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Reduced SARS-CoV-2 infection and death after two doses of COVID-19 vaccines in a series of 1503 cancer patients

Barrière et al. reported less effective immune responses after COVID-19 vaccination in cancer patients versus patients without cancers.[1] Cancer patients are at high risk of death from COVID-19,[2] but also develop less effective antiviral immune responses after COVID-19 or vaccination.[1,3,4] In this report we analyze the clinical efficacy of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccination in cancer patients receiving active cancer treatment in 1503 cancer patients receiving one or two doses of COVID-19 vaccine in the Centre Léon Bérard.

From 4 January to 6 April 2021, 1503 cancer patients without previously documented COVID-19 infection [female $N = 735$ (48.9%)], median age: 64.8 years, (range 16.7-95.4 years), under active cancer treatment received at least one dose of SARS-CoV-2 vaccine. <10% of patients refused vaccination. 1127 (74.9%), 317 (21.1%) and 59 (4%) received BNT162b2, messenger RNA (mRNA)-1273 and Chadox1 vaccines respectively as first doses, depending on availability. 1203 (80%) patients had a solid tumor and 300 (20%) had

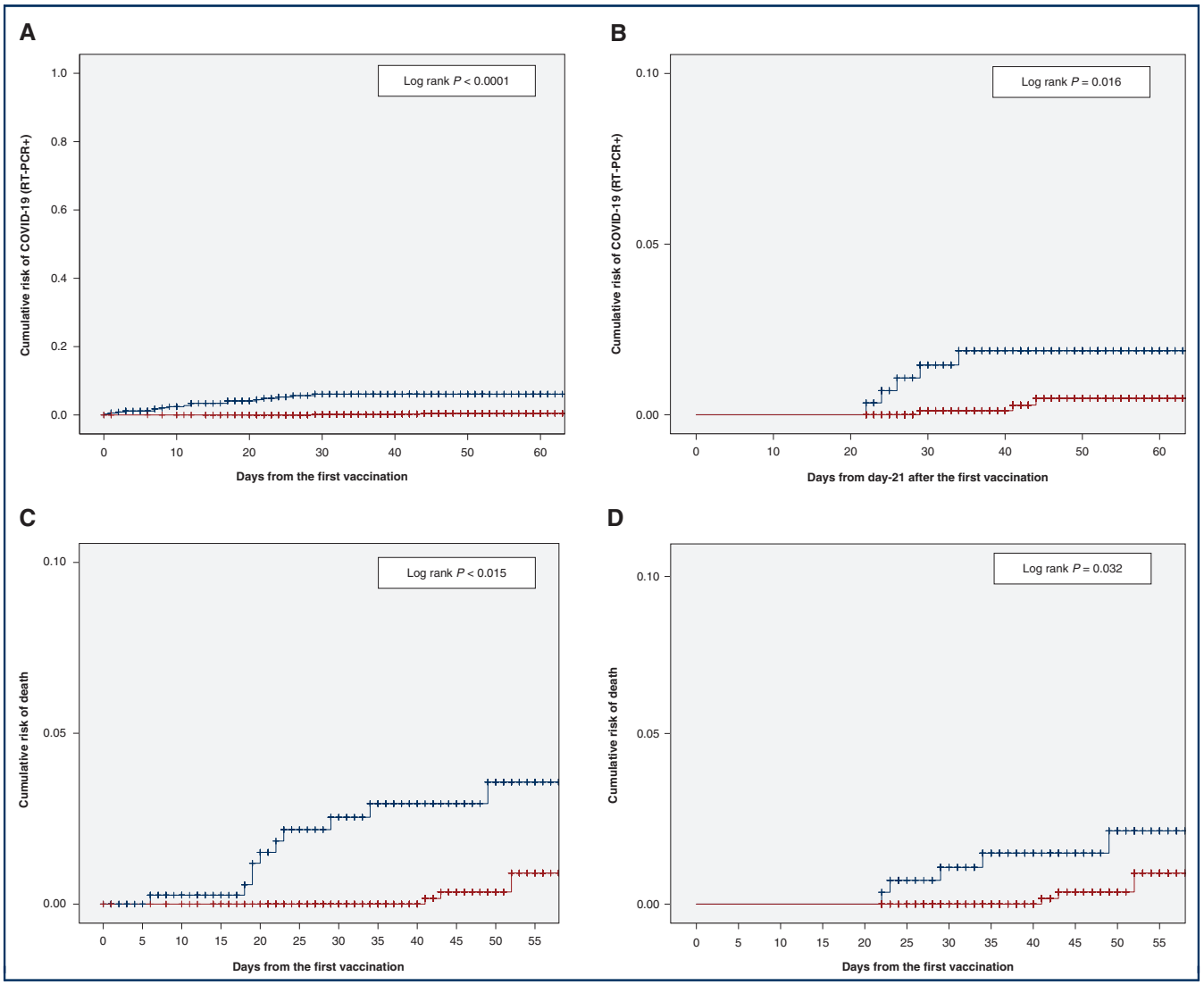

Figure 1. Documented SARS-CoV-2 infection and death after one dose versus two doses of COVID-19 vaccines in cancer patients.
(A) Risk of SARS-CoV-2 RT-PCR+ from the first vaccine injection (1 dose in blue versus 2 doses in red). (B) Risk of SARS-CoV-2 RT-PCR+ from day-21 after the first vaccine injection (1 dose in blue versus 2 doses in red). (C) Survival from the first vaccine dose (1 dose in blue versus 2 doses in red). (D) Survival from day 21 after the first vaccine dose (1 dose in blue versus 2 doses in red).
COVID-19, coronavirus disease; SARS-Co-V2, severe acute respiratory syndrome coronavirus 2.

hematological malignancy, including 72 patients with chronic lymphocytic leukemia. 1081 (71.9%) had metastatic disease. 1003 (66.7%), 60 (3.9%), 245 (16.3%) and 189 (12.5%) had received cytotoxic chemotherapy, anti-CD20, radiotherapy, or surgery, respectively, in the previous 3 months.

1091 (72.6%) patients received two injections of COVID-19 vaccine at a median interval of 26 days (range 13-80 days), and 412 (27.4%) received only one injection (median follow-up after the day of vaccination for this group was 43 days, range 1-130 days).

