Nursing Investigator Awards: Research/Clinical

006

Virtual Outpatient Heart Failure Care - Lessons From the Covid-19 Era

Sharon Ugolini[1], Favel L. Mondesir[2], Chase Maires[3], Erin Davis[3], Holly Andrews[2], Chantel White[2], Jess Anderson[2], Jacob Fetzer[2], Jill Waldron[2], Kevin Shah[2], Omar Wever-Pinzon[2], Jose Nativi-Nicolau[2], Line Kemeyou[2], Edward M. Gilbert[2], Stavros Drakos[2], James C. Fang[2], Josef Stehlik[2]; [1]University of Utah Heath, Salt Lake City, UT; [2]University of Utah School of Medicine, Salt Lake City, UT; [3]University of Utah Health, Salt Lake City, UT

Background: The COVID-19 pandemic disrupted the way care is delivered to patients with chronic conditions such as heart failure (HF). Many outpatient encounters are now conducted virtually via telehealth. Whether virtual visit for HF results in similar type of interventions as when the patient is seen in person is not known. **Methods:** Starting on March 15, 2020, all non-time sensitive outpatient in-person appointments at our institution were cancelled and transitioned to virtual appointments where possible. We included all patients seen in a tertiary care HF clinic from February 18 to March 13 (pre-Covid) and from March 16 to May 15 (post-COVID). We examined the volume of in-person and virtual visits and compared medication titration rates pre- and post-COVID. **Results:** The study cohort included 745 patients, mean age 60.7+/-15.3 years, 65.2% male, 80.9% Caucasian, 7.7% Hispanic/Latino. Of these, 227 patients were seen pre-COVID and 518 post-COVID. All appointments were in-person pre-COVID. After the change, only 18% of appointments were in-person while 82% were virtual. Outpatient volume decreased after March 15, but gradually increased, eventually to volumes that exceeded pre-COVID (**Figure**). Detailed results on medication titration are shown in **Table**. Diuretic titration took place in 33/227 (14.5%) of patients pre-COVID and 83/518 (16.0%) post-COVID (p=NS). Among 567 patients with HF with reduced ejection fraction (HFrEF), titration of guideline-directed medical therapy (GDMT) took place in 86/172 (50.0%) of patients pre-COVID and 159/395 (40.2%) post-COVID (p=0.03). Among the 395 HFrEF patients seen post-COVID, GDMT was titrated in 33/68 (48.5%) patients seen in person and 126/327 (38.5%) seen virtually - p=0.13. Barriers to medication titration in virtual visits were lack of blood pressure readings and lack of recent laboratory results. **Conclusion:** Telehealth has become an essential method of outpatient care delivery for chronic HF. Once implemented, it offered efficiencies including improved access to the HF clinic thanks to higher throughput capacity compared to physical clinic space. However, we identified that GDMT titration took place less frequently than during in-person visits. Since it is anticipated that telehealth use will continue into the future, approaches to maximize GDMT in the absence of traditional direct physical contact with HF patients are needed.
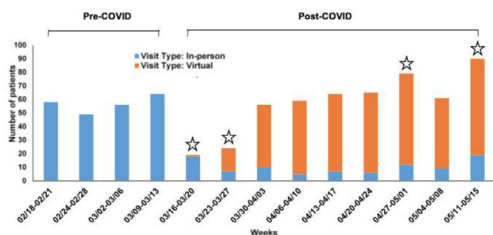

Figure. Volume and type of HF clinic visits before and after COVID-19 related changes.

Table. Titration of medical therapies for heart failure

All patients	Pre-COVID N=227	Post-COVID N=518	
Diuretic titration N(%)	33 (14.5)	83 (16.0)	p=0.61
GDMT titration N(%)	103 (45.4)	186 (35.9)	p=0.01
Diuretic or GDMT Titration N(%)	123 (54.2)	236 (45.6)	p=0.03
HFrEF patients	**Pre-COVID N=172**	**Post-COVID N=395**	
Diuretic titration N(%)	26 (15.1)	65 (16.5)	p=0.69
GDMT titration N(%)	86 (50.0)	159 (40.2)	p=0.03
Diuretic or GDMT Titration N(%)	102 (59.3)	196 (49.6)	p=0.03

007

Enhancing Shared Decision Making in a Chronic Population. Use of an Advance Directive Decision Aid for Patients with Heart Failure and Their Caregivers

Emily Benton[1], Maureen Metzger[2], Patricia Hollen[2], Larry Allen[1], Colleen McIlvennan[1]; [1]University of Colorado, Denver, CO; [2]University of Virginia, Charlottesville, VA

