Letters

RESEARCH LETTER

Rate of Recurrent Guillain-Barré Syndrome After mRNA COVID-19 Vaccine BNT162b2

On December 20, 2020, Israel initiated a national vaccination program against COVID-19. National and international vaccine guidelines did not preclude patients who have previously been diagnosed with Guillian-Barré Syndrome (GBS) from receiving the COVID-19 vaccine.[1,2] However, previous association between vaccines and GBS raises the level of caution and hesitancy among clinicians and patients regarding administering the vaccine.[3-5] The aim of this study was to establish rates of GBS relapse among Pfizer-BioNTech BNT162b2 vaccine receivers.

Methods | We performed a descriptive retrospective cohort study in the second largest health maintenance organization in Israel, Maccabi Healthcare Services (MHS), serving more than 2.5 million members, representing a quarter of the Israeli population. MHS has a nationwide centralized database, spanning more than 20 years, that includes extensive clinic and hospital diagnoses as well as vaccine registries. Data from the medical records were retrieved for all members who were recorded as having an *International Classification of Diseases, Ninth Revision (ICD-9)* diagnosis code for GBS (code 357.0). To ensure that the correct patients with GBS diagnosis were identified, manual review of the electronic medical record was conducted of all cases. The criterion for a GBS case was a diagnosis given by a hospital neurology department. Data collected included information regarding GBS, vaccine administration, medical care encounters, and hospital visits after receiving at least 1 vaccine dose. The study was approved by the MHS institutional review board (0029-21-MHS).

Results | Seven hundred two cases of GBS were identified between 2000 and 2020. Three hundred thirty-seven (48%) were women and the mean (SD) age was 53 (18) years. Of these patients, 579 had received 1 vaccine dose and 539 received 2 doses. A median (IQR) of 108 (82 to 122) days' follow-up was obtained after the first vaccine administration and 90 (64 to 100) after the second. Of 40 patients who received only 1 dose of vaccine, 38 had COVID-19 previously and needed only 1 dose according to Israeli Ministry of Health guidelines.[1]

Forty-eight of 579 patients were seen in a hospital (**Table**). Twenty-four had visited the emergency department and were released after less than 24 hours for transient non-neurologic concerns and the others needed admission for a variety of conditions. Only 5 were referred to the hospital for neurological concerns. Two patients had paresthesia, 1 patient had several months' duration of tremor, and 1 patient was evaluated for a seizure. They were released from the emergency department within a few hours without further medical observation. The fifth patient had a history of previously diagnosed GBS and was treated with plasmapheresis with no residual neurological symptoms. The patient had progressive leg weakness and paresthesia that started shortly after receiving the first vaccine dose, which lasted for several weeks. Several days following administration of the second vaccine dose, the patient was admitted to the hospital. The clinical picture and electrodiagnostic evidence were suggestive of sensorimotor demyelinating polyneuropathy. The patient was treated with plasmapheresis in the hospital and, by the day of discharge, had a significant improvement in her lower limb weakness and only minor proximal weakness without any sensory disturbance.

Discussion | To our knowledge, this is the first study assessing safety of messenger RNA COVID-19 vaccine in previously diagnosed cases of GBS. In this cohort study, which included 702 patients, only 1 needed short medical care for relapse of previous syndrome, which represents a minimal risk.

The study has limitations. First, it relies on medical records and diagnosis. However, a meticulous medical record inspection was conducted to validate all cases. Second, this study included only hospital visits, which may underestimate other symptoms that presented only in the community. Nevertheless, any significant serious neurologic concern would probably have been evaluated in a hospital setting.

The Israeli Ministry of Health and national immunization guidelines did not include a history of GBS as a precaution or contraindication to receiving the COVID-19 vaccine, and our study supports this approach.

Shirley Shapiro Ben David, MD
Israel Potasman, MD
Daniella Rahamim-Cohen, MD

Author Affiliations: Health Division, Maccabi Healthcare Services, Tel Aviv, Israel (Shapiro Ben David, Rahamim-Cohen); Internal Medicine and Infectious Diseases, Maccabi Healthcare Services, Haifa, Israel (Potasman).

