Severe COVID could reduce male fertility

December 7 2021, by Lauren Baggett

Credit: CC0 Public Domain

Each day, clinicians and scientists are learning more about the acute and long-term health effects of COVID-19 on the body. A new study from the University of Georgia explores the potential impact of the virus on male fertility.

The article, published recently in *Nature Reviews Urology,* reviews the ways SARS-CoV-2 might target and infect testicular cells. The authors

also provide an experimental framework for tracking how the virus could impact testicular function and fertility in acute COVID-19 patients.

"We know that in severe cases, the testis does not do well during COVID," said lead author Clayton Edenfield, a doctoral environmental health science student in UGA's College of Public Health. Edenfield worked under the direction of associate professor Charles Easley, a co-author on the paper.

The authors reviewed the available evidence on SARS-CoV-2's interaction with cells in the body, past research on the impact of other SARS-CoV viruses on the testis and patient reports to determine how COVID could be interacting with testicular tissues and function.

Reproductive organs susceptible to viral infection

Since the onset of the pandemic, scientists have determined that SARS-CoV-2 can infect multiple organs throughout the body through two major proteins: angiotensin-converting enzyme 2 (ACE2) receptors and transmembrane protease serine 2 (TMPRSS2). These proteins act as a door through which the virus can enter the cell.

The testis produces both proteins, making them susceptible to viral infection and potential cell damage, argue the authors, and clinical reports support this.

"There have been autopsy reports that show some sort of viral entry into the testis as well as downside effects of the virus in the testis. So, this is going to be things like inflammation and orchitis, testicular pain, as well as the breakdown of the blood-testis barrier—and even in some cases, the virus is actually in ejaculate," said Edenfield.

Edenfield says that lingering damage to major organs seen in long COVID patients could also happen within the testis, including damage to the blood-testis barrier, which works as a wall to keep out unwanted things like environmental toxins, viruses and the body's own immune cells.

"If it's being damaged by this whole-body immune response, and the virus can interact with the blood-testis barrier, you'd see a very large reduction in fertility," said Edenfield, which could look like a reduction in sperm count or sperm quality.

COVID's possible lingering effects on fertility

The worst-case scenario, Edenfield says, is if the virus damages the organ's germline sperm cells, the cells responsible for creating new sperm, that could have lasting effects on fertility and could even lead to birth defects.

"Fortunately, most people that are of reproductive age are fairly protected from severe cases, but in the 1% that is affected, the virus could cause a lot of damage," he added.

These outcomes on male fertility are still unconfirmed, but the authors proposed a framework of experimental approaches to direct future research.

More information: R. Clayton Edenfield et al, Implications of testicular ACE2 and the renin–angiotensin system for SARS-CoV-2 on testis function, *Nature Reviews Urology* (2021). DOI: 10.1038/s41585-021-00542-5

Provided by University of Georgia