With a median follow-up of 44 (range 1-130) days for the whole group of 1503 patients, 24 of the 1503 (1.5%) patients developed COVID-19 symptoms with documented SARS-CoV-2 on RT-PCR: 4/1091 (0.4%) in patients who received two doses of vaccine versus 20/412 (5%) for those who received a single dose ($P < 0.0001$). With a landmark analysis at 21 days after first dose, these numbers were 4/1001 (0.4%) versus 5/283 (1.7%) for patients who received two versus one dose of vaccine ($P = 0.016$). Figure 1A and 1B show the cumulative risk of documented COVID-19 with positive RT-PCR for SARS-CoV-2. The same differences were observed when mRNA vaccines were selected (not shown). Diagnosis of RT-PCR documented SARS-CoV-2 was not correlated with age, comorbidities (e.g. diabetes, renal failure, obesity), solid or hematological malignancies (not shown).

Three of the 24 (12.5%) RT-PCR+ patients died of COVID-19; 2 of 5 (40%) versus 1 of 19 (5%) patients with hematological and solid tumors, respectively ($P = 0.036$), representing an overall mortality rate of 0.7% and 0.08% in these two groups. The overall survival within 2 months from the date of the first vaccination was inferior for patients vaccinated with one dose versus patients vaccinated twice (Figure 1C, log rank $P = 0.015$) in the overall population, as well as with a landmark analysis at 21 days (Figure 1D, $P = 0.032$).

A total of 96 of the 1503 (6%) were tested for antispike antibody (Ab) after vaccination at a median time of 55 days after the first vaccine; 61/96 (63%) had detectable antispike Ab. Among these, four of the eight (50%) patients who later presented a documented SARS-CoV-2 RT-PCR had a detectable antispike Ab. Among the 96 tested patients, 4 of the 5 (80%) patients who died had undetectable antispike Ab after vaccination [versus 31/91 (34%) of the remaining patients, $P = 0.038$]. Two of the 5 who died had a RT-PCR documented SARS-CoV-2 infection.

In this analysis, COVID-19 vaccination was found to be effective in cancer patients. Documented COVID-19 was, however, more frequent in patients who received only one dose of vaccine. Overall death rate in the 2 months following the first vaccination was significantly higher in patients receiving only one dose and in patients with hematological cancers.

Consistent with Barrière et al. and another recent report,[5] two doses of COVID-19 vaccines at 21- to 28-day intervals, according to the methods of the published randomized clinical trials, must be recommended in cancer patients receiving active treatment.

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DISCLOSURE

The authors have declared no conflicts of interest.

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