	6 (13.95)	0.65 (0.11-3.90)	0.634
Time of first antibody determination after COVID-19 diagnosis, months– mean (IQR)	3.02 (0.92)	3.09 (1.75)	2.99 (0.89)	1.39 (0.72-2.65)	0.324
Time of second antibody determination after COVID-19 diagnosis, months– mean (IQR)	11.76 (1.38)	11.66 (1.25)	11.86 (1.41)	0.96 (0.60-1.52)	0.850

Count of total cases of variables with missing information: n^1= 18, n^2=47, n^3= 11.

[a]Any comorbidity includes obesity, lung disease, cardiovascular disease, diabetes, hypertension, haematological benign disease, chronic kidney disease, liver disease, HIV or malignancy. [b]Progressive MS includes secondary progressive multiple sclerosis (SPMS) and primary progressive multiple sclerosis (PPMS). [c]Statistical analysis was performed using a not adjusted logistic regression model. Abbreviations: MS: multiple sclerosis; SD: standard deviation; IQR: interquartile range; EDSS: Expanded Disability Status Scale: DMT: disease modifying therapy; IgG, IgM, IgA: immunoglobulin G, M or A; RT-PCR: reverse transcription-polymerase chain reaction

% is the proportion of patients of the column with that variable if not otherwise specified.

Supplementary data. eTable 5. COVID-19 severity according to treatment

	ASYMPTOMATIC COVID-19 (n=14; 9.7%)	MILD-MODERATE COVID-19 (n=112; 77.2%)	SEVERE-CRITICAL COVID-19 (n=19; 13.1%)	MILD-MODERATE vs SEVERE-CRITICAL* p-value
No treatment	0	21 (70.0)	9 (30.0)	
Interferon	3 (15.79)	16 (84.21)	0	**0.009**
Glatiramer acetate	2 (15.38)	10 (76.92)	1 (7.69)	0.116
Dimethyl fumarate	1 (5.56)	19 (88.89)	1 (4.76)	**0.046**
Teriflunomide	0	12 (100)	0	**0.034**
Fingolimod	1 (16.67)	5 (83.33)	0	0.127
Natalizumab	1 (25.0)	3 (75.0)	0	0.208
Alemtuzumab	1 (14.29)	6 (85.71)	0	0.100
Cladribine	1 (50.0)	1 (50.0)	0	0.369
Ocrelizumab	1 (14.29)	5 (71.43)	1 (14.29)	0.406
Rituximab	3 (13.64)	13 (59.09)	6 (27.27)	0.832
Other anti-CD20	0	3 (75.0)	1 (25.0)	0.839
Other DMTs	0	1 (100)	0	0.522

COVID-19 severity is categorized as (1) asymptomatic those without symptoms, (2) mild–moderate disease if patients had no signs or symptoms of pneumonia or a mild pneumonia and (3) severe–critical disease if they presented dyspnoea, or a respiratory rate of ≥30 breaths per minute or a blood oxygen saturation of ≤93%, or a ratio of the partial pressure of arterial oxygen to the fraction of inspired oxygen of <300 mmHg, or infiltrates in >50% of the lung field within 24–48 h from the onset of symptoms and/or organ or multiple organ failure

* Univariable analysis of the risk of presenting a severe-critical COVID-19. For this analysis, asymptomatic cases were included in the mild-moderate group.

SUPPLEMENTARY DATA

eTABLES

Supplementary data. eTable 1. Univariable and multivariable analysis of SARS-CoV-2 positive humoral response in anti-CD20 treated patients

[a]Any comorbidity includes obesity, lung disease, cardiovascular disease, diabetes, hypertension, haematological benign disease, chronic kidney disease, liver disease, HIV or malignancy. [b]Progressive MS includes secondary progressive multiple sclerosis (SPMS) and primary progressive multiple sclerosis (PPMS). [c]Statistical analysis was performed using a not adjusted logistic regression model. [d]Statistical analysis was performed using a logistic regression model adjusted for age, sex, presenting any comorbidity, MS phenotype EDSS, DMTs, COVID-19 severity and months of the serology after COVID-19.. Abbreviations: MS: multiple sclerosis; SD: standard deviation; IQR: interquartile range; EDSS: Expanded Disability Status Scale: DMT: disease modifying therapy; IgG, IgM, IgA: immunoglobulin G, M or A; RT-PCR: reverse transcription-polymerase chain reaction. % is the proportion of patients of the column with that variable if not otherwise specified.

