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.

for treatment of hypoxic patients with remdesivir and steroid, we have demonstrated a lower mortality from COVID-19 compared to other studies on HT recipients. No mortality was observed in the breakthrough cases.

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Characteristics and Outcome of COVID-19 Infection in Heart Transplantation Recipients in the Netherlands

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Purpose: Immunocompromised patients are at high-risk for complicated COVID-19 infection. The aim of this study is to describe the characteristics and outcome of heart transplantation (HTx) recipients infected with COVID-19 in the Netherlands.

Methods: All HTx patients with a COVID-19 infection between February 2020 and June 2021, proven by positive polymerase chain reaction-test or positive serology in one of the three heart transplant centers in the Netherlands were retrospectively included. The primary endpoint of this study is all-cause mortality.

Results: COVID-19 was diagnosed in 54/665 (8%) HTx patients, mean time from HTx was 11±8 years, mean age 53±14 years and 39% were female. Immunosuppressive therapy was reduced in 37%, 21 (39%) patients required hospitalization and all-cause mortality was 6%. Severe COVID-19 disease (hospitalized with ICU admission or mortality) was seen in 7 (13%) patients. Compared to patients with mild (not hospitalized) or moderate (hospitalized, no ICU admission) COVID-19 infection, patients with severe COVID-19 infection were generally older (p=0.007) and had a history of ischemic heart failure (p=0.004) more frequently. Compared to patients with moderate COVID-19 infection, severe COVID-19 patients were transplanted earlier and had a significantly higher body mass index (30±3 vs 26±3; p=0.01). Myocardial infarction, cellular rejection and pulmonary embolism were observed once in three different HTx patients. Physical complaints post-infection persisted with a median of 30 days (IQR 30-83 days) in 16 (39%) cases.

Conclusion: HTx patients are at increased risk for complicated COVID-19 infection with frequent hospitalization, but mortality is substantially lower than previously described.

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Efficacy and Safety of mRNA SARS-CoV2 Vaccination in Heart Transplant Recipients

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Purpose: Data on immunologic response to SARS-CoV2 vaccination in heart transplant recipients are scarce. We investigated the efficacy and safety of mRNA SARS-CoV2 vaccination in this patient population.

Methods: In a retrospective single-center study we included 54 consecutive adult heart transplant recipients who received 2 doses of mRNA SARS-CoV2 vaccine between January 1 and June 30, 2021. All patients were followed for 112±28 days after the second dose. At the end of follow-up we measured humoral response to SARS-CoV2 by assessing total antibody levels to the receptor-binding domain of SARS-CoV2 spike (S) protein using anti-RBD immunoassay. Anti-S antibody serum levels ≥250 BAU/mL were considered protective. At the same time, cellular response was measured by the IFN-γ response to S-peptide stimulation of recipient T lymphocyte populations. Protective cellular response was defined as more than 0,3% of IFN-γ responsive T cells.

Results: Of 54 recipients, 44 (81%) were male with a mean age of 63±8 years and a mean time from transplantation of 6.6±4.0 years. Immunosupressive regimen consisted of tacrolimus (mean C0 level 7.4±1.7 μg/mL), mycophenolate mofetil (mean dose 2120±419 mg) and steroids (mean dose 2.5±0.9 mg). The majority of patients received BTN162b2 vaccine (83%), and 17% of recipients were vaccinated with mRNA-1273. During follow-up, a humoral response was present in 24 (44%) of the recipients (median anti-S serum level 35.5 BAU/mL). We found no difference in humoral response between patients receiving BNT162b2 and mRNA-1273 vaccine (median anti-S serum level 68.3 BAU/mL vs. 15.5 BAU/mL, P=0.81). Protective humoral response was observed in 6 (11%) of the recipients (median anti-S serum level 557 BAU/mL). A cellular response to vaccine was present in 3 (6%) of the recipients; all 3 displayed a protective level of reponse. No recipients developed simultaneous protective humoral and cellular responses. Recipient age was the only predictor of protective humoral response (55±11 years in responders vs. 65±8 years in nonresponders; P=0.01). In 3 (6%) recipients we found worsening of allograft function requiring hospital admission, which occured within 1 month after receiving the second dose of vaccine.

Conclusion: In heart transplant recipients, mRNA SARS-CoV2 vaccination appears to be of limited efficacy and may, in some cases, be associated with worsening of allograft function.

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Impact of COVID-19 Vaccination After Orthotopic Heart Transplantation

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Purpose: The effect of COVID-19 vaccination in orthotopic heart transplant (OHT) patients is unknown. After OHT, patients are increased risk of COVID infection and hospitalization.

Methods: We retrospectively analyzed 119 patients who underwent OHT between 2017 and 2021. Eleven patients were excluded who died prior to the COVID outbreak in the United States.

Results: The mean age was 51 years (IQR 26). The known vaccination rate (partial or complete) was 83%. The overall infection rate was 14% (17 COVID cases were identified.) Five patients were infected prior to the availability of the COVID vaccine. Of the remaining 2 (16%) and 5 (42%) were in vaccinated and unvaccinated patients respectively. The hospitalization rate due to COVID infection or COVID-related complications such as supplemental oxygen use was 29%. All hospitalized subjects underwent changes in their antirejection therapies, and half required oxygen supplementation therapy at discharge. No COVID-related deaths were identified. There were 2 partially/fully vaccinated patients at the time of COVID infection. One patient had mild symptoms and did not require hospitalization while the other patient was asymptomatic.

Conclusion: Hospitalization rates were markedly higher in the OHT cohort compared to Kentucky state data (29% vs 4%.) Multiple factors contribute to this finding. Patients with OHT have more co-morbidities and after OHT and immunosuppressant therapy blunts host response to infection placing these patients at higher risk of complications. There was a higher vaccination rate in our OHT cohort compared to Kentucky state data (83% vs 61%). Breakthrough COVID infection was found in only 4% of OHT patients strongly supporting the efficacy of the vaccination in this immunosuppressant subgroup. While there were no COVID related deaths in our cohort, downstream complications related to immunosuppression changes and organ rejection detection require long term follow up. The vaccine has proved highly efficacious in this group and should be implemented up front, prior to transplantation. We suggest pre-transplant COVID-19 vaccination should become mandatory in patients being evaluated for OHT.

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Hemodynamic Effects of COVID-19 Vaccination in Hospitalized Patients Awaiting Heart Transplantation

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