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COVID-19 vaccination and dizziness

骨立診所　謝函潔

醫生啊～～
哇頭殼揪暈內～～～

哇捂注疫苗，甘無關係？？

Dizziness: common complaint

- 5% in primary care visits
- Dizziness: a vague term!!
  - vertigo
  - disequilibrium
  - presyncope
  - lightheadedness

ENT

神經科

Am Fam Physician. 2010;82(4):361-368.

Dizziness:
common complaint after COVID-19 vaccination??

YES NO

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 FEBRUARY 4, 2021 VOL. 384 NO. 5

Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine

L.R. Baden, H.M. El Sahly, B. Essink, K. Kotloff, S. Frey, R. Novak, D. Diemert, S.A. Spector, N. Rouphael, C.B. Creech, J. McGettigan, S. Khetan, N. Segall, J. Solis, A. Brosz, C. Fierro, H. Schwartz, K. Neuzil, L. Corey, P. Gilbert, H. Janes, D. Follmann, M. Marovich, J. Mascola, L. Polakowski, J. Ledgerwood, B.S. Graham, H. Bennett, R. Pajon, C. Knightly, B. Leav, W. Deng, H. Zhou, S. Han, M. Ivarsson, J. Miller, and T. Zaks, for the COVE Study Group*

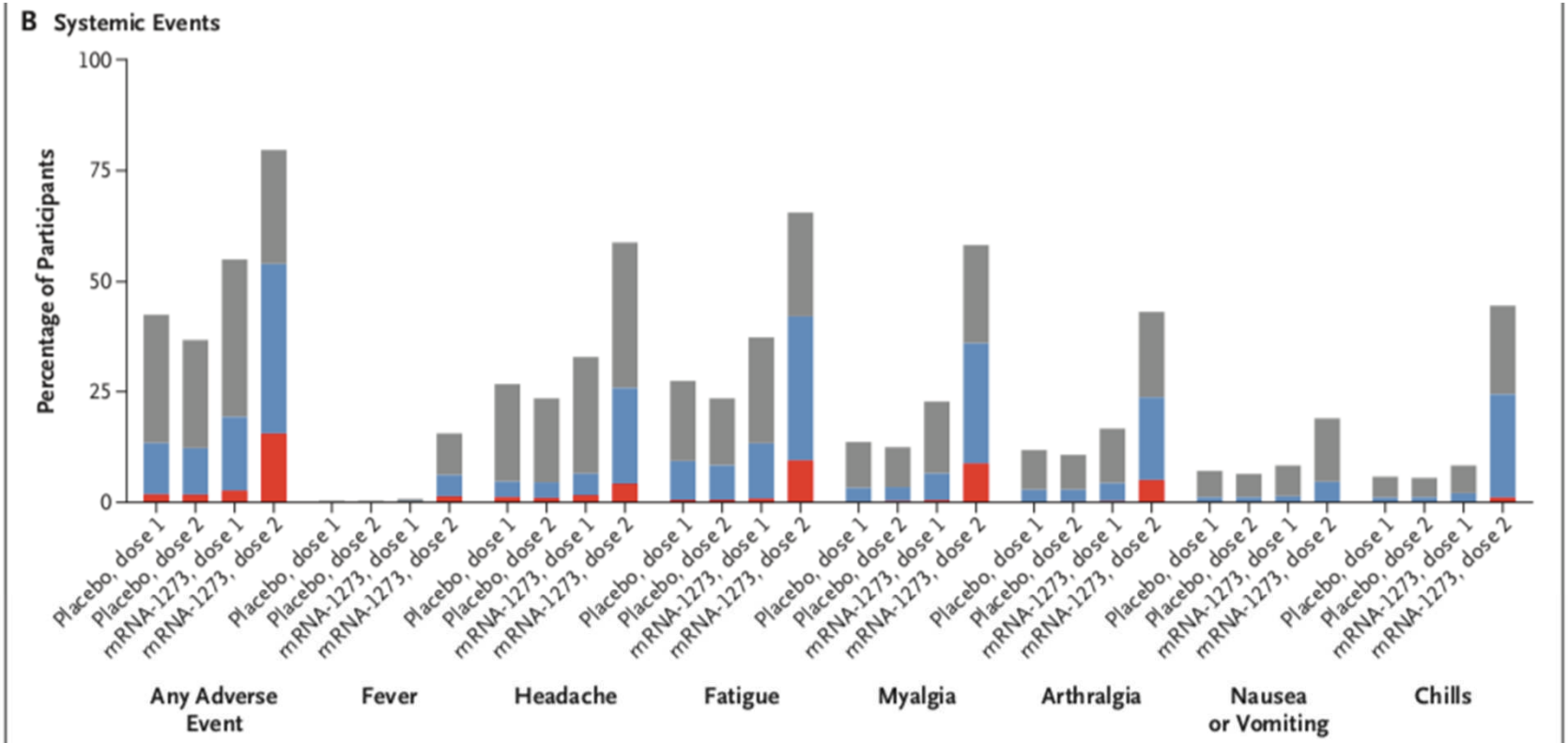

Figure 2. Solicited Local and Systemic Adverse Events.

Shown is the percentage of participants who had a solicited local or systemic adverse event within 7 days after injection 1 or injection 2 of either the placebo or the mRNA-1273 vaccine.

搜尋關鍵字：dizziness　　結果：0

Dizziness: common complaint?

- 11.8% of the reports associated with COVID-19 vaccines in the Vaccine Adverse Event Reporting System (VAERS) cite dizziness as a possible side effect
- 0.80% list vertigo
- 1.27% reported syncope (fainting)

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DOI: 10.1002/jmv.26996

RESEARCH ARTICLE

JOURNAL OF MEDICAL VIROLOGY WILEY

Non-life-threatening adverse effects with COVID-19 mRNA-1273 vaccine: A randomized, cross-sectional study on healthcare workers with detailed self-reported symptoms

