



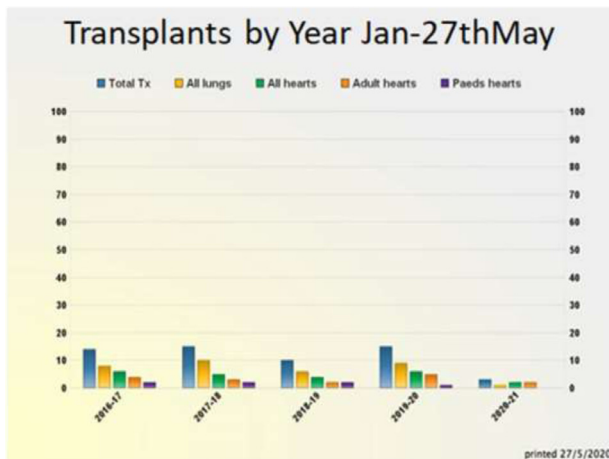
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transplant activity for each financial year up to April 2020 and our activity between Jan - 27th May 2020 (the first UK pandemic peak) comparing this to the same period over the last five years. This allowed us to directly compare the effect of COVID with previous years activity.

Results: A total of 19 heart patients died during Jan to 27th May 2020. Out of the total deaths 4 were from paediatric group, 11 were post-transplant and 5 on the active list. There were no cardiac deaths related to COVID 19. The total deaths during the same period were 19, 24, 20 and 32 in the years 2019, 2018, 2017 and 2016 respectively. A total of 41 lung patients died during Jan to 27th May 2020. Out of the total 11 were on the active list awaiting transplant and 19 were post-transplant deaths. Of these 2 were COVID deaths. The corresponding deaths during year 2019, 2018, 2017 and 2016 were 46, 51, 49 and 46 respectively. Transplant activity from Jan to 27th May in 2016-19 averaged 32 (16 hearts, 16 lungs); activity during the same time period in 2020 was 4 lungs and 13 hearts, clearly affected by reduced activity due to COVID19.

Conclusion: This audit does not suggest a significant rise in mortality due to the COVID 19 pandemic in vulnerable patients either pre or post-transplantation. Measures such as shielding were highly effective in this population. Transplant activity for the year was affected.



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Rapid Virtualization of a Heart Function Clinic in Response to the COVID-19 Pandemic

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Purpose: The current COVID-19 pandemic has had an unprecedented impact on healthcare systems across the world. It has stretched to the limit acute care systems, indirectly it has shaped new and innovative ways to deliver care for those with chronic conditions. Herein we describe initial outcomes of the rapid virtualization of the Heart Function Clinic at a major quaternary Hospital in Toronto, Ontario.

Methods: Consecutive patients attending the heart function clinic at the Toronto General Hospital between March 9, 2020 and June 30, 2020 were included. Visits were classified as "in-person" if patients were physically present for the clinical interaction and "virtual" if the clinical interaction occurred while the patient was away using currently available modes of communication: telephone or web-enabled (Ontario Telemedicine Network -OTN, or other available web-based applications). The purpose of the individual visit was categorized as: "surveillance", "titration", "new assessment" or "Clinical trial".

Results: A total of 292 patients had a total of 521 clinical encounters during the lockdown period. Of these, 168 (32.2%) were "in-person", while 353 (67.8%) were "virtual". 101 (19.3%) were primarily for the purposes of titration. These virtual assessments led to 14(2.7%) in-person assessments. 258 (49.5%) of patients had an LVEF < 40%, among these patients

220 (85.3%) were on an ACEi, ARB or ARNi, 242 (93.8%) on a Beta-blocker, 191 (74%) on an MRA, 46 (17.8%) on SGLT2inhibitor.

Conclusion: Rapid virtualization of a large academic multi-disciplinary clinic is possible. This allows for ongoing delivery of safe care to patients with chronic conditions and can be used as a model for other clinics facing the pandemic. Lessons learned will be used to transition to a hybrid model of in-person and virtual even after the pandemic has come to an end.

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Telemedicine (TM) during SARS-CoV-2 Outbreak

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Purpose: As Italy faced SARS-CoV-2 outbreak as first country outside China, and our hospital converted most of activities into the ones for COVID-19 patients (pts), we had to manage the need for continuing care of advanced heart failure (HF), heart transplant (HT) and LVAD pts. TM was a possible strategy, but its role in this very sick cohort is unknown.