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Corresponding Author: Shirley Shapiro Ben David, MD, Maccabi Healthcare Services, Hamered 27, Tel Viv 6812509, Israel (shirley.shap@gmail.com).

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1. Israeli Ministry of Health. Coronavirus (COVID-19) vaccines. Accessed April 30, 2021. https://www.health.gov.il/UnitsOffice/HD/PH/epidemiology/td/docs/365_Corona.pdff.

2. Centers for Disease Control and Prevention. COVID-19 vaccines for people with underlying medical conditions. Accessed April 27, 2021. https://www.cdc.gov/coronavirus/2019-ancov/vaccines/recommendations/underlying-conditions.html.

Table. Patients Who Have Been Previously Diagnosed With GBS and Hospital Visits Following COVID-19 Vaccine Administration[a]

Case No./ Sex/Age, y	Time from diagnosis to first vaccination, y	Hospital visits after 1st/2nd vaccination	Time from vaccination to hospital visit, d	Emergency department (1)/ hospital admission (2)	Reason for hospital visit
1/M/80s	6	1st	0	1	Paresthesia
2/F/50s	14	1st	1	1	Paresthesia
3/F/50s	21	1st	2	1	Seizure
4/M/70s	17	1st	4	2	SOL lung
5/M/60s	3	1st	7	2	Diverticulitis
6/M/50s	15	1st	8	2	STEMI
7/M/60s	8	1st	8	2	Severe COVID-19
8/F/80s	21	1st	11	2	Severe COVID-19
9/F/60s	13	1st	15	1	Trauma
10/M/30s	4	1st	16	1	Tremor
11/F/30s	11	1st	16	2	Delivery
12/F/30s	8	1st	19	2	Surgery
13/M/60s	14	2nd	0	2	Surgery
14/M/70s	17	1st	23	1	Trauma
15/F/30s	2	2nd	3	2	GBS
16/F/50s	2	2nd	3	1	Vitreous detachment
17/M/70s	12	2nd	4	1	Epigastric distress
18/F/50s	6	2nd	5	1	Hypertension
19/F/40s	21	2nd	13	2	Fatigue
20/M/mid-teens	12	2nd	13	1	Lymphadenitis
21/M/60s	8	2nd	14	2	Surgery
22/F/50s	4	2nd	15	1	Trauma
23/F/60s	2	2nd	18	2	Surgery
24/M/40s	7	2nd	28	1	Chest pain
25/M/70s	16	2nd	28	2	Surgery
26/M/70s	17	2nd	29	1	Urinary retention
27/M/60s	7	2nd	30	2	Surgery
28/F/70s	1	2nd	31	1	Hypertension
29/M/60s	2	2nd	32	2	COPD exacerbation
30/M/70s	20	2nd	33	1	Suicide attempt
31/M/30s	5	2nd	33	1	Trauma
32/M/80s	8	2nd	34	2	Surgery
33/F/50s	14	2nd	37	1	Hemolytic anemia
34/M/60s	11	1st	60	1	Vomiting
35/M/60s	3	2nd	41	2	Upper GI tract bleeding
36/F/80s	15	2nd	49	1	Syncope
37/M/20s	7	2nd	53	1	Trauma
38/M/80s	8	2nd	56	2	Pneumonia
39/M/60s	12	2nd	57	2	Surgery
40/M/80s	1	2nd	57	1	Atrial fibrillation
41/M/70s	19	2nd	71	2	Pericarditis
42/F/60s	5	2nd	75	2	Trauma
43/M/70s	1	2nd	77	2	Surgery
44/F/70s	6	2nd	78	1	Cellulitis
45/F/60s	7	2nd	81	1	Trauma
46/M/50s	10	2nd	86	2	Surgery
47/M/70s	3	2nd	94	2	Trauma
48/M/60s	2	2nd	101	1	Trauma

Abbreviations: COPD, chronic obstructive lung disease; GI, gastrointestinal; GBS, Guillian-Barré syndrome; SOL, space-occupying lesion; STEMI, ST elevation myocardial infarction.

[a] BNT162b2 (Pfizer-BioNTech) vaccine.

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