Renuka Ananth Kalyan Kadali[1,2] | Ravali Janagama[3] | Sharanya Peruru[4] | Viswanath Gajula[5] | Rajasekhar R. Madathala[6] | Nikhita Chennaiahgari[7] | Srikrishna V. Malayala[8]

TABLE 2 Event rate based on the descending order of occurrence

Symptom/sign/adverse event (after the first and or second dose)	Percentage reported in descending order (*n* = number of respondents with event)
Reported with most frequency	
Sore arm/pain	94.21% (407)
Generalized weakness/fatigue	65.74% (284)
Headache	59.26% (256)
Muscle pain	54.17% (234)
Chills	52.78% (228)
Fever	35.65% (154)
Nausea	26.62% (115)
Arthritis/joint pains	24.77% (107)
Sweating	18.52% (80)
Swelling	15.05% (65)
Dizziness	14.58% (63)
Itching	14.58% (63)
**Rash	13.43% (58)
Decreased appetite	13.19% (57)
Muscle stiffness/spasm	11.11% (48)
Decreased sleep quality	10.65% (46)
Brain fogging	9.95% (43)

vertigo-like symptoms by 3.47% (15)

Dizziness after COVID-19 vaccination

- 30/1325 clinical visits had new or significantly exacerbated otologic symptoms after COVID-19 vaccination
- Moderna: 18, Pfizer: 12
- Mean age: 60.9±13.8 years old
- Women / men: 11/ 19
- Onset time: 10.18 ± 9 days post-vaccination
- hearing loss: 25 (83.3%), tinnitus: 15 (50%), dizziness: 8 (26.7%), vertigo: 5 (16.7%); 11 had previous otologic diagnoses

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frontiers | Frontiers in Pharmacology

ORIGINAL RESEARCH
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Check for updates

Profiling COVID-19 Vaccine Adverse Events by Statistical and Ontological Analysis of VAERS Case Reports

Wenxin Guo[1†], *Jessica Deguise*[1†], *Yujia Tian*[2†], *Philip Chi-En Huang*[1†], *Rohit Goru*[1†], *Qiuyue Yang*[3], *Suyuan Peng*[4], *Luxia Zhang*[4,5,6], *Lili Zhao*[7], *Jiangan Xie*[3*] and *Yongqun He*[8,9,10*]

TABLE 2 | Profiles of COVID-19 vaccine-associated Top 10 AEs in females and males. Data is derived from VAERS case reports from all COVID-19 vaccines as of 31 December 2021.