Methods: During the lockdown (03-05/2020), we decided to make either a phone (PV) or an in presence (IV) visit, selecting for IV pts listed for HT, with LVAD, recently HT, scheduled for a biopsy within 6 months after HT or a RHC for listing eligibility. In PV, we assessed symptoms, blood pressure, drugs, and programmed a subsequent IV. All pts in IV group were triaged by phone for COVID-19 symptoms or contacts and if scheduled for RHC or biopsy received SARS-CoV-2 swab 48 h before the procedure. Study endpoints were: combined incidence at 6 months of MACE (HF hospitalization, CV death and need for anticipated IV) in HF/VAD group, and MACE, rejection and any cause- hospitalization in HT group.

Results: Among 448 pts (57±12y, 240 HT, 191 HF, 17 LVAD), 52% were managed by PV and a subsequent IV was scheduled after 3±2 months. Pts managed by PV were healthier: in HF-VAD group they were less frequently listed, had less Afib, LVAD (2/17) (p<0.01 all); post-capillary PH (pC-PH) was similarly distributed; in HT group there were less pts transplanted in the last 5 years (15% vs 52%, p<0.01) and numerically less with 2R rejection in the previous 6 months (8.3% vs 27.1%, p=0.13). The PV group had a lower incidence of the endpoints in both HF/VAD and HT cohorts (92.3±2.3% vs 70.3±4.4%; 97.0±1.7%vs82.5±4.1%, p<0.01). Overall, the predictors of the endpoints at multivariate analysis were pC-PH and PV (HR: 5.2 and 0.1, p<0.03 both) and a recent 2R rejection (HR: 3.6, p=0.05) in the HF/VAD and HT group respectively. There were no cases of COVID-19 in IV; 5 pts got infected at home in a context of infection prevalence of 6/1000 inhabitants in our region and of 40% of hospital beds dedicated to COVID-19 pts.

Conclusion: In this retrospective study, by reporting an organization set up in an emergency situation, we show that TM can be safely used to manage stable HF, LVAD and HT patients, whereas pC-PH and a recent rejection may identify those needing IV. These data suggest that the availability of devices for monitoring pulmonary pressures may improve safety of PV in HF pts and that TM could be useful not only in a pandemic outbreak but also subsequently.

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The Effect of Body Mass Index on Presentation of COVID-19 amongst Heart Transplant Recipients: A Multi-Institutional Study

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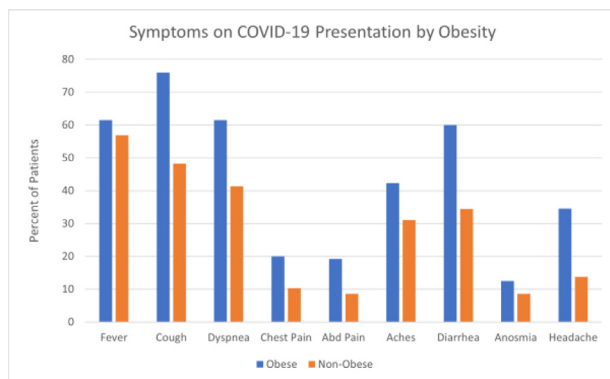
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Purpose: Characteristics and outcomes of heart transplant (HT) recipients who contract coronavirus (SARS-CoV-2) have been poorly described. The current study was undertaken to better understand the risk obesity may pose in this patient population

Methods: A prospectively-maintained Trans-CoV-VAD Registry containing HT recipients at 11 participating institutions who presented with SARS-CoV-2 were reviewed. Presenting characteristics, hospitalization rates, ventilator & intensive care unit usage, and mortality were queried. Patients were grouped by body mass index (BMI) into obese (BMI \geq 30 kg/m²) and non-obese cohorts (BMI<30 kg/m²). Comparisons between groups were made utilizing chi-squared, Fisher's exact, and Mann-Whitney U-tests. Multivariable logistic regression models were utilized

Results: Across all centers, 85 HT recipients who tested positive for SARS-CoV-2 were identified, of whom 26 (31%) were obese. Median time from HT to diagnosis was 4.6 (1.8-13.8) years. No differences in age (57 vs 60 p 0.85) or female gender (31% vs 24% p 0.5) were noted between obese and non-obese patients. On presentation, obese patients were more symptomatic with higher rates of cough (76% vs 48% p 0.02), dyspnea (62% vs 41% p 0.09), diarrhea (60% vs 35% p 0.03), and headache (35% vs 14% p 0.03). No differences in rates of admission (62% vs 64% p 0.8), ICU presentation (44% vs 35% p 0.6) or need for mechanical ventilation were noted (38% vs 22% p 0.2). More secondary infections were noted amongst obese patients (32% vs 13% p 0.04). On follow-up, mortality was similar between groups (12% vs 9% p 0.7). On multivariable modeling, BMI was not associated with increased adjusted odds of hospital/ICU admission or mechanical ventilation (p>0.10)

