

COVID-19 in a centenarian, the vaccination, the breakthrough infection, and the third booster dose

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To the Editor—Dr Ellen Tam and her colleagues contributed an important study of coronavirus disease 2019 (COVID-19) infection among the older adults¹ who are an increasingly large population in Hong Kong. Of particular interest is the higher mortality associated with increasing frailty but not necessarily increasing age. The latter seems to level off after age 90. May I substantiate this observation with the case of a centenarian who was fully vaccinated with two doses of Comirnaty and survived a breakthrough COVID-19 infection before proceeding to receive a third booster vaccination.

A female patient born in December 1920 had vascular dementia that had progressed over 15 years to a level at which she was completely dependent on a carer. She also had recurrent urinary and respiratory tract infections, osteoporosis and persistent bed sores. Echocardiogram revealed concentric left ventricular hypertrophy and diastolic dysfunction. Her clinical frailty score had been >7 for the last 10 years.

Two doses of Comirnaty were administered on the patient on 19 July and 22 August 2021, respectively. On 8 March 2022, while waiting for her third dose (booster), her whole family became infected with COVID-19 (tested positive by rapid antigen test) and developed cough and fever. The patient remained asymptomatic with no fever, cough, shortness of breath or loss of appetite. Family members recovered spontaneously and the patient remained negative on rapid antigen test from 12 March 2022 onwards. The third dose of Comirnaty was given to the patient after a delay of 4 months on 1 July 2022 and was well tolerated. Her severe acute respiratory syndrome coronavirus 2 nucleocapsid and envelope protein antibody titre was >2500 units/μL, well above the measuring capacity of our laboratory equipment.

This case shows how a centenarian with poor clinical frailty score was well protected against

symptomatic COVID-19 infection during the height of the most severe wave of infection. Her antibody response after the third dose of Comirnaty was proven to be very high. We do not regularly test antibody level at a population level following vaccination but the level of protection can be seen from data in the official records (Table²). Although older adults aged over 80 accounted for the great majority of COVID-19 deaths, those who received three doses of vaccine remained well protected with a mortality rate of ≤1%.² Had this age-group been fully vaccinated, their mortality would have been reduced from 6542 to around 65.

Kordowitzki³ produced a report of COVID-19 infection in centenarians across various countries. Mortality rate of COVID-19 appeared to peak among octogenarians, as in this Hong Kong study, and showed some decline among those in their 90s. Although there are scanty reports of centenarian survival from COVID-19 infection from China, Germany and France, there has been little mention of the protection afforded by vaccination in this age-group. Genetic and acquired immune factors that favour extreme longevity might also favour immunity against COVID-19 infection.³

I hope the experience of this patient might be of interest to health workers dealing with the oldest section of our population, particularly in overcoming their vaccine hesitancy.

Author contributions

The author contributed to the drafting of the letter and critical revision for important intellectual content. The author approved the final version for publication and takes responsibility for its accuracy and integrity.

Conflicts of interest

The author declared no conflict of interest.

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References

- Tam EM, Kwan YK, Ng YY, Yam PW. Clinical course and mortality in older patients with COVID-19: a cluster-based study in Hong Kong. *Hong Kong Med J* 2022;28:215-22.
- Hong Kong SAR Government. Archive of statistics on 5th wave of COVID-19. Available from: <https://www.coronavirus.gov.hk/eng/5th-wave-statistics.html#>. Accessed 20 Jul 2022.
- Kordowitzki P. Centenarians and COVID-19: is there a link between longevity and better immune defense? *Gerontology* 2022;68:556-7.

TABLE. Mortality percentage and number of deaths by age-group and number of doses of the coronavirus disease 2019 (COVID-19) vaccine received in the fifth wave of COVID-19²

Age-group, y	Mortality percentage by No. of doses of COVID-19 vaccine received				No. of deaths
	No vaccine	Had 1 dose	Had 2 doses	Had 3 doses	
60-69	64%	15%	17%	4%	774
70-79	68%	17%	14%	1%	1546
≥80	74%	16%	9%	1%	6542
All ages combined	72%	16%	12%	<1%	9231