#	AE	# Of cases in females	% in total female cases	# Of cases in males	% in total male cases	F/M case ratio	F/M % ratio
1	Headache	94,367	0.196	28,300	0.135	3.33	1.452
2	Pyrexia	74,910	0.156	28,802	0.137	2.6	1.139
3	Fatigue	77,049	0.16	25,447	0.121	3.03	1.322
4	Chills	66,146	0.137	23,066	0.11	2.87	1.245
5	Pain	67,849	0.141	20,731	0.099	3.27	1.424
6	Dizziness	51,097	0.106	19,553	0.093	2.61	1.14
7	Nausea	55,307	0.115	14,415	0.069	3.84	1.667
8	Pain in extremity	51,915	0.108	14,852	0.071	3.5	1.521
9	Myalgia	30,550	0.063	11,708	0.056	2.61	1.125
10	Arthralgia	30,126	0.063	11,350	0.054	2.65	1.167

509,307,789 COVID-19 vaccines were administered
717,577 adverse event case reports were collected in VAERS
a crude AE reporting rate of 0.14%

TABLE 3 | Statistically significant medically relevant AEs associated with the Janssen, Moderna, and Pfizer COVID-19 vaccines.

Adverse Event	Vaccine	Count	PRR	x^2
Behavioral and neurological AE (38) Janssen (22) Moderna (6) Pfizer (23)				
Vertigo	Pfizer	3,859	2.13	1,450.80
Ear AE (4) Pfizer (4)				
Deafness	Pfizer	809	2.03	269.64
Ear discomfort	Pfizer	1,362	3.00	982.30
Hypoacusis	Pfizer	781	2.50	411.39
Tinnitus	Pfizer	6,933	2.92	4,844.67

proportional reporting ratio (PRR)

vaccines

MDPI

Systematic Review

Nervous and Muscular Adverse Events after COVID-19 Vaccination: A Systematic Review and Meta-Analysis of Clinical Trials

Jiaxin Chen [1,†], Yuangui Cai [1,†], Yicong Chen [1], Anthony P. Williams [2,3], Yifang Gao [4,*] and Jinsheng Zeng [1,*]

Table 2. Other nervous and muscular adverse events after COVID-19 vaccination in phase 3 clinical trials.

	Inactivated Vaccine					Replication-Incompetent Vectors Vaccine				mRNA Vaccine	
	Kaabi 2021 [37]			Voysey 2020 [38]		Logunov 2021 [39]				Baden 2020 [40]	
	Vaccine		Control	Vaccine	Control	Vaccine		Control		Vaccine	Control
	WIV04 n = 13,464	HB02 n = 13,471	n = 13,453	n = 12,021	n = 11,724	At Least One Dose n = 16,427	Two Dose n = 9258	At Least One Dose n = 5435	Two Dose n = 3038	n = 15,185	n = 15,166
Systemic neurological symptoms *	0	1	0	9	10	1	NA	0	NA	14	19

Included migraine, dizziness, vertigo, syncope, presyncope, muscle weakness, pathological changes in nervous system.

Table I. Audiological and vestibular adverse events reported in the literature after COVID-19 vaccination. SSHL: Sudden Sensorineural Hearing Loss.

