Appendix 1

Supplementary Methods

Patient's characteristics were compared using Chi-square test or Fisher's exact test for the categorical data, and t-test or Wilcoxon signed-rank test for continuous data. Factors associated to antibody response after the second vaccine were analyzed by using univariate and multivariate logistic regression models.

Multiple imputations by chained equations (MICE) were performed to account for the missingness in covariates. The number of multiple imputations was set to five with five iterations. Logistic regression analysis was carried out based on the imputed datasets by combining estimates from each completed dataset using Rubin's rules. All tests were two-tailed, and the results were considered statistically significant when p<0.05. All analyses were performed using Graphpad prism v9.1.0 for Mac (San Diego, California, USA) aside from ROC analysis and logistic regression which were performed using R statistical software version 3.5.2 (R foundation for Statistical Computing, Vienna, Austria, http://www.r-project.org/).

Supplementary Table 1. Characteristics of the chronic lymphocytic leukemia patients by vaccination status.

Characteristics	Serologic results post-vaccination			
	Total	Post-Dose 1	Post-Dose 2	Post-Dose 3
Number of CLL patients	530	158	506	95
Vaccine type				
BNT162b2 - Pfizer BioNTech (%)	377 (71%)	89 (56%)	367 (72%)	85 (89%)
mRNA-1273 - Moderna (%)	76 (14%)	54 (34%)	69 (14%)	5 (5%)
BNT162b2 or mRNA-1273 (%)	77 (15%)	15 (10%)	70 (14%)	5 (5%)
Age at vaccination, median (range)	71 years (37-93)			
Sex				
Females (%)	115 (22%)	31 (20%)	114 (23%)	24 (25%)
Males (%)	239 (45%)	79 (50%)	231 (46%)	65 (68%)
Missing data (%)	176 (33%)	48(30%)	161(31%)	6 (6%)
CLL treatment, number of CLL patients (%)				
Treatment-naïve	218 (40%)	67 (42%)	210 (41%)	15 (16%)
Prior CLL treatment, currently untreated	136 (26%)	36 (23%)	130 (26%)	17 (18%)
On therapy	176 (34%)	55 (35%)	166 (33%)	63 (66%)
BTK inhibitor	109 (20%)	32 (20%)	104 (21%)	46 (48%)
Venetoclax	24 (5%)	9 (6%)	23 (5%)	2 (2%)
Venetoclax + Anti-CD20 mAb	20 (4%)	4 (3%)	19 (4%)	8 (8%)
Venetoclax + BTK inhibitor	8 (2%)	5 (3%)	6 (1%)	4 (4%)
Miscellaneous	15 (3%)	5 (3%)	14 (3%)	3 (3%)
Gamma-globulins before vaccination, median (range)	6.1 g/L (1.2-13.8)			

Abbreviations: CLL, chronic lymphocytic leukemia; BTK, Bruton tyrosine kinase; mAb, monoclonal antibody.