Supplementary data. eTable 2. Clinical and demographic characteristics of the cohort in relation to SARS-CoV-2 cellular response

Count of total cases of variables with missing information: n^1= 25, , n^2= 16

[a]Any comorbidity includes obesity, lung disease, cardiovascular disease, diabetes, hypertension, hematological benign disease, chronic kidney disease, liver disease, HIV or malignancy. [b]Progressive MS includes secondary progressive multiple sclerosis (SPMS) and primary progressive multiple sclerosis (PPMS). [c]Statistical analysis was performed using a not adjusted logistic regression model. Abbreviations: MS: multiple sclerosis; SD: standard deviation; IQR: interquartile range; EDSS: Expanded Disability Status Scale: DMT: disease modifying therapy; IgG, IgM, IgA: Immunoglobulin G, M or A; RT-PCR: reverse transcription-polymerase chain reaction % is the proportion of patients of the column with that variable if not otherwise specified.

Supplementary data. eTable 3. Humoral and cellular response of the cohort in relation to treatment and COVID-19 severity

COVID-19 severity is categorized as (1) mild–moderate disease if patients had no signs or symptoms of pneumonia or a mild pneumonia and (2) severe–critical disease if they presented dyspnea, or a respiratory rate of ≥30 breaths per minute or a blood oxygen saturation of ≤93%, or a ratio of the partial pressure of arterial oxygen to the fraction of inspired oxygen of <300 mmHg, or infiltrates in >50% of the lung field within 24–48 h from the onset of symptoms and/or organ or multiple organ failure

Supplementary data. eTable 4. Clinical and demographic characteristics of the cohort in relation to SARS-CoV-2 humoral persistence 6 months after COVID-19

Count of total cases of variables with missing information: n^1= 18, n^2=47, n^3= 11.

[a]Any comorbidity includes obesity, lung disease, cardiovascular disease, diabetes, hypertension, hematological benign disease, chronic kidney disease, liver disease, HIV or malignancy. [b]Progressive MS includes secondary progressive multiple sclerosis (SPMS) and primary progressive multiple sclerosis (PPMS). [c]Statistical analysis was performed using a not adjusted logistic regression model. Abbreviations: MS: multiple sclerosis; SD: standard deviation; IQR: interquartile range; EDSS: Expanded Disability Status Scale: DMT: disease modifying therapy; IgG, IgM, IgA: immunoglobulin G, M or A; RT-PCR: reverse transcription-polymerase chain reaction

% is the proportion of patients of the column with that variable if not otherwise specified.

Supplementary data. eTable 5. COVID-19 severity according to treatment

COVID-19 severity is categorized as (1) asymptomatic those without symptoms, (2) mild–moderate disease if patients had no signs or symptoms of pneumonia or a mild pneumonia and (3) severe–critical disease if they presented dyspnea, or a respiratory rate of ≥30 breaths per minute or a blood oxygen saturation of ≤93%, or a ratio of the partial pressure of arterial oxygen to the fraction of inspired oxygen of <300 mmHg, or infiltrates in >50% of the lung field within 24–48 h from the onset of symptoms and/or organ or multiple organ failure *Univariable analysis performed using a not adjusted logistic regression model of the risk of presenting a severe-critical COVID-19. For this analysis, asymptomatic cases were included in the mild-moderate group.

eFIGURES

Supplementary data. eFigure 1. Study flow diagram

Supplementary data: eFigure 2. Humoral and cellular response in relation to last treatment or infusion in patients treated with anti-CD20 therapies, cladribine or alemtuzumab

Spearman rank correlation (r) between different immunological responses to SARS-CoV-2 infection and months from last infusion or treatment to time of COVID-19 infection (A) and immunological testing (B). The studied immunological responses include: titers of titers of immunoglobulin G against SARS-CoV-2 IgG-S (upper left) and SARS-CoV-2 Ig-N (upper right); titers of interferon-gamma produced by T-cell against SARS-CoV-2 antigen mix 1 (lower left) and antigen mix 2 (lower right). Each dot represents a different subject. Cut-off values for antibody and cellular positivity are indicated by a dotted line. Abbreviations: SARS-CoV-2 IgG-S: SARS-CoV-2 IgG anti-spike antibody, SARS-CoV-2 Ig-N: total immunoglobulins against SARS-CoV-2 nucleocapsid

Supplementary data: eFigure 3. Correlation between humoral and cellular response and treatment duration at COVID-19 in patients treated with anti-CD20 therapy

Spearman rank correlation (r) between anti-CD20 therapy duration in years and: titers of immunoglobulin G against SARS-CoV-2 IgG-S (upper left) and SARS-CoV-2 Ig-N (upper right), titers of interferon-gamma produced by T-cell against SARS-CoV-2 antigen mix 1 (lower left) and antigen mix 2 (lower right). Each dot represents a different subject. Cut-off values for antibody and cellular positivity are indicated by a dotted line. Abbreviations: SARS-CoV-2 IgG-S: SARS-CoV-2 IgG anti-spike antibody, SARS-CoV-2 Ig-N: total immunoglobulins against SARS-CoV-2 nucleocapsid