Author	Vaccine	Tinnitus	SSHL	Vertigo	Dizziness
Ciorba et al[5] according to MHRA	Pfizer-BioNTech	153 (0.09%)	71 (0.04%)	1,406 (0.84%)	-
	Oxford-AstraZeneca	113 (0.17%)	25 (0.04%)	885 (1.33%)	-
	Moderna	12 (0.10%)	10 (0.09%)	90 (0.80%)	-
Ciorba et al[5] according to AIFA	Pfizer-BioNTech	1257 (0.49%)	335 (0.14%)	985 (0.38%)	-
	Oxford-AstraZeneca	3,727 (0.47%)	24 (0.08%)	78 (0.26%)	-
	Moderna	110 (0.37%)	724 (0.09%)	2,175 (0.27%)	-
Parrino et al[6]	Pfizer-BioNTech	3	-	-	-
Formeister et al[7]	Pfizer-BioNTech	-	28 (0.3%)	-	-
	Moderna	-	12	-	-
Jeong et al[8]	Pfizer-BioNTech	-	2	-	-
	Oxford-AstraZeneca	-	1	-	-
Di Mauro et al[9]	Pfizer-BioNTech	-	-	23	-
	Oxford-AstraZeneca	-	-	5	-
	Moderna	-	-	4	-
	Janssen-Johnson	-	-	1	-
Wichova et al[10]	Pfizer-BioNTech	15	25	5	8
Kadali et al[11]	Pfizer-BioNTech	16 (1.99%)	-	20 (2.49%)	-

Screening → need image study??

Stroke

JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Stroke Association℠

A Division of American Heart Association

HINTS to Diagnose Stroke in the Acute Vestibular Syndrome: Three-Step Bedside Oculomotor Examination More Sensitive Than Early MRI Diffusion-Weighted Imaging

Jorge C. Kattah, Arun V. Talkad, David Z. Wang, Yu-Hsiang Hsieh and David E. Newman-Toker

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frontiers in Medicine

BRIEF RESEARCH REPORT
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Check for updates

Acute Vertigo After COVID-19 Vaccination: Case Series and Literature Review

Paola Di Mauro[1], Ignazio La Mantia[1], Salvatore Cocuzza[1], Pasqua Irene Sciancalepore[2], Deborak Rasà[1], Antonino Maniaci[1], Salvatore Ferlito[1], Isabella Tundo[1] and Roberta Anzivino[3]*

VAERS database

possible adverse reactions involving the cochleovestibular system:

- total: 1,302,332 COVID-19 vaccine total adverse events,
- 12,787 tinnitus (0.98%)
- 1,627 hypoacusis, (0.12%)
- 8,504 vertigo (0.65%)
- 254 positional vertigo (0.02%)
- 133 vestibular neuronitis (0.01%)

reported vertigo or dizziness not more than 48h after the COVID-19 vaccination

- 33 patients (7 men and 26 women; mean age 54.53 ± 14 years) during 5/1~7/30 in 2021
- bedside examination with vestibulospinal stability tests, head impulse test, nystagmus direction, testing skew (HINTS) examination, head shaking test (HST), hyperventilation-induced nystagmus (HIN), and positional nystagmus maneuvers.

Romberg test

Fukuda stepping test

Finger-nose-finger, heel-knee-shin test, rapid alternating movement

HINTS: head impulse test

- Head impulse test, nystagmus direction, testing skew (HINTS)

Head impulse test

- “positive” (or abnormal): when rapid movements of a patient’s head bring to a fixation loss of the eyes and a corresponding refixation saccade: this is common in people with peripheral vertigo
- Instead, central vertigo has a “negative” (or normal) HIT, and this is because the VOR is not damaged and the eye of a patient remains fixed on target

HINTS: nystagmus

- pseudo-spontaneous nystagmus
- gaze induced nystagmus
- direction changing nystagmus
- head shaking nystagmus
- pure torsional, or pure vertical nystagmus

→ possible central lesion

HINTS: nystagmus

- spontaneous horizontal nystagmus in primary position
- inhibited with fixation
- Alexander’s law (the amplitude of the nystagmus increases in the gaze-direction of the primary position nystagmus fast phase)

→ Vestibular problem

HINTS: skew deviation

HINTS: skew deviation

- Skew deviation is a vertical ocular misalignment in primary position of gaze, and it reflects an altered otolith-ocular reflex (OOR)

