Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

investigation, including antiviral drugs, we suggest that convalescent plasma could be useful in patients with COVID-19 infection and concurrent persistent B-cell immunodeficiency; we will consider this approach for our patient.[3–5]

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REFERENCES

1. Berlin DA, Gulick RM, Martinez FJ. Severe Covid-19. *N Engl J Med*. 2020. https://doi.org/10.1056/NEJMcp2009575.
2. Gao Y, Chen Y, Liu M, Shi S, Tian J. Impacts of immunosuppression and immunodeficiency on COVID-19: a systematic review and meta-analysis. *J Infect*. 2020;81(2):e93—e95.
3. Valk SJ, Piechotta V, Chai KL, et al. Convalescent plasma or hyperimmune immunoglobulin for people with COVID-19: a rapid review. *Cochrane Database Syst Rev*. 2020;5:CD013600.
4. Franchini M. Why should we use convalescent plasma for COVID-19? *Eur J Intern Med*. 2020;77:150—151.
5. Pinto D, Park YJ, Beltramello M, et al. Cross-neutralization of SARS-CoV-2 by a human monoclonal SARS-CoV antibody. *Nature*. 2020;583(7815):290—295.

Does androgen deprivation therapy protect against severe complications from COVID-19?

Currently, there is a paucity of effective treatments to address the remarkably high morbidity and mortality associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) coronavirus disease-19 (COVID-19). This letter highlights a potential therapeutic strategy based on known biology of SARS-CoV-2 cellular entry and replication.

SARS-CoV-2 relies on surface expression of angiotensin-converting enzyme 2 (ACE2) and transmembrane serine proteases 2 (TMPRSS2) for cellular entry and replication in the respiratory epithelium.[1,2] In *in vitro* and mouse models, TMPRSS2 inhibition limits respiratory cell damage and reduces severity of infection.[1,3] TMPRSS2 is commonly expressed in prostate cancer cells and is known to be regulated by androgens.[4] Hence, androgen deprivation therapy (ADT) may theoretically reduce TMPRSS2 expression limiting SARS-CoV-2 cellular entry and preventing severe complications from COVID-19. In fact, a recent report from Alimonti and colleagues demonstrated a lower rate of infection in prostate cancer patients on ADT, compared with those not on ADT.[5] Herein, we report our observational study of all patients in a single New York City health system with COVID-19 and prostate cancer to determine the impact of ADT on COVID-19 clinical outcomes. To our best knowledge, this is the largest study to report severity of COVID-19 in patients receiving ADT.

This study was approved by the Mount Sinai School of Medicine Institutional Review Board. We identified all Mount Sinai Health System (MSHS) patients with prostate cancer and SARS-CoV-2 viral detection by PCR (based on testing within and outside MSHS) from 1 March 2020 to 4 June 2020. We collected clinical information including demographics, medical history, and medications including ADT use. ADT use was defined as a gonadotropin-releasing hormone (GnRH) analog or antagonist administered within 3 months and/or documented testosterone concentrations $\leq$50 ng/dl within 6 months of COVID-19 diagnosis. We collected COVID-19-related outcomes including death, hospitalization, oxygen utilization, and intubation. We carried out bivariable and multivariable logistic regression models, adjusting for age, cardiac, and pulmonary disease, to evaluate differences in COVID-19-related outcomes between ADT and non-ADT cohorts. All tests were two-sided at a 0.05 level.

We identified 58 patients in our study, 22 and 36 in the ADT and non-ADT cohorts, respectively. Baseline characteristics were similar in both groups, with the exception of prostate cancer clinical disease state and baseline pulmonary disease. Specifically, those in the ADT group had a higher incidence of metastatic disease (64% versus 0%, $P < 0.001$) and higher rates of pulmonary disease (27% versus 6%, $P < 0.02$), compared with the non-ADT group. Median follow-up in the entire cohort was 23 days (range 1—48).

