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Case Report

# Unique COVID/Anti-Spike Protein Immune Responses in Two Elderly Patients without COVID-19 Vaccination

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## ABSTRACT

Published reports continue to emerge regarding different health outcomes in patients immunized and not immunized against the SARS-CoV-2 antigen (i.e., spike protein) that were infected with the virus. Because of the vast array of protein isoforms made from the laboratory-created SARS-CoV-2 viral genome, patients with different innate immune systems and underlying health issues responded differently upon coronaviruses/cold virus infection and re-infection. The case presentation highlights two patients during the calendar years 2020/21 and 2022, that presented with cold virus symptoms, tested positive for coronavirus antigens on lateral flow strips, developed bacterial sinus infections, were hospitalized, and treated with pooled antibody plasma. Throughout their medical sequela each patient maintained strong antibody titers against spike protein based on IgG levels in their saliva.

**Keywords:** Spike protein; Antibody; Infection; Immunity; Vaccination; COVID-19; mRNA vaccine

## INTRODUCTION

The following article provides case presentation on two unique medical cases of male individuals that contracted Severe acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2 virus) and subsequent bacterial infections and did not receive any vaccine against the virus during the calendar years 2020-22. Both patients had underlying health issues that negatively impacted their daily activities and quality of life, and each received convalescent donor plasma enriched with anti-SARS-CoV-2 antibodies. Table 1 is a summary of their health profiles and indicates that each patient had a poor quality of health (Patient A profile described in detail at end of article).

One of the main findings in the article published October 2022, by Rotello, et al. [1] is that the collected saliva antibodies were easily isolated, bound robustly to spike protein (as measured using an ELISA) and were IgG hyperimmune as determined by isotyping. In addition, the patients' antibodies recognize different isoforms of the early and mature spike protein produced from the Moderna mRNA vaccine after introduction into mammalian cells in cell culture [1,2]. Each patient indicated that the COVID-19 virus behaved more like a "cold virus" and would have made it difficult to provide immunity protection and overall immunity like typical vaccines, for example, shingles, polio, and respiratory syncytial virus. Recently, a Nature paper described over 100,000 genomes of the COVID virus, demonstrating that these coronaviruses are unlike the shingles virus that rarely mutates. An additional factor is that while dipstick (lateral strip) antigen-based diagnostic tests are sensitive, they do not discriminate between different types of coronaviruses (personal communication from Moderna). In the natural environment, viruses with similar sequences exist and patients that continually self-test are faced with health decisions to treat specifically or generally with a so-called COVID specific dual-acting agent, Paxlovid [3]. This strategy initiates a perpetual test-treat cycle, which can lead to the development of a strong economic forecast that would encourage an emergency use authorization by large pharmaceutical companies (e.g., Pfizer).

This combination drug consists of a protease inhibitor that disables viral replication and a CYP3A inhibitor to prevent the drug from being inactivated. Addition of a CYP3A inhibitor is not the most efficient way to combat a respiratory virus specifically for patients that might be taking other medications whose activity is dependent on being metabolized by CYP3A.

## CASE PRESENTATION

In this Case report, patient A has a very selective autoimmune disease, received convalescent antibodies, and still contracted the SARS-CoV-2 virus. This individual had no previous history of

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compromised airflow, except on excursion, which resulted in extreme shortness of breath and tiredness. Patient A was also diagnosed with Myasthenia Gravis (MG) and currently has atypical eye and nasal secretions related to Myasthenia Gravis (MG) (Table 1).

| Body system-conditions | Patient A | Patient B |
|---|---|---|
| Age | 82 | 65 |
| Cardiac | High BP | High BP |
| Metabolic Status | Low-Moderate | Low |
| Immunity | Compromised | Normal |
| Body Mass Index (BMI) | 120% overweight | 125% overweight |
| Activity/Exercise/Lifestyle | Inactive/minimal | Inactive/minimal |
| Pulmonary status | Below normal | Moderate |
| Glucose and Insulin scores | Diabetic | Mild Diabetic |
| Diet Quality | Sub-optimal | Sub-optimal |
| Stressors in Life | Aging | Aging, ADHD |
| Lifestyle drug | ED medication | ED medication |
| Inflammation | Joint issues | Requires joint replacement |
| Hormone status | Low testosterone | Low testosterone |

