

# 81st SIC National Congress 2020

## Abstracts

### TELECARDIOLOGY AND E-HEALTH

#### 77 Routine outpatients visits during SARS-CoV2 global pandemic

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**Aims:** The inability to carry office visits was collateral damage caused by the Coronavirus (COVID-19) pandemic. Tele-health is a relatively new, and yet fundamental amid the current crisis, resource to bridge the gap between physicians and patients.

**Methods and results:** We report our experience with telemedicine and describe the major events occurred in our patients. 121 consecutive adult patients with arterial hypertension (F/M: 56/65; mean age: 66.8 years) were enrolled. 33 patients (27%) had also diabetes, 94 (78%) were also affected from dyslipidemia and 11 (9%) had CAD. They all referred to our ambulatory of hypertension, in most of case for several years. Given the impossibility to continue routine outpatient visits during lockdown, they were all phone called by three residents in order to detect their state of health or any events they could have experienced over this period. They were all asked about their own blood pressure values, the occurrence of new symptoms and of new-onset both cardiovascular and non cardiovascular events. We also followed a self-made preset form. 31 of them (26%) experienced cardiovascular symptoms/events during this period: 11 had hypertensive peaks, in one case associated with nausea and vomiting while 2 of them had hypotensive episodes; 10 had typical angina and/or dyspnoea while 4 had atypical angina; 6 had palpitations; 1 of them developed new onset atrial fibrillation resolved with pharmacologic cardioversion during hospitalization; 1 had syncope; 1 patient reported new onset peripheral oedema; 2 patients died during lockdown for non cardiovascular causes. 17 of them also developed non cardiovascular symptoms, 7 of whom were severe anxiety and/or panic attacks. Almost all patients had important lifestyle changes, in 15 cases (12.3%) associated with weight increase.

**Conclusion:** The impossibility to access to routine outpatient visits during lockdown due to global pandemic of SARS-CoV2, has brought out the risk of underestimating consequences of chronic disease, in absence of appropriate Follow-up. Nevertheless, the two deaths we report were not related to cardiovascular disease. The risk is that both the missing of cardiovascular control visit and the extension of the waiting list, could provoke serious complications in patients suffering from chronic cardiovascular disease.

#### 352 The remote monitoring: how can it impact the management of PAH patients

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**Aims:** Telemonitoring is being increasingly used for chronic disease monitoring. While the primary aim of telemonitoring is to improve chronic disease management and decrease hospitalizations, the potential impact on patient's health-related quality of life may be an additional benefit. Pulmonary arterial hypertension (PAH) is a chronic disease that modifies the patient's quality of life. The aim of our study was to evaluate whether telemonitoring, on the basis of encouraging results in subjects with heart failure, could significantly affect the quality of life and perception of the disease in subjects with PAH.

**Methods and results:** Thirty consecutive outpatients with PAH were subjected to the SF-36 (v1) STANDARD Health Questionnaire to understand the quality of life, daily life activities that they were and were not able to do and their state of mind about others and about their pathology. Subsequently, patients were randomized into two groups; and one of these was subjected to a structured and continuous telephone follow-up of 15, 30, 60 and 120 days on the extent of dyspnoea, oedema, diuresis, weight body, blood pressure, and heart rate. Patients undergoing remote monitoring with respect to the control group showed statistically significant differences,

however, with respect to the perception of the quality of life ( $0.27 \pm 0.59$  vs  $-0.40 \pm 0.6325$ ,  $p = 0.005$ ) and in the limitation of 100 m ( $1.2 \pm 0.41$  vs  $1.73 \pm 0.70$ ,  $p = 0.017$ ).

**Conclusion:** The perception of the health status (both physical and emotional), of patients with PAH can be improved by telemedicine nursing telephone follow-up; remote monitoring could better improve outpatient management of the patient suffering from PAH.

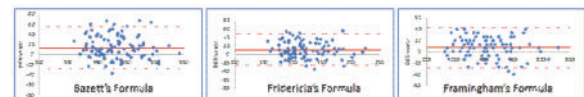
#### 18 Validation of remote measurement of the QTc intervals using an apple watch

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**Aims:** In many circumstances, especially in the Covid-19 period, it could be necessary to measure the QT interval repeatedly and even daily. The aim of this study was to evaluate the feasibility of remote measuring LI-LII and V2 leads with using a commercially available Apple Watch Series 4 (Apple Inc., Cupertino, CA, USA).

**Methods and results:** The accuracy of the QTc calculation with the smartwatch compared to the standard ECG was tested using different formulae. Eighty-one patients admitted to our CCU and 19 subjects admitted to the outpatient clinic for routine cardiovascular evaluation were studied. LI-LII and V2 tracings were obtained immediately after the recording of the standard 12-lead ECG. The LI was recorded with the smartwatch on the left wrist and the right index finger on the crown; recording LII was obtained with the watch on the left lower abdomen and the right index finger on the crown; The chest lead V2 was recorded with a smartwatch in the fourth intercostal space left parasternal with the right index finger on the crown. All recorded 30" ECGs were digitally stored using the health application of an iPhone Series 10 in the pdf format (Apple Inc., Cupertino, CA, USA). The advantage of saving the ECG in pdf format is that it can be sent also via e-mail. There was an agreement between the QT-LI, QT-LII, QT-V2 and QT mean intervals of smartphone electrocardiography tracings and standard electrocardiography (Respectively, Spearman's correlation coefficient: 0.881; 0.885; 0.801; 0.911 [ $p < 0.001$ ]). The reliability of the QTc measurements was tested with Bland-Altman analysis using Bazett's, Friedericia's, and Framingham's formulas between standard ECG and smartwatch (Figure).