The clinical outcomes between ADT and non-ADT cohorts are listed in Table 1. ADT use, after controlling for age, cardiac disease, and pulmonary disease, was associated with lower rates of hospitalization [odds ratio (OR) 0.23, 95% confidence interval (CI) 0.06—0.79, $P < 0.02$] and supplemental oxygen requirements (OR 0.26, 95% CI 0.07—0.92, $P = 0.036$). ADT use was also associated with a protective effect on need for intubation (OR 0.31, 95% CI 0.05—1.81, $P = 0.192$) and mortality (OR 0.37, 95% CI 0.08—1.80, $P = 0.22$); however, it did not reach statistical significance.

Despite the limitations of a small sample size, our data support the hypothesis that ADT may limit severe complications from COVID-19, based on lower rates of hospitalization and supplemental oxygen requirements for

Table 1. Clinical outcomes from COVID-19 in prostate cancer patients on ADT, compared with those not on ADT

Clinical outcomes	Unadjusted OR (90% CI)	*P* value	Adjusted OR[a] (95% CI)	*P* value
Death	0.58 (0.16–2.13)	0.410	0.37 (0.08–1.80)	0.220
Hospitalization	0.24 (0.08–0.75)	0.014	0.23 (0.06–0.79)	0.020
Supplemental O_2 utilization	0.27 (0.09–0.82)	0.021	0.26 (0.07–0.92)	0.036
Intubation	0.30 (0.06–1.54)	0.150	0.31 (0.05–1.81)	0.192

ADT, androgen deprivation therapy; CI, confidence interval; COVID-19, coronavirus disease 2019; OR, odds ratio.
[a] Adjusted for age, cardiac disease, pulmonary disease.

COVID-19, compared with those infected patients not on ADT. Intubation rates and overall survival demonstrated similar trends but did not reach statistical significance. One important question not addressed in our study is whether ADT earlier in the disease course is more beneficial than in more severe cases.[6] Another limitation of this study is ascertainment bias. Specifically, one-third of our cohort were comprised of patients who reported information regarding COVID-19 testing carried out elsewhere, predominantly in the ADT cohort. This may largely reflect a population who contracted COVID-19 with minimal-to-mild symptoms.

Our data, in conjunction with the report from Alimonti and colleagues,[5] suggest that ADT may have a protective effect in decreasing the severity of COVID-19. Given our study limitations, we aim to develop a larger multi-institution dataset for validation. Additionally, a prospective clinical trial is warranted to answer this important clinical question.

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REFERENCES

1. Hoffmann M, Kleine-Weber H, Schroeder S, et al. SARS-CoV-2 cell entry depends on ACE2 and TMPRSS2 and is blocked by a clinically proven protease inhibitor. *Cell*. 2020;181:271–280.e8.
2. Zhou P, Yang XL, Wang XG, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*. 2020;579:270–273.
3. Iwata-Yoshikawa N, Okamura T, Shimizu Y, Hasegawa H, Takeda M, Nagata N. TMPRSS2 contributes to virus spread and immunopathology in the airways of murine models after coronavirus infection. *J Virol*. 2019;93:e01815–e01818.
4. Lin B, Ferguson C, White JT, et al. Prostate-localized and androgen-regulated expression of the membrane-bound serine protease TMPRSS2. *Cancer Res*. 1999;59:4180–4184.
5. Montopoli M, Zumerle S, Vettor R, et al. Androgen-deprivation therapies for prostate cancer and risk of infection by SARS-CoV-2: a population-based study (N = 4532). *Ann Oncol*. 2020;31(8):1040–1045.
6. Sharifi N, Ryan CJ. Androgen hazards with COVID-19. *Endocr Relat Cancer*. 2020;27:E1–E3.

An analysis of cancer patients with asymptomatic infection of SARS-CoV-2 in a cancer center in Wuhan, China

The asymptomatic infection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has now become the focus of epidemic control in Wuhan. Patients with cancer, a large population of immunocompromised individuals, have been observed to have a higher risk of coronavirus disease 2019 (COVID-19) infection.[1] However, reports on cancer patients with asymptomatic infection are still scarce.[2]

A retrospective study was performed to evaluate asymptomatic infections in 5119 individuals without typical symptoms of COVID-19 infection (including 2818 patients