→ Consider central cause

Signs of Vestibular Impairment

- Head Shaking Test
- shaked rapidly at 2 Hz oscillation for approximately 20 s in the horizontal plane.
- A positive test HSN was defined by the presence of at least three beats of nystagmus after stopping the head shake.
- fast phase beats toward the healthy labyrinth

Hyperventilation-Induced Nystagmus

- In the cases of VN and acoustic neuroma, the HIN can evoke a paretic nystagmus (in which the fast phases beat toward the healthy side) by disrupting central compensation mechanisms, but, in these pathological conditions, it can also evoke an excitatory type of nystagmus, in which the fast phases beat, on the contrary, toward the affected side.

Hyperventilation-Induced Nystagmus

- In cerebellar diseases, HIN can increase or evoke a downbeat nystagmus.

TABLE 1 | General characteristics of patients (sex and age), types of vaccines received, reported symptomatology (objective, subjective vertigo, or dizziness), numbers of patients who refer associated ear, nose, and throat (ENT) symptoms.

Total number of patients	33
Men	7 (21, 21%)
Women	26 (78, 79%)
Mean age	54.53 ± 14.14
Range	24–78
Vaccine received	**Number of patients, (%)**
MRNA vaccine Pfizer-Biontech (Tozinameran)	23 (69, 70)
Vaccine Astrazeneca (CHADOX1 NCOV-19)	5 (15, 15)
MRNA vaccine Moderna (CX-024414)	4 (12, 12)
Vaccine Janssen (AD26.COV2.S)	1 (3, 3)
Reported symptomatology	
Objective vertigo	16 (48, 5)
Subjective vertigo	14 (42, 4)
Dizziness	3 (9, 1)
Associated ENT symptoms	
Hearing loss	4 (12, 12)
Tinnitus	6 (18, 2)
Ear fullness	2 (6, 06)
Hypersensitivity to noise	1 (3, 03)

TABLE 3 | Analysis of nystagmus and probable clinical diagnosis.

Type of nystagmus	**Number of patients, (%)**
No presence of nystagmus	7 (21, 21)
Presence of horizontal or rotatory nystagmus	9 (27, 27)
Presence of positive HST/ "central HINTS" or vertical or oblique nystagmus/ "central HINTS"	17 (51, 52)
Probable clinical diagnosis	
No presence of vestibular impairment or central etiology of vertigo/dizziness	7 (21, 21)
Benign paroxysmal positional vertigo	9 (27, 27)
Probable central etiology	17 (51, 52)

Acute vertigo after COVID-19 vaccination

- Positive for Romberg test: 26 (78.79%), 1 can’t execute it
  - 17 – pluridirectional oscillation
  - 5 – anteroposterior oscillation
  - 2 – laterolateral oscillation
  - 2 – fall tendency
- Positive for Fukuda stepping test: 21 (63.64%), 6 can’t execute it
  - 10 – Rt or Lt deviation
  - 11 – fall tendency

COVID-19 & audio-vestibular disorder

- cochleitis or neuritis caused by viral involvement of the inner ear or the vestibulocochlear nerve, potentially leading to vertigo, tinnitus, and hearing loss
- immune-mediated response such as production of proinflammatory cytokines and vasculitic events that may negatively affect the audio-vestibular system
- cross-reactions of antibodies or T-cells, which may misidentify inner ear antigens as the virus, leading to accidental damage to the inner ear

COVID-19 & audio-vestibular disorder

- vascular disorders because cochlea and semicircular canals are largely susceptible to ischaemia
- endothelial dysfunction
- proneness to worry and incoming stress, together with the absence of masking sounds, have been shown as potential risk factors for tinnitus worsening during pandemic

COVID-19 & audio-vestibular disorder

- SHNL after COVID-19 vaccination has been linked to an abnormal autoimmune response (mediated by circulating immune complexes or cytotoxic vestibule-cochlear autoantibodies) or a vasculitic event with subsequent localized damage to the cochlea

Summary

- Dizziness after COVID-19 vaccination: may be common but under-estimated
- HINTS!!