**Table 1:** General health status of elderly two male patients.

Patient B has a history of health issues including severe arthritis, gout, and mild diabetes. Patient B routinely suffers from sinus infections and has had previous surgery to remove fluid from frontal sinuses. Key characteristics of both patients, which put them at risk for future infections by cold viruses, include being overweight and diabetic, inactivity, poor diet, and below normal pulmonary status. The inactivity and reduced respiratory capacity generally led to more sickness and allowed fluid to rapidly accumulate in lungs, which contributed to other issues related to cardiac output, oxygen levels, and quality of life. Another consistent finding is each male patient occasionally uses erectile dysfunction medication (e.g., Viagra). The other general conclusion is vaccination does not seem to prevent severe disease or viral transmission, but symptoms from infection are determined by a patient's overall medical history. It appears that mRNA vaccines work for a short period of time and boosters don't appear to prime the immune system like a bona fide vaccine, which are commonly designed against the most antigenic peptide/protein and allows the subject to create strong memory B- cells and hyper-immune IgGs (personal communication, Moderna 2021). This latter approach was recently adopted by Novavax and approved for targeting COVID variants that includes the adjuvant Matrix-M extract from soapbark tree and the highly variable spike protein with its numerous post-translation modifications, including extensive glycosylation [4]. Each patient's saliva IgA antibodies were reactive on separate occasions to spike protein, which is one of the predominate antibody isotypes found in saliva.

## RESULTS AND DISCUSSION

Patient A is a 79-year-old male who was diagnosed with COVID-19 on 1/212021. He has a history of gout, hyperlipidemia, diabetes mellitus, hypertension, chronic pain syndrome, myasthenia gravis, and chronic kidney disease, type III. He was admitted to an emergency room for evaluation of worsening symptoms of cough and shortness of breath attributable to COVID infection on 1/24/2021. The patient was placed on nasal cannula oxygen and started on an IV of ceftriaxone and doxycycline for bacterial pneumonia. Procalcitonin was negative. The patient met with an infectious disease specialist and was started on IVs of remdesivir, dexamethasone and convalescent plasma. Patient was weaned off oxygen and provided supportive care. Patient completed convalescent plasma transfusions on 1/26/2021. He continued to improve but continued to require nasal cannula oxygen support for hypoxemia. Inflammatory markers began to decrease. On 1/29/2021, the patient planned to receive his last dose of remdesivir and be discharged home, however, after speaking with his daughter he felt he may benefit from rehabilitation and therefore therapy teams were consulted and COVID testing was re-ordered. The repeat COVID test was negative. Infectious disease was narrowed; antibiotics IV ceftriaxone and IV doxycycline were converted to PO

doxycycline for bacterial pneumonia. The patient completed all treatments for COVID virus. On 01/29/2021, the patient was discharged to short-term rehabilitation. Patient A on his final discharge report indicated that he had confirmed acute sepsis with fever and tachycardia that required hospitalization. His status/release from hospital and post remdesivir remained as acute viral pneumonia, along with acute possible bacterial pneumonia due to gram negative and gram-positive bacteria. His signs and symptoms present on admission, were acute respiratory failure, elevated D-dimer, hypertension, chronic kidney disease stage lll and Myasthenia Gravis, positive autoantibodies to acetylcholine receptor.

