Evaluating the COVID-19 Pandemic in US Veterans: transitioning from Delta to Omicron Variants

Audun J. Lier, M.D., M.P.H., Zeena Lobo, M.D., George Psevdos, M.D.

Division of Infectious Diseases, Northport Veteran Affairs Medical Center, Long Island NY

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Background

In the two years of the COVID-19 pandemic multiple variants of the SARS-CoV-2 virus have emerged ranging from alpha to omicron, the latter of which emerged in November 2021. The omicron variant has over 50 mutations, many in the spike protein that facilitates virus entry into human cells as well as immune evasion and is also the target of the current armamentarium of COVID-19 vaccines. We aimed to provide a clinical epidemiological analysis of US Veterans (USV) with COVID19 during the fall and winter 2021-2022 omicron surge and hypothesized that COVID19 vaccination status would be protective.

Methods

We performed a retrospective chart review of USV with PCR confirmed SARS-CoV-2 infection at Northport Veterans Affairs Medical Center from 11/1/2021 to 4/15/2022. Demographic data, comorbidities, choice of monoclonal antibody therapy, need for hospitalization, history of receipt of previous COVID-19 vaccination, SARS-COV-2 sequencing, and IgG levels to the receptor-biding domain (RBD) of the spike protein in vaccinated USV were reviewed.

Results

Variable	Entire cohort N = 605	Vaccinated N = 425	Unvaccinated N = 180	*p*-value
Age (range)	62 (20-97)	59.2 (20-97)	60.8 (21-93)	0.28
Gender, n (%)	559 (92.4)	388 (91.3)	170 (94.4)	0.09
Race, n (%)				
Caucasian	474 (78.3)	329 (77.4)	144 (80.0)	0.05
Black	105 (17.4)	73 (17.2)	32 (17.8)	
Asian	12 (2.0)	6 (1.4)	2 (1.1)	
Ethnicity, n (%)				
Hispanic	77 (12.7)	58 (13.6)	19 (10.6)	0.13
Vaccine status, n (%)				
≥1 vaccine dose	426 (70.4)	426 (70.4)	0	--
Moderna or Pfizer 1 dose	400 (66.1)	400 (66.1)	0	--
Moderna or Pfizer 2 doses	229 (37.9)	229 (37.9)	0	--
Moderna or Pfizer 3 doses	152 (25.1)	152 (25.1)	0	--
Comorbidity, n (%)				
Body mass index, median	30.3	30.0	31.0	**0.04***
COPD/Asthma	86 (14.2)	50 (11.8)	36 (20.0)	**0.0005***
Chronic kidney disease	50 (8.3)	40 (9.4)	10 (5.6)	**0.04***
Cirrhosis	7 (1.2)	7 (1.64)	0 (0)	**0.004***
Transplant recipient	1 (0.17)	1 (0.24)	0 (0)	**0.01***
Cancer on chemotherapy	52 (9.4)	40 (9.4)	8 (4.4)	**0.009***
HIV	5 (0.8)	3 (0.7)	2 (0.5)	0.32
Previous COVID19, n (%)	26 (4.3)	18 (1.4)	8 (4.4)	0.45
COVID19 symptom, n (%)				
Cough	342 (56.5)	249 (58.6)	93 (51.7)	**0.04**
Dyspnea	59 (9.8)	49 (11.5)	10 (5.6)	**0.004***
Malaise	187 (30.9)	122 (28.7)	65 (36.1)	**0.04**
Fever or chills	144 (23.8)	114 (26.8)	30 (16.7)	**0.001***
Tobacco use, n (%)	217 (35.9)	188 (44.2)	29 (6.1)	**<0.0001***
Opioid use, n (%)	39 (6.4)	29 (6.8)	2 (1.1)	**<0.0001***
Hospitalized, n (%)	65 (10.7)	49 (11.5)	20 (11.1)	0.44
Received treatment, n (%)				
Monoclonal antibody	63 (10.4)	49 (11.5)	14 (7.8)	0.07
Remdesivir or Dexamethasone	34 (5.6)	28 (6.6)	19 (10.6)	**0.04***
All-cause mortality, n (%)	14 (2.3)	10 (2.3)	4 (2.2)	0.46
SARS-CoV2 variant, n (%)				
Omicron	80 (80.1)	59 (13.9)	21 (11.7)	**0.011**
Delta	19 (19.2)	19 (4.5)	0 (0)	