Conclusion: Acute presentations of SARS-CoV-2 amongst HT recipients carry significantly higher mortality over the general population. Obesity appears to impact presenting symptoms and secondary infections, but does not strongly impact ICU requirements or mortality



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Malnutrition is Associated with Gut Dysbiosis and Perioperative Infections in LVAD Patients

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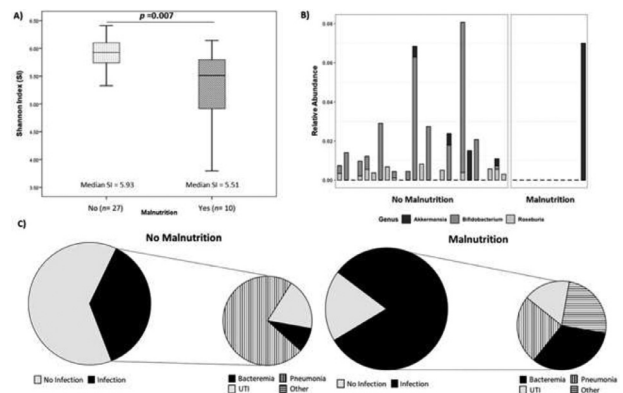
Purpose: Malnutrition is common in heart failure (HF) and contributes to poor outcomes. Nutrient metabolism might be influenced by the complex

interplay between HF progression, venous congestion, inflammation and gut dysbiosis. We investigated the association between nutritional status and: i) biomarkers of congestion and inflammation; ii) gut microbial diversity; and iii) perioperative infections among HF pts undergoing LVAD.

Methods: From 8/2016 to 8/2018, hospitalized pts with prospectively collected stool and blood samples prior to LVAD and a nutritional assessment were retrospectively reviewed. Nutritional status was assessed according to current guidelines. Pts were divided into 2 groups: no malnutrition vs malnutrition (\geq moderate). Calorie and fiber consumption over 7-day period pre-LVAD was averaged. Serum biomarkers of congestion (NT-proBNP) and inflammation (CRP) were measured. Stool samples were analyzed using 16S rRNA sequencing and summarized both at the taxa level, and overall using the Shannon index (a composite metric of gut alpha-diversity). Regression analyses explored differences in Shannon index and individual taxa (via DESeq) by nutritional status.

Results: 37 pts (56 \pm 12.6 y, 92% M) were included. 10 (27%) had malnutrition. Malnourished pts had significantly lower Shannon Index (Fig 1A). A positive correlation was found between Shannon index and calorie (r =.36, p=.027) and fiber intake (r=.32, p=.05). We observed n=3 taxa, all with anti-inflammatory properties, to be significantly enriched in pts without malnutrition (Fig 1B). Pre-LVAD levels of NT-proBNP and CRP were similar between groups. Perioperative infections were more prevalent in pts with malnutrition (Fig 1C); specifically, pre-LVAD 50% vs 18% and post-LVAD infections 60% vs 26%, both p=.05.

Conclusion: Malnutrition is associated with gut dysbiosis and perioperative infections in HF pts undergoing LVAD. Proof of principle trials to increase fiber intake and reduce gut dysbiosis and infection are justified.



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Tacrolimus Time in Therapeutic Range is Associated with Cellular Rejection and Gut Dysbiosis Early after Heart Transplant

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Purpose: Tacrolimus (TAC) is a cornerstone therapy in heart transplant (HT). Few studies have associated TAC time in therapeutic range (TTR) and coefficient of variation (CV) with cellular rejection (CR) in this population. Recent data suggested that gut microbiome may influence TAC dosing requirements after HT. We aimed to: 1) evaluate the relationship of TAC-TTR and TAC-CV with rates of CR, and 2) determine if TAC-TTR or TAC-CV correlate with measure of gut microbial diversity in the first year after HT.

Methods: Pts who received HT between 06/2016 and 07/2019 were enrolled. All TAC serum levels from post-HT day 30-365 were analyzed.