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Detection of the Omicron Variant among SARS Cov-2 Positive Cases In No. (1) Defence Services General Hospital, Myanmar

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Abstract

The "severe acute respiratory syndrome coronavirus type 2" (SARSCoV-2) is an enveloped, single-stranded, positive-sense RNA virus; it is known as "coronavirus disease 19" (COVID-19). It originated in Wuhan, Hubei province, People's Republic of China, in December 2019; then, it spread worldwide causing a global pandemic. Genetic variants of SARS-CoV-2 have been emerging and circulating around the world: original (wild-type), Alpha (B.1.1.7), Beta (B.1.351, B.1.351.2, B.1.351.3), Delta (B.1.617.2, AY.1, AY.2, AY.3), and Gamma (P.1, P.1.1, P.1.2). In late November 2021, the Omicron variants (B.1.1.529) was discovered in South Africa.

Keywords: Coronavirus disease; Acute respiratory syndrome

Introduction

The Omicron variant was found to be more infectious/transmissible than Delta variant; high public health impact [1]. Therefore, timely diagnosis of Omicron variant is important for early quarantine to reduce further spread. Some reports revealed that "rapid antigen tests did detect the omicron variant but the sensitivity was reduced". On the other hand, few researchers suggested that "high viral load was required to detect the Omicron variant in rapid antigen tests". The question of "whether the Omicron variant was imported from other/neighbouring countries or it mutated from the remaining Wild type in our own country, Myanmar" was very difficult. Moreover, one study proved that the Omicron variant originated from mouse [2]. Nasopharyngeal swabs were taken from both clinically suspicious cases, contacts of COVID-19 PCR positive cases attending clinics at No. (1) Defence Services General Hospital, and healthy travellers coming to Myanmar at

Mingaladon airport from October 2021 to early January 2022; then, they were proceeded with both Abbot COVID-19 Antigen Rapid Test Device and RT-PCR test. Swabs were collected using plastic swab with nylon flocked swabs, it was placed in a 3ml viral transport media, and sent to molecular laboratory of No. (1) Defence Services General Hospital. SARS CoV-2 nucleic acid was extracted from nasopharyngeal swabs using Gene Pure Pro fully automatic Nucleic Acid purification System (Hangzhou Bioer Technology Co., Ltd, China). SARS CoV-2 RNA detection was done by bio Perfectus Nucleic Acid Detection Kit (bio Perfectus, Jiangsu bio Perfectus Biotech Co., Ltd, China). All SARS CoV-2 positive samples were tested with abTESTM COVID-19 Variant qPCR I kit (AIT biotech Pte-Ltd, Singapore), using Applied Biosystem 7500 Fast Real Time PCR System according to the manufacturer's instruction. abTESTM COVID-19 variant qPCR I kit differentiates wild and variant SARS CoV-2 infection among all positive samples. After that, SARS CoV-2 Alpha, Beta, Gamma, Delta & Omicron variant infection among all SARS CoV-2 variant samples were tested by GenXPro SARS CoV-2 ABGD variant Detection Kit (GenXPro, Germany) and SARS CoV-2 variant Omicron (B.1.1.529) Real Time PCR Kit (bioPerfectus, Jiangsu bioPerfectus Biotech Co., Ltd, China).

Table 1: *The frequency distribution of SARS CoV-2 nasopharyngeal swab PCR tested and positive cases per month.*

	Total Tested (n)	Detected	
		(n)	(%)
Oct-2021	19066	321	1.7%
Nov-2021	13785	272	2.0%
Dec-2021	13559	149	1.1%
Jan-2022 (till 20/1/2022)	6244	41	0.65%

Table 2: *The frequency distribution of SARS CoV-2 nasopharyngeal swab PCR positive cases and the Omicron variant per month at No. (1) DSGH and Myanmar.*

Month/ year	COVID-19 Confirmed cases at No. (1) DSGH	Omicron Confirmed cases at No. (1) DSGH	COVID-19 Confirmed cases Myanmar [No. (1) DSGH included]	Omicron Confirmed cases Myanmar [No. (1) DSGH included]
October 2021	321	0	34,151	0
November 2021	272	0	22,329	0
December 2021	149	0	8,432	4 (December 28)
January 2022 (till 20/1/2022)	41	10	2,644	117
Total	783	10	67,556	121

Table 3: *The frequency distribution of different SARS CoV-2 variant infections and their clinical severity status at No (1) DSGH (n = 74).*

