SARS-CoV-2 outbreak in a long-term care facility after vaccination with BNT162b2

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Dear Editor:

The recently approved BNT162b2 vaccine has demonstrated a 95% protection against Covid-19[1]. It has been proposed to delay the boosting dose of BNT162b2 in order to provide more individuals with at least single doses of the vaccine. The responsible UK authorities approved this policy and thereby initiated a controversial debate[2,3]. Several arguments against this policy have recently been presented in this journal[4]. There is missing evidence whether a single dose regimen is sufficient to terminate transmission chains. Here we report a SARS-CoV-2 outbreak after application of the first dose of BNT162b2 vaccine in an elderly care home in North-Rhine Westfalia, Germany. This retrospective analysis was approved by the local ethics committee (no. 21-9867-BO).

In early January 2021 73/76 (96%) residents and about 90% of the employees received a first dose of BNT162b2. SARS-CoV-2 rapid antigen tests were all negative among residents and participating employees the day before. However, a member of the mobile vaccination team as well as an employee reported respiratory symptoms one and four days after vaccination, respectively and tested positive for SARS-CoV-2 by PCR. Thereupon, local health authorities ordered serial PCR testings of all residents 7, 14, 20, 23, 27, 30 and 35 days after the first vaccination and imposed intensified quarantine measures. A boosting dose of BNT162b2 was offered to all asymptomatic residents 21 days after the first vaccination.

The median age of all residents was 88 years and 61/76 (80%) were female. The vaccination itself was not associated with any serious adverse events in this cohort. Serial PCR testings identified SARS-CoV-2 infections in 26/76 (34%) residents. Positive cases were detected 7 days (1), 14 days (10), 20 days (12) and 23 days (3) after the first vaccination (Figure 1). Only 3/26 (12%) residents were symptomatic at the time of diagnosis while 12/26 (46%) positively tested residents developed symptoms in the further course. Overall case fatality rate was 9/26 (35%). Of note, 5 of the 9 patients with fatal outcome were diagnosed on day 20 after vaccination. All three residents who refused to receive a BNT162b2 vaccination were tested positive, but showed mild courses of the

disease. No new cases of SARS-CoV-2 infection were detected 23 days after the first and two days after the boosting dose administration.

Our analysis of a SARS-CoV-2 outbreak revealed a vulnerable phase after administration of the first dose of BNT162b2 in a long-term care facility. Indeed, the measured low mean CT values and high mortality observed in this population were consistent with "natural" Covid-1919 disease rather than vaccine-attenuated. Preprint data from Israel demonstrate a 51% effectiveness of a single BNT162b2 dose in reducing SARS-CoV-2 infections 13-24 days after vaccination. However, clinical outcome parameters of the detected infections were not analyzed[5]. Here we report that a single dose of BNT162b2 did not prevent symptomatic and fatal outcomes of SARS-CoV-2 infections in this high-risk population up to 23 days after the initial vaccination indicating an incomplete protection against severe Covid-19 for that period.

The authors have no potential conflicts.

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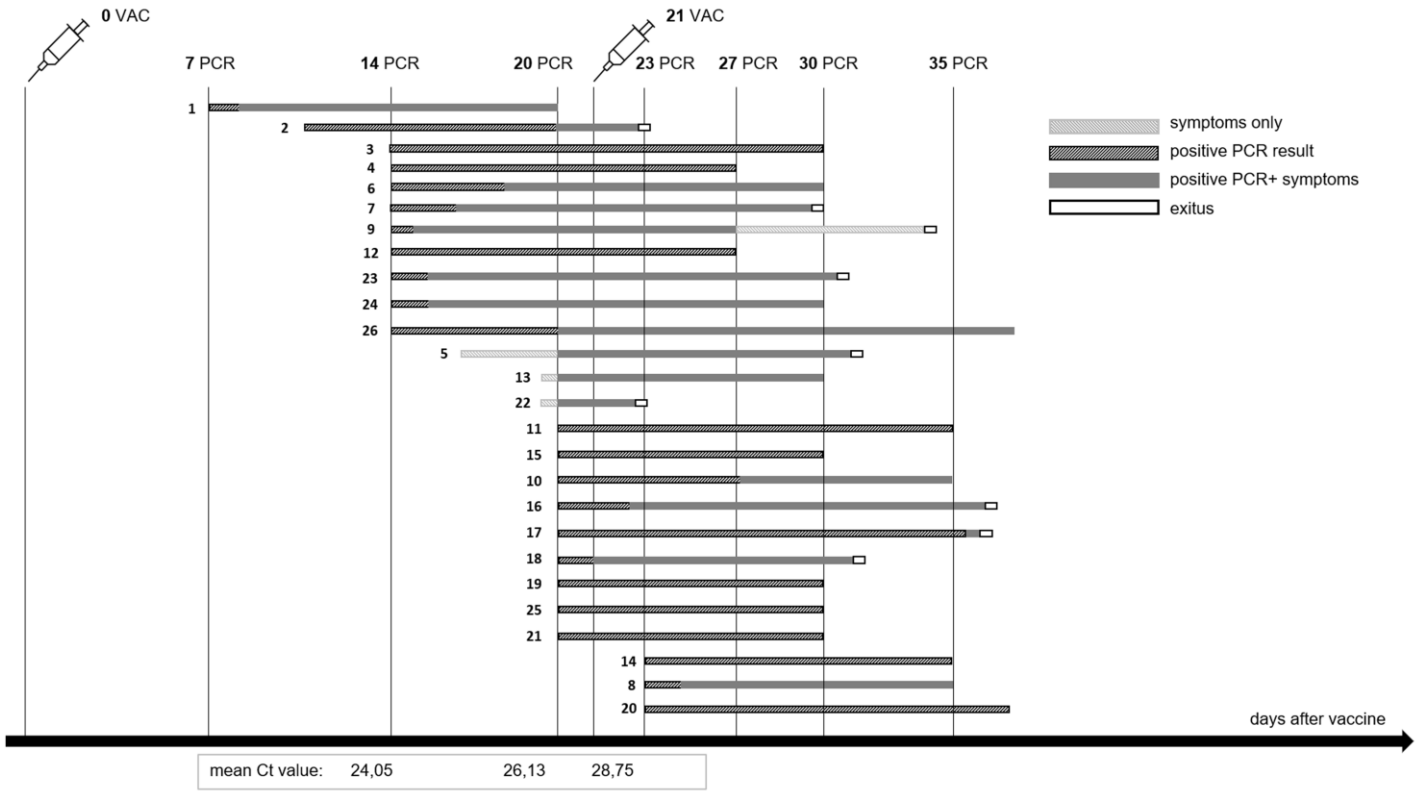
Figure 1. Outbreak overview. BNT162b2 (VAC) was administered on day 0 and day 21. SARS-CoV-2 infections were confirmed by positive PCR tests in 26 residents. 9 residents died in the further course, among those R5, R16, R17, R18 and R22 were diagnosed on day 20 after vaccination. Of note, infection in R8 was detected on day 23 and resulted in symptomatic disease. R4, R11, R26 received no vaccination and had mild courses of the disease. Cycle treshold (Ct) values as an approximate measure of SARS-CoV-2 viral load were analyzed at time of diagnosis. Ct values were increasing over time indicating a lower viral load in those initially diagnosed on day 20 and day 23 compared with those who were diagnosed on day 14 (p=0,36; ANOVA; not statistically significant). Resident numbering reflects spatial distance in the facility (e.g. R1 and R2 live close to each other).

Figure 1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