Low rate of transmission to triple-vaccinated contacts of an imported case of SARS-CoV-2 Omicron infection: a contact tracing study in Israel

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Highlight (Word Count: 49):

We conducted contact-tracing investigation of multiple patients and healthcare workers exposed to a pre-symptomatic physician, triple-vaccinated with BNT162b2 COVID-19 vaccine, infected with SARS-CoV-2 B.1.1.529 (Omicron) Variant. Of 51 contacts, 45(88%) were triple-vaccinated (boosted) with BNT162b2 vaccine and 47(92%) contacts were masked. One (1/51, 2%) triple-vaccinated primary contact became infected.

Text (715 words)

On November 26, 2021, the World Health Organization designated SARS-CoV-2 B.1.1.529 (Omicron) a variant of concern. By November 26, 4.1 million (44%) Israelis had received a third dose (booster) of the BNT162b2 COVID-19 vaccine. On November 28, Omicron was reported in Israel. We describe findings from a contact tracing investigation of a healthcare worker with confirmed Omicron infection conducted at Sheba Medical Center (SMC).

The index patient was a 45-year-old previously healthy cardiologist, triple vaccinated with BNT162b2 COVID-19 vaccine (third dose given on August 17). He had attended a cardiology conference in London during November 19-24, and tested negative on SARS-CoV-2 nasopharyngeal PCR swabs obtained on November 20, 21 and 24 upon arrival to London and return to Israel. On November 25 the index patient attended SMC cardiology staff meeting and treated patients at the cardiac catheterization laboratory. On November 26, the index patient participated in a national cardiology conference. Early morning, November 27, he developed a flu like illness and tested positive for SARS-CoV-2 on a nasopharyngeal PCR swab. On November 28, infection with Omicron was confirmed at the reference virology laboratory.

Following the report, SMC infection prevention and control unit conducted an in-hospital contact tracing investigation which included all identifiable contacts of the index patient (Online Appendix 1). Overall, 53 primary contacts were identified, of whom complete information was obtained for 51(96%). Of the 51 included in the investigation eight patients and 16 healthcare workers were exposed at the catheterization laboratory two days prior to symptom onset; 19 participated at the

SMC cardiology staff meeting two days prior to symptom onset; and eight participated at the national cardiology conference during the day before symptom onset (Table). Most contacts (45/51, 88%) were triple-vaccinated (boosted) with BNT162b2 vaccine. The median time from the third dose to the suspected exposure date was 100 days. All close contacts were defined as indoor (closed space) contacts, and all occurred in single, non-HEPA filtered spaces. Four (8%) of the 51 contacts were unmasked close contacts. Detailed contact data including distance and duration of exposure were reported for 37/51(73%) of identified contacts (Online appendix 2)

At least one nasopharyngeal PCR test was obtained from all contacts starting day four post exposure. One primary contact was infected (1/51, 2%). The infection was detected in a 69 years old healthy, triple vaccinated cardiologist who carpooled with the index patient, both without masks for 90 minutes on November 26 afternoon.

Additional investigations of non-hospital contacts of the index case were conducted by the ministry of health (MoH) briefly described here: the index case was with his nuclear family, wife and three children, all fully vaccinated, at home during November 24-27 and attended a family dinner with nuclear family and six additional persons (of whom three were unvaccinated children) on November 26. These ten family contacts family were followed by MoH per protocol including isolation and PCR testing during days two and eight post exposure. None were infected. The primary infected contact tested positive on November 28. The first PCR test revealed N gene positive at a Ct of 37, E and RdRp were negative. On December 6th, a follow-up PCR revealed the peak N gene Ct value of 18. His 62 years old triple vaccinated wife, isolated from him on November 27th and tested positive on December 4th, therefore considered a secondary infection.

Conclusions:

Reports from South Africa and Europe suggest high transmissibility of Omicron variant compared with previous variants. One investigation of a point source exposure during a Christmas party in Norway reported a 59% confirmed attack rate(1). Our investigation revealed a lower transmission rate. The pre-symptomatic, triple vaccinated index case had multiple, mostly masked contacts to mostly triple-vaccinated healthcare workers and patients during the 48 hours prior to symptom onset which resulted in only a 2% infection rate among primary contacts. Factors contributing to the low attack rate reported in this event may include low levels of viral excretion during the pre-symptomatic exposure time frame(2), reduction of excreted viral load due to receipt of primary series and boosting(3), a high proportion of triple vaccinated persons among exposed contacts(4) and use of facemasks during most contacts(5). More data should be obtained through systematic investigations of point source exposures to Omicron variant in different settings to assess the impact of boosting on transmission.

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Table: Demographic and exposure characteristics of primary contacts (N=51) of SARS-CoV-2 B.1.1.529 (Omicron) patient by vaccination status – Israel, November-December 2021.

	Three doses of BNT162b2 COVID-19 vaccine (boosted)	Two doses of BNT162b2 COVID-19 vaccine (unboosted)	Recovered and boosted (1 or 2 additional doses)	Recovered unvaccinated
n	45	3	2	1
Median age [IQR]	49 [37,60]	37 [36,55]	33 [33,33]	36 [36,36]
Male gender (%)	36 (80)	1 (33)	2 (100)	1 (100)
Median days from last vaccine dose or disease [IQR; range]	100 [87,109; 55-136]	232 [206,253; 180-273]	59 [42,77; 24-94]	43 [43,43; 43-43]
Unmasked close contact (%)	4 (9)	0 (0)	0 (0)	0 (0)
Masked patient contact (%)	7 (16)	1 (33)	0 (0)	0 (0)
Masked HCW contact (%)	13 (29)	1 (33)	1 (50)	1 (100)
Masked conference contact (%)	21 (47)	1 (33)	1 (50)	0 (0)
Infected (%)	1 (2)	0 (0)	0 (0)	0 (0)
IQR – interquartile range				

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