Background: Heart failure (HF) is a costly, progressive, symptomatic, and deadly condition affecting more than 6 million people in the United States. Despite evidence that advance care planning (ACP), including completion of an advance directive (AD), enhances decision-making quality and patient experience, completion rates remain low. ACP decision aids have been shown to improve the quality of decisions in other chronic illnesses, yet few have been tested in the HF population. **Purpose:** This pilot study was designed to test the feasibility and acceptability of an Advance Directive Decision Aid (ADDA) in hospitalized patients with HF and their designated caregivers. The secondary aim was to describe the levels of decisional conflict (DC) and decisional regret (DR) associated with participating in ACP discussions and consideration of completing an AD. **Methods:** Convenience sampling was used to recruit 30 dyads (patients with HF and their designated caregivers) from an academic medical center. Feasibility was assessed by tracking the enrolled, ineligible, and refusal rates, in addition to the time to deliver the intervention. Acceptability was assessed via completion of a follow-up survey and participation in an exit interview. The dyads were evaluated for DC and DR following delivery of the ADDA. **Results:** For enrolled patients, mean age was 56.5 years (SD = 12.17), 73% were Caucasian, most were male (66.6%), 54% were diagnosed with HF <1 year, and 70% were NYHA IV. Patients that were ineligible or refused participation were similar in sociodemographic data to the enrolled sample, though the refusal sample was significantly younger (56.5 years vs 49.47 years; p = 0.011). The ADDA took 2-5 minutes to complete. 80% of dyads found the ADDA to be acceptable and would recommend the ADDA to others. Dyads also reported that the ADDA assisted decision making to complete an AD. Dyads expressed similar amounts of DC; however, caregivers were found to have significantly more DR compared to patients (p = 0.008). In qualitative analysis, both patients and caregivers reported decreased anxiety and gratitude about ACP discussions. Enrolled patients expressed a sense of relief in participating in ACP discussions, though continued to endorse a sense of "impending death" if they completed an AD. Only 8 of 30 patients completed an AD at the conclusion of the study. **Conclusions:** This pilot study revealed that the ADDA was feasible in clinical practice and acceptable to patients and caregivers. Younger patients were more likely to refuse the ADDA and caregiver regret was higher among caregivers than patients after viewing the ADDA. Patients remain fearful that completing an AD means death is imminent. Future research needs to be directed at breaking down the barrier to completing an AD and increasing completion rates, engaging the younger aged HF population, and understanding and decreasing caregiver regret.

008

Predictive Model for Risk of 30-Day Rehospitalization Using a Natural Language Processing/Machine Learning Approach Among Medicare Patients with Heart Failure

Youjeong Kang, John Hurdle; University of Utah, Salt Lake City, UT

Introduction: Nearly 80% of all patients with heart failure (HF) are older adults (≥65 years of age). Prior studies have built predictive models that relied on structured data from electronic health records (EHRs) to predict the risk of 30-day rehospitalization for patients with HF. Structured data mostly included simple vocabularies such as age, and ethnicity. Rarely do prior studies include clinical narrative data in a free-text format (i.e., unstructured data). No previous study has focused on using clinical narrative notes specifically for Medicare patients with HF in the acute-care setting. **Aim:** To identify clinical notes for building a predictive model for risk of 30-day rehospitalization among Medicate patients with HF. **Methods:** This study first used free-text discharge summary notes and nursing care plans collected from June 1, 2015 to December 31, 2019, for a randomly selected 500 Medicare patients with HF. Natural Language Processing (NLP): we iterated over standard text pre-processing steps, exploring the impact of n-gram length, term document-frequency, word stemming, and the added value of parts-of-speech. We chose two models: 1) the classification model called Bag-of Words (BOW), where each document is represented by a vector based on the pre-processed text, and 2) Document Embedding, where document terms are mapped to a dimension-reducing layer (length equals 300). The latter runs exceptionally fast (on the order of tens-of-seconds for 2,000 documents). Machine Learning (ML): the output of the NLP BOW and Document Embedding models were fed to six different conventional machine learning systems (logistic regression, support vector machine, random forest, k-nearest neighbor clustering, a three-layer neural network, and Naïve Bayes). **Results:** The mean age was 77±7.9, and the average of length of hospital stay was 4.9 days ± 4.8. The best BOW model we found using discharge summaries (n=387) produced an Area Under the Receiver Operating Characteristics Curve (AUC) of 0.71 and F_1 score of 0.65. The best Document Embedding model yielded an AUC of 0.65 and an F_1 score of 0.61. Using nursing care notes as the unit of analysis (n = 2,046), the NLM/ML performed far better. The best BOW model on care plans found an AUC of 0.85 and F_1 score of 0.77. The best Document Embedding produced an AUC of 0.83 and an F_1 score of 0.75. In all cases we held out 33% of the data set for validation, repeating a random draw 10 times and averaging the performance results. **Conclusions:** We conclude that nursing care plans are a better predictor of 30-day rehospitalization risk than discharge summaries. Because nursing care plans are shorter than discharge summaries, they have the added advantage of faster processing. Since the faster Document Embedding model's performance is comparable to that of BOW, we suggest its use in future work in the area of 30-day rehospitalization risk in Medicare patients with HF.