Table 1. Demographic characteristics of the cohort

Results

Patient	Age	Sex	Race	COVID-19 Vaccine	Monoclonal Therapy	Hospitalization	Rem/Dex	Bar/Toci	Sequencing	LOS (days)	Comments
1	74	M	W	Pfizer 2	Sotrovimab	NO	NO	NO	Omicron	N/A	COPD exac 6 wks later
2	88	M	W	No	NO	YES	YES	Tocilizumab	Delta	5	Made DNR
3	73	M	W	Pfizer 2	NO	YES	YES	Baracitinib	Pending	10	Made DNR
4	97	M	B	Pfizer 2	BAM/ETE	YES	NO	NO	Not done	28	Metastatic pancreatic ca
5	77	M	W	No	NO	YES	Dex only	NO	Not done	27	Made DNR
6	76	M	W	Pfizer 2	CAS/IMD	YES	NO	NO	Omicron	14	Died 3 wks later
7	65	M	W	Pfizer 2	NO	NO	NO	NO	Not done	N/A	Died from DKA 7 wks later
8	92	M	W	Pfizer 2	NO	YES	YES	NO	Pending	2	Made DNR
9	79	M	W	Moderna2	NO	YES	YES	NO	Not done	5	Died at home on O2
10	76	M	W	No	NO	YES	YES	Baracitinib	Omicron	15	---
11	74	M	B	Pfizer 2	NO	YES	YES	NO	Not done	3	Made DNR
12	89	M	W	Moderna2	NO	YES	YES	NO	Omicron	4	Cardiac arrest 6 wks later
13	52	M	B	Pfizer 2	NO	YES	NO	NO	Not done	12	Liver cirrhosis
14	82	M	W	Moderna 3	NO	YES	YES	NO	Omicron	8	Died 2 mo later

Table 2. Deceased Veterans characterized by vaccination status, hospitalization status, receipt of COVID19 treatment, and temporal relationship with expiration

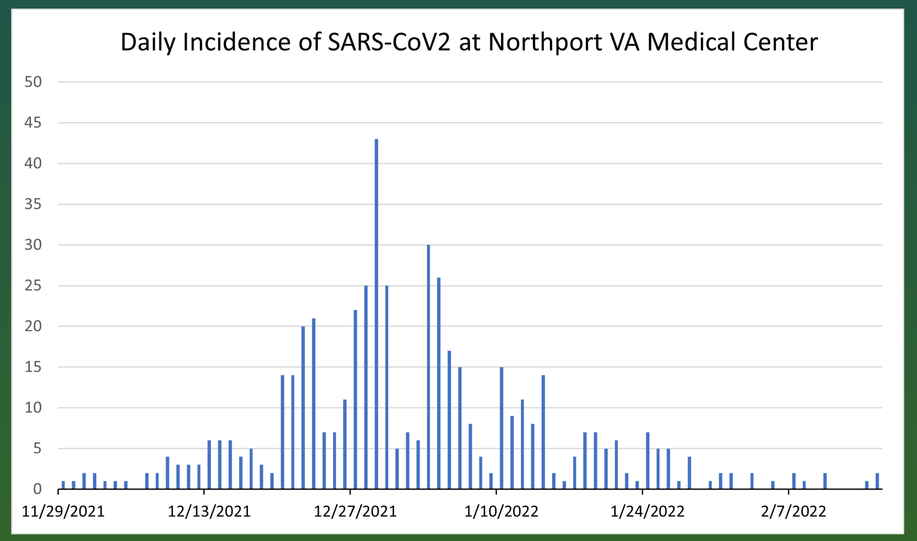
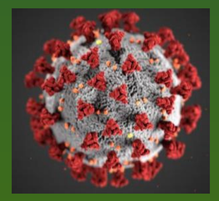


Figure 1. Daily incidence of SARS CoV2 infection at Northport VA Medical Center, November 2021 through April 2022



Conclusion

- Omicron and Delta SARS-CoV-2 infections were seen among USV including unvaccinated as well as vaccinated with detectable neutralizing IgG titers
- The greatest number of COVID19 cases occurred during the months of December 2021 and January 2022
- Most USV who were vaccinated had received at least 1 dose, with diminishing frequency at doses 2 and 3
- Unvaccinated USV were more likely to have a higher BMI and COPD/asthma
- Vaccinated USV were more likely to have CKD, cirrhosis, cancer, tobacco and opioid use
- Unvaccinated USV were more likely to require utilization of Remdesivir or Dexamethasone indicating higher frequency of severe COVID19

Declaration of Interests

- The authors declare that they have no conflicts of interest

References

- Fan, Y., Li, X., Zhang, L. *et al.* SARS-CoV-2 Omicron variant: recent progress and future perspectives. *Sig Transduct Target Ther* **7**, 141 (2022). https://doi.org/10.1038/s41392-022-00997-x