Effectiveness of COVID-19 vaccine BNT162b2 at age 12-15 years with one dose

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Abstract:

The clinical trial of BNT162b2 at age 12-15 years reported 100% effectiveness in preventing COVID-19 after 7 days from dose-2, which is administrated at day 21. We reanalyzed the data and found 100% effectiveness also after 14-20 days from dose-1 administration. This could relate to studies showing increased dose-1 effectiveness at younger ages. Our findings support the possibility of vaccinating younger ages with the United Kingdom regimen, which delays dose-2 to day 84 to allow more dose-1 vaccinations.

Introduction:

The BNT162b2 clinical trial for age 16 year and above reported 95% effectiveness after 7 days from dose-2, and a reanalysis of that data showed 93% effectiveness after 14-20 days from dose-1.^{1,2} The clinical trial of BNT162b2 at age 12-15 years reported 100% effectiveness after 7 days from dose-2, which lead us to reanalyze its data for the effectiveness after 14-20 days from dose-1.³

Methods:

We extracted data from the FDA report on the BNT162b2 clinical trial phase-3 for age 12-15 years, which had 2,260 participants divided between the BNT162b2 and the placebo groups.³ The extracted infection rate in the vaccinated group was divided by that of the placebo, and that value was subtracted from 1 to calculate the vaccine effectiveness. We calculated the effectiveness for days 14-20 from dose-1 administration.

Results:

The BNT162b2 group had 2 infections in its 1st week, 1 infection in its 2nd week, and 0 infections in its 3rd week. The placebo group had 3 infections in its 1st week, 4 infections in its 2nd week and 5 infections in its 3rd week (figure 1).

Figure 1: Cumulative COVID-19 in BNT162b2 vs. placebo

Legend: Y-axis indicates the cumulative COVID-19 infection rate. X-axis indicates the days from dose-1 administration. Blue indicates the BNT162b2 group while red indicates the placebo group.

The vaccine effectiveness in preventing COVID-19 was 50% after 7-13 days from dose-1, and 100% after 14-20 days from dose-1 (figure 2).

Figure 2: BNT162b2 effectiveness by days from dose-1 administration

Legend: Y-axis indicates the effectiveness of BNT162b2 in preventing COVID-19 after a 7-day moving average. X-axis indicates the days from dose-1 administration.

Discussion:

Our reanalysis of data from the BNT162b2 clinical trial suggests that for age 12-15 years, effectiveness reached 100% in dose-1, which is the same as dose-2. This may relate to dose-2 effectiveness reaching a ceiling effect at 100%, and to studies

finding higher dose-1 effectiveness at younger ages.⁴ Studies from the United Kingdom, which delays dose-2 to vaccinate more people, have shown dose-1 effectiveness continues to rise for at least 60 days.⁵ Our finding suggest that such a strategy might be especially beneficial at younger ages since they have higher dose-1 effectiveness.

References:

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