Type of SARS CoV-2 virus	Number of cases	Asymptomatic	Mild	Moderate	Severe	Critical	Survived	Non-survived	Imported
Wild	2		2				2		
Delta	62		50	12			62		2 Malaysia, 1 Sri Lanka
Omicron	10	10					10		9 India, 1 Russia
	74						74		

SARS CoV-2 variant Omicron (B.1.1.529) Real Time PCR Kit detect Orf1ab gene and mutations E484A, N679K, L981F, 69-70del and H655Y of S gene. A sample was considered as Omicron (B.1.1.529) if any two of three specific targets (E484A, N679K and L981F) with cycle threshold (Ct) less than 40 and ΔCt values were detected in manufacturer's reference range.

Their Ct value were recorded. After that, procedure for differentiation Wild type and variant was done. If Wild type was negative, other specific variants were searched. Of clinical severity/symptoms, history was taken either face to face (if they came to No (1) DSGH) or viber/telecommunication (if they could not come to No. (1) DSGH). Then, both clinical and molecular parameters were analysed. During this period, among 50,842 nasopharyngeal swab samples were tested and 770 (1.5%) samples were SARS CoV-2 test positive. The total number of positive samples on October, November, December and January were 321, 272, 149 and 28 respectively. Table 1 in these 770 positive samples, Ct value less than 30 were selected (n=74). Wild type was seen in 2 cases (2/74 = 2.7 %); and, the Delta variant in 62 cases (62/74= 83.8 %) and the Omicron variant in 10 cases (10/74= 13.5%). Of the Delta variant infected cases, 3 cases were imported; 2 from Malaysia and 1 from Sri Lanka. The Omicron variant was detected only in January 2022. Although we have been trying to trace the Omicron variant since October 2021, it was not detected until end of December 2021. We discovered the Omicron only in early January 2022 in imported cases only i.e., travellers. These imported cases were coming from neighbouring countries; 9 from India and, 1 from Russia. Regarding clinical presentations, the Omicron variant produces upper airway symptoms as it has more affinity to upper respiratory airway than lung parenchyma. Thus, the clinical severity as well as the mortality rate is relatively lower than the Delta variant. The Delta variant produces severe/critical manifestation; and, the mortality is the highest among all the variants so far [3-5]. The wild type has the lowest infectivity and mortality among SARS CoV-2 virus [6,7]. With the development of vaccine, the break through infections following completed vaccination with SARS CoV-2 were reported from various studies [8-10]. Of the Wild type, there were two cases in this study; the first case was fully vaccinated and the second case had incomplete vaccination. Both were mild cases and not fatal. The cases infected with the Delta variant were not severe (mild 50, moderate 12). And, none of them was fatal. It was doubtful that the Delta variant seemed to be less virulent in Myanmar following third wave. Of clinical severity of the Omicron, the reports were contradictory. The preliminary data from South Africa suggested that not only the number of the Omicron infected cases but also the number of hospitalizations were high. On the other hand, in Scotland, early national data revealed that the Omicron variant was associated with a two-thirds reduction in the risk of COVID-19 hospitalisation when compared [11]. The researchers from California, the Omicron infected cases were less severe [12]. In this study, all cases infected with the Omicron variant were asymptomatic; and, they did not need hospital stay or oxygen. Majority of them (80%) had completed vaccination; therefore, it confirmed the study of live-virus neutralization assays, the omicron variant was shown to escape antibody neutralization by the BNT162b2 messenger RNA vaccine (Pfizer–BioNTech) [13]. Like the Delta variant, the breakthrough infection could occur with the Omicron variant. The mean Ct value were as follows: 28.5 in the Wild type, 24.1 in the Delta variant and 23.5 in the Omicron variant. The Omicron variant had the lowest Ct value; the highest viral load. It may be one of the reasons for quickest transmissibility, supporting the previous evidence [1]. It can be concluded that the wild type was still infectious in Myanmar; however, it caused mild infection if there was no co-morbidity. The Delta variant still occupied the majority of cases; it produced moderate degree of severity. The over-all virulence of the Delta variant seemed to be less severe following third wave. There were still imported cases of the Delta variant from neighbouring countries. All the Omicron variant infected cases were asymptomatic; all cases were imported from neighbouring countries (India, and Russia). The breakthrough infection cases following completed vaccination were seen with both the Delta variant and the Omicron variant. The Omicron variant had the largest viral load among other types; however, the clinical severity seemed to be the weakest (Tables 1-3).

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