Could androgen deprivation therapy guard against severe COVID-19 and related infections?

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Findings from an Italian study suggest androgen deprivation therapy (hormone therapy) for prostate cancer may offer some protection from coronavirus (COVID-19) by decreasing levels of an enzyme that can escalate severe infections. While more research is needed to validate and understand the findings, it does point experts to possible pathways for preventing and treating COVID-19. In any case, as evidence continues to emerge on how we beat COVID-19, men on androgen deprivation therapy should continue to follow the advice of their treatment teams and health authorities, such as social distancing and handwashing to protect themselves from COVID-19.

Since it was first reported in Wuhan, China, in December 2019, COVID-19 caused by the virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 or coronavirus for short) has spread rapidly around the world and is believed to have infected more the 4.2 million people as of today (12 May 2020). Although, the real number of infections is speculated to be a lot higher as not all people infected show symptoms and the rate of testing for COVID-19 differs vastly between different countries. For more information about COVID-19 and some of the studies being carried out around the world to better understand, treat and prevent this disease refer to our April blog here.

Some people are at higher risk of developing life threatening COVID-19 complications. These people include elderly people, people with respiratory illnesses or high blood pressure and those being treated for cancer. However, a study recently published in the journal Annals of Oncology by a team of Italian and Swiss researchers lead by Professor Andrea Alimonti suggests that androgen deprivation therapy may give men some advantage against COVID-19.
COVID-19 and cancer risk

Professor Alimonti’s team examined the medical records of 9280 patients (4532 were men) with confirmed COVID-19 infection registered on 1st April 2020. The data were from 68 different hospitals in Veneto, one of the regions hardest hit by the disease in Italy. The information collected about these patients included gender, hospitalisation, admission to intensive care unit, death, tumour diagnosis, prostate cancer diagnosis, and androgen-deprivation therapy (ADT).

The researchers observed that men were more likely than women to be hospitalised for COVID-19 (60% men compared to 40% of women). They were more likely to be admitted to ICU with severe symptoms (78% men compared to 22% women) and were more likely to die from the disease (62% men compared to 38% women). This is despite higher infection rates in women (44% men compared to 56% women).

Of the 4532 COVID-19 male patients they studied, a total of 430 (9.5%) had cancer with 118 (28%) having prostate cancer. For the rest of the men with cancer, 17% had kidney/bladder cancer, 15% had colorectal cancer, 11% had leukemia/lymphoma, 3% had lung cancer and the remaining 26% had other cancers.

Overall, the researchers observed that men with cancer, including prostate cancer, developed more severe COVID-19 disease than men without cancer. Of the men with cancer, 67.9% (292 men) were hospitalised and 17.4% (75 men) died. For men who did not have cancer, 47.0% (2131 men) were hospitalised and 6.9% (n=312) died. When they looked at the ages of the patients, they found that the differences could not be explained by age, with both younger and older men with cancer were still more likely to have severe COVID-19 symptoms than men without cancer. The researchers concluded that “male cancer patients have an increased risk of SARS-CoV-2 infection and develop more severe forms of COVID-19”.

COVID-19 and prostate cancer risk

On April 1st this year, there were 5,273 men with a diagnosis of prostate cancer who were being treated with ADT and 37,161 men with prostate cancer not on ADT. Interestingly only 4 (0.08%) of the men on ADT contracted COVID-19 compared to 114 (0.31%) not on ADT. Using statistical analysis, the researchers found that men with prostate cancer who were not receiving ADT were 4.05 times more likely to get Covid-19 than men on ADT.
When they looked at the entire population of people with other forms of cancer in Veneto on April 1st (79,661 men and women) the researchers found 312 people with cancer had contracted COVID-19. When compared to men on ADT they found that the people with other forms of cancer had 5.17 times the chance of contracting COVID-19 than men on ADT.

Furthermore, none of the 4 men on ADT died from COVID-19 and only 1 developed severe disease. For men with prostate cancer not on ADT 31 had severe disease and 18 died. But the researchers do not make it clear if all these men died from COVID-19 or other causes.

From these results the researchers suggest that ADT is associated with a reduced probability of developing COVID-19 infections and when infection did occur, it was less severe.

**How could ADT protect people from COVID-19**

Recent research suggests that a protein called TMPRSS2 helps COVID-19 to infect healthy human cells. It is a member of a larger family of enzymes known as Type II Transmembrane Serine Proteases which are found throughout the body and have a wide variety of functions in the body as well as having roles in cancer and viral infections.

In prostate cancer there are high levels of TMPRSS2 in both the primary tumours and in the metastases. Androgens increase TMPRSS2 while ADT lowers the levels. Similarly, TMPRSS2 levels in other parts of the body like the lung respond to androgen levels. It is possible that ADT used to treat prostate cancer might have reduced TMPRSS2 levels in the lungs of these men giving them some protection from COVID-19. Controlled clinical trials must be carried out before the benefits of ADT on COVID-19 infection can be determined for certain.

**What does this mean for men with prostate cancer**

The Veneto study is the first of its kind to suggest that ADT might be of benefit in protecting men from COVID-19. Like all studies it has limitations. It is possible that the higher incidence of COVID-19 in cancer patients reflects higher levels of testing for COVID-19 as these people are more likely to go to hospital. Furthermore, the lower incidence of COVID-19 in men on ADT might be partly because they are better at social isolating. It is not clear from the study if all of the cancer patient deaths were from COVID-19 or if some of the deaths were from the cancer or other causes.
If ADT is found to be protective, then it offers another possible treatment approach for COVID-19. Clinical trials have been initiated to test if a single dose of ADT benefits men with COVID-19 who do not have prostate cancer.

Until the results of clinical trials looking at ADT and COVID-19 are available it is not possible to recommend that men with COVID-19 be treated with ADT. It is also not recommended at this stage that men with prostate cancer have their treatment changed to ADT solely for COVID-19 protection purposes. Instead men should continue on their current recommended treatments and talk to their doctor or nurse about any concerns they may have.

If you have prostate cancer it is very important that you continue to follow government guidelines about social distancing, frequent handwashing and not touching your face. More information can be found on PCFA's fact sheets here.