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## Case Report

# Covid-19 and severe OAT syndrome with dramatic recovery

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## Abstract

We describe a young man of 37 years with a transient but marked Oligoasthenoteratozoospermia (OAT) syndrome due to severe covid infection with the perfect recovery of semen parameters along with recovery of general health.

**Setting district general hospital:** Intervention none.

We review the role of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2 virus), the role of Angiotensin-Converting Enzyme 2 (ACE-2), Angiotensin 1-7 (Ang 1-7) and propose that it is potentially involved in a cause and effect mechanism of injury.

## Introduction

Covid-19 was declared by the world health organization to be a public health emergency of international concern in January 2020 [1]. The virus uses ACE-2 as a receptor to enter the host cell [2]. The receptor ACE 2, angiotensin 1-7 and its MAS receptor have been found within the testis, in particular on the spermatogonia, Leydig, and Sertoli cells [3]. There are conflicting reports regarding the aetiology of testis damage, whether it be a direct invasion, inflammatory-related [4,5] reduction in sex hormone, or fever-induced [6]. The role of renin-angiotensin-aldosterone system plays a key role and the balance of its opposing effects may indicate the outcome severity of the illness [7,8]. Our patient was young and otherwise fit and well with his only risk factor for adverse outcome being of Asian origin. It has been proposed that there is a relationship between covid virus infection and infertility with sequelae that can be both transient, acute, and chronic [7].

## Case report

He developed symptoms in December 2020, of tonsillitis, sore throat, dry cough, and then dizziness over the course of a day. Then fever, weakness, decreased oxygen saturation, and

shortness of breath. He was admitted to ITU for continuous positive airways pressure assistance for 10 days in total. The acute illness lasted about 2 weeks in total. He had no significant medical or surgical history and is of normal build and activity.

May 2021 our urology department receives a referral for a 36-year-old man fit of Asian origin with primary infertility of 3 years on inquiry and severe OAT syndrome. He had not had any medical or surgical issues prior to this. He had not undergone any treatment prior to this consult.

## Investigations

Normal hormone profile (LH 3.3iu/l, FSH 5.6iu/l, testosterone 10.7nm/l march 2021) karyotype 46xy and no evidence of AZF microdeletions. Ultrasound testis no abnormality detected.

## Vaccinated AstraZeneca vaccine march 2021.

Semen analysis February 2021 count of 1 million, morphology "too few" and 2% motility. March 2021 counts 5.3 million, morphology 2%, and 63% motility. June 2021 counts 75 million, morphology 1%, and motility 72%. We had no semen parameters before this to compare.



## Discussion

The blood–testis barrier is not impermeable to viruses and damage has been recorded with orchitis secondary to both Mumps and HIV [9].

SARS–CoV–2 (severe acute respiratory distress syndrome coronavirus) has caused a worldwide pandemic with serious consequences for the general population, young and old, male and female [1]. The high contagiousness is due to its rapid community transmission, high virulence, and sustained surface viability.

The main target is the lungs, but the heart, kidney, and testis are also affected. This is due to the receptor ACE2 (angiotensin–converting enzyme 2) angiotensin 1–7 and its MAS receptor for the virus being expressed in these tissues [7]. ACE 2 is involved in both steroidogenesis and spermatogenesis in the male testis. Fever in itself can cause damage to the testis [7] and sperm production affecting count and motility.

The virus enters the cell via its spike protein binding the ACE2 on the cell surface and then the virus fuses and releases its single–stranded RNA into the host cytoplasm [8]. It has been reported that semen parameters can recover after a fever with non–covid viruses [10]. This gentleman’s semen parameters completely recovered to 75 million/ml after a severe drop in the count to only 1 million/ml. This may have been due to the fact he is young with no co–morbidity. We do recognize the risk factor of Asian background. We have had to assume that his semen parameters were normal before the acute respiratory disease. It may be that his renin–angiotensin–aldosterone system is poised favorably with a dominance of the vasodilatory angiotensin 1–7 [11].

## Conclusion

Covid has spread around the world and will affect millions of men, women, and their fertility. Most people will recover both from the systemic disease and the local testicular inflammatory damage. This case illustrates this. As regards cause and effect we have too little data at present and conclusions should be limited. However observational studies, including case reports, can predict which path further studies should concentrate on. We do know that integral male reproductive cells contain the ACE2 receptor and the virus does target this, it is not unreasonable to assume an adverse relationship here on the transient depression of spermatozoa production. Clinical and translational studies are needed to verify the relation between ACE2, the spike protein of SARS–CoV–2, and its effects on fertility.

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