Patient B has fewer details in his medical report and differs from patient A in medications and underlying health issues. Patient B presented with COVID-19 in September 2020 and exhibited a number of symptoms including low grade fever, achy joints, lost of taste and smell, lots of phlegm and sinus drainage, extreme bouts of coughing mild pneumonia and severe fatigue. In bed for 10 days at home. The saliva antibodies evaluated for spike protein reactivity were obtained one month after this episode of COVID. The second bout of COVID for patient B was July 2022, however, he had no loss of taste or smell. The following is a list of medications for patient B; metformin HCL-500 mg once a day; lisinopril-HTCZ–20-25 mg 2 doses every morning; doxazosin mesylate–4 mg 1 dose at bedtime; labetalol HCL 200 mg, twice a day, morning and bedtime; spironolactone 25 mg 1 tablet in the morning; potassium chloride 20 meq once day; amlodipine besylate 10 mg at night; magnesium 250 mg once a day; fish oil 1200 mg twice a day and Cholestoff (nature made brand) 2 tablets in the morning [5-9].

## CONCLUSION

Patient A is currently managing his Myasthenia Gravis and pursuing enrollment in a clinical trial for a novel antibody therapy. Patient A has unique B-cells that could be used to develop high affinity humanized monoclonal antibodies to target bacteria and or viruses. Various platforms exist in industry to isolate the B-cells from patient A, analyze their IgG genes, produce humanized antibodies against infectious disease targets, and harvest disease-specific antigens. This strategy would be like that used by Regeneron to make its REGEN-COV antibodies from Chinese patients in Wuhan during the initial COVID outbreak. The humanized antibodies from patient A may be useful in terms of targeting bacterial and viral antigens in the next coronavirus (cold virus) outbreak. Patient B very similar to patient A us has chronic inflammation and joint issues mainly within his shoulders and knees. He has had hyaluronic acid injections in his joint spaces to relieve symptoms. His most recent diagnosis recommends full knee replacement. The B-cells present within this patient would also be informative as most elderly patients with chronic health issues have inflammation that is not remedied by OTC medications. In addition, patient B has ADHD and suffers from low testosterone or andropause. The main conclusion is most subjects exposed to the coronavirus/cold virus of 2019 suffered long term side effects because of underlying health issues that impacted brain function and cardiovascular function. As with most serious health concerns, patients are at risk for survival if health issues exist that compromise quality of life.

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## CONFLICTS OF INTEREST

None

## REFERENCES

1. Veenstra TD, Pauley B, Injeti E, Rotello RJ. In vitro Characterization of SARS-CoV-2 Protein Translated from the Moderna mRNA-1273 Vaccine. Sci J Bio Life Sci Res.2022;03:1-15.
2. Moderna COVID-19 Vaccine.2022
3. The U.S. Food and Drug Administration (FDA) has issued an Emergency Use Authorization (EUA) for the emergency use of the unapproved product PAXLOVID for the treatment of mild-to-moderate coronavirus disease 2019 (COVID-19) in adults and pediatric patients (12 years of age and older weighing at least 40 kg) with positive results of direct severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) viral testing, and who are at high risk for progression to severe COVID-19, including hospitalization or death. Authorized for Emergency Use. 2022.
4. Coronavirus disease 2019 (COVID-19). 2022.
5. Approved medicines push the limits of science. 2022.
6. Baum A, Fulton BO, Wloga E, Copin R, Pascal KE, Russo V,et al. Antibody cocktail to SARS-CoV-2 spike protein prevents rapid mutational escape seen with individual antibodies.Science.2020;369: 1014-18.
7. Copin R, Baum A, Wloga E, Pascal KE, Giordano S, Fulton BO, et al. The monoclonal antibody combination REGEN-COV protects against SARS-CoV-2 mutational escape in preclinical and human studies.Cell.2021;184: 3949-3961.
8. Weinreich DM, Sivapalasingam S, Norton T, Ali S, Gao H, Bhore R,et al. REGN-COV2, a neutralizing antibody cocktail, in outpatients with covid-19. N Engl J Med. 2021 384:238-51.
9. Besnier F, Bérubé B, Malo J, Gagnon C, Grégoire CA, Juneau M, et al. Cardiopulmonary rehabilitation in long-COVID-19 patients with persistent breathlessness and fatigue: the COVID-rehab study. Int J Environ Res Public Health.2020;19: 4133.