LETTER TO THE EDITOR

Weak immunogenicity after a single dose of SARS-CoV-2 mRNA vaccine in treated cancer patients

Active cancer and ongoing antineoplastic treatments are major factors for severe coronavirus disease 2019 (COVID-19) and death; reasons why the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccination remains a priority in cancer patients (CPs). However, immunocompromised patients were excluded from major studies on mRNA vaccines, and could have a decreased response to vaccination, as recently demonstrated in solid organ transplant recipients. Herein, we aimed to assess the proportion of antibody response 4 weeks after the first injection of the BNT162b2 (Pfizer-BioNTech) vaccine in CPs and health care workers (HCWs) as the control population.

All consecutive patients with cancer on active treatment or with treatment in the last 2 years and HCWs who underwent SARS-CoV-2 vaccination between 17 February 2021 and 18 March 2021 at the Pitié Salpêtrière Hospital, Paris, France, were selected for analysis. The titration of SARS-CoV-2 antibodies was proposed just before the second injection of BNT162b2 vaccine. Serum anti-nucleoprotein (N) immunoglobin G (IgG) and anti-spike protein (S) IgG against the receptor binding domain (RBD) of the S1 domain were detected using the Abbott SARS-CoV-2 IgG chemiluminescent microparticle immunoasay (CMIA), according to the manufacturer’s instructions. The presence of anti-N IgG was used as a surrogate marker of prior COVID-19.

Statistical analysis consisted of univariable analysis (Chi-square tests) and then multivariable analysis (binary logistic regression, including all variables with P value < 0.1 in univariable analysis) to determine the factors associated with the lack of seroconversion in CPs. Median titers of anti-S IgG were compared between CPs and HCWs, using a Mood's test. This study was approved by the Commission Nationale de l'Informatique et des Libertés (MR004, registration number: 2221945).

SARS-CoV-2 antibodies were measured in 110 CPs and 25 HCWs (Table 1). In CPs who did not have COVID-19 before vaccination, the seroconversion rate was only 55%, while it reached 100% in HCWs. Titters of anti-S IgG were significantly higher in HCWs in comparison with seropositive CPs (680 versus 315 UA/ml, P = 0.04). Sex, cancer locations and metastatic status were similar in seroconverters and non-seroconverter CPs (Supplementary Table S1, available at https://doi.org/10.1016/j.annonc.2021.04.020). After adjustment for potential confounders, two factors were strongly associated with no seroconversion: age >65 years [odds ratio 3.58, 95% confidence interval (CI) 1.40-9.15, P = 0.008] and treatment by chemotherapy (odds ratio 4.34, 95% CI 1.67-11.30, P = 0.003).

<table>
<thead>
<tr>
<th>Cancer location, n (%)</th>
<th>Breast</th>
<th>Lung</th>
<th>Gynecological</th>
<th>Prostate</th>
<th>Digestive</th>
<th>Kidney</th>
<th>Bladder</th>
<th>Upper aero-digestive tract</th>
<th>Thyroid</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>34</td>
<td>16</td>
<td>14</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>4.5</td>
<td>6</td>
<td>4.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Women</td>
<td>33</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>7</td>
<td>6</td>
<td>4.5</td>
<td>6</td>
<td>4.5</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Table 1. Characteristics of cancer patients and health care workers with SARS-CoV-2 serological outcome

No symptomatic COVID-19 occurred between the two injections of vaccine in CPs and HCWs.

In summary, almost half of CPs showed no anti-spike antibody response after the first injection of BNT162b2 vaccine, and this low seroconversion rate could be much worse in elderly patients and in patients under chemotherapy. In comparison, 100% of the HCWs had anti-spike seroconversion. Moreover, even in CPs with metastatic status were similar in seroconverters and non-seroconverters, two factors were strongly associated with no seroconversion: age >65 years [odds ratio 3.58, 95% confidence interval (CI) 1.40-9.15, P = 0.008] and treatment by chemotherapy (odds ratio 4.34, 95% CI 1.67-11.30, P = 0.003).
seroconversion, the level of antibody response could be lower than expected.

In conclusion, our findings argue for not extending the 21-day period between the two SARS-CoV-2 vaccine injections in CPs, and for performing serological monitoring to assess antibody response in this particular population, which could lead to adapting this vaccine strategy. We would also recommend a vaccine strategy including family and friendship circles.


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REFERENCES