**Conclusion:** These data demonstrated the feasibility to measure the QTc in LI, LII, and V2 leads with a smartwatch with results comparable to that performed with the standard ECG. These data could have an important clinical impact both for the widespread diffusion of smartwatches and for the monitoring of drug-induced QT interval prolongation, especially in the Covid-19 era.

#### 323 Impact of telemedicine network provided by local pharmacies in the management of symptomatic tachyarrhythmias during COVID-19 outbreak

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**Aims:** During the lockdown period in Italy, from March 11th to May 4th 2020, a progressive increase in COVID-19 cases occurred in all Italian regions, in particular in the Lombardy Region. The current rise in COVID-19 cases has led to an increasing involvement of hospitals, in order to face the Coronavirus outbreak, shifting healthcare resources towards the management of COVID+ patients. This has led, on the

other hand, to a progressive decrease in hospital admissions due to conditions not associated with SARS-CoV2 infection. In other European countries interested by a national lockdown, a decrease in registered new-onset atrial fibrillation (AF) cases was observed, as a consequence of a reduction in admissions to the Emergency Department (ED). Undiagnosed AF patients can develop complications that could potentially translate into poorer long-term outcomes. In this scenario, we aimed to verify the impact of telemedicine during lockdown, in comparison with the same period in 2019.

**Methods and results:** We analyzed 12-lead ECGs recorded by 5000 country pharmacies, evaluated and stored in one telemedicine platform provided by Health Telematic Network (HTN), in cooperation with our Cardiology Department, Federfarma (Pharmacists' National Association), and Italian National Health Institute. During the lockdown period in 2020, 6,104 ECGs were performed in territorial pharmacies, compared to 17,280 ECGs recorded in the same period in 2019. Among ECGs performed, we detected AF in 344 patients (5.64%) in lockdown period, compared to 393 cases (2.27%) detected in the same period in 2019, with an increase of 40.25%. We detected also Atrial Flutter in 32 patients (0.52%) in lockdown period, compared to 25 cases (0.14%) detected in the same period in 2019. The difference was +26.92%. Moreover, we found Paroxysmal Supraventricular Tachycardia in 8 patients (0.13%) during lockdown, compared to 6 cases (0.03%) detected in the same period in 2019, with an increase of 23.07%. In lockdown period, a total of 384 patients (6.29%) were referred to ED because of symptomatic tachyarrhythmia, compared to 424 patients (3.47%) referred to ED in the same period in 2019, with an increase of 55.16%. In the Lombardy Region, during lockdown period, were reported 194 cases of tachyarrhythmia in territorial pharmacies (about 50.52% of all cases in Italy). Among these, 93 cases of tachyarrhythmia were in the Brescia area (about 47.94%), whereas 50 cases were in the Bergamo one (about 25.77%).

**Conclusion:** These data show that, during the COVID outbreak period, a large number of patients with cardiovascular symptoms preferred to go to territorial pharmacies rather than the closer hospital. Telemedicine played a prominent role in managing patients with cardiovascular symptoms at home. Moreover, this service allowed to refer to the hospital only patients with clinically relevant tachyarrhythmia, avoiding the risks of treatment delay, especially in Italian region the most affected by the COVID-19 outbreak. This once again underlines how telemedicine network provided by pharmacies may become an important tool offered to citizens, especially during coronavirus pandemic emergency, within the Italian National Health System services.

### 324 Role of telemedicine network provided by pharmacies to detect acute myocardial infarction in patients with chest pain during coronavirus pandemia

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**Aims:** During the lockdown period in Italy, from March 11th to May 4th 2020, a progressive increase in COVID-19 cases occurred in all Italian regions, in particular in the Lombardy Region. The current rise in COVID-19 cases has led to an increasing involvement of hospitals, in order to face the Coronavirus outbreak, shifting health-care resources towards the management of COVID+ patients. This has led, on the other hand, to a progressive decrease in hospital admissions due to conditions not associated with SARS-CoV2 infection. During COVID-19 outbreak period, it has been observed a decrease in hospital admissions for acute myocardial infarction. This phenomenon put in serious difficulty the clinical management of COVID-free patients with cardiovascular disease, at the beginning of phase 2 (starting from May 4 2020). In this scenario, we aimed to verify the impact of telemedicine during lockdown, in comparison with the same period in 2019.

**Methods and results:** We analyzed 12-lead ECGs recorded by 5000 country pharmacies, evaluated and stored in one telemedicine platform provided by Health Telematic Network (HTN), in cooperation with our Cardiology Department, Federfarma (Pharmacists' National Association), and Italian National Health Institute. During the lockdown period, were recorded 6,104 ECGs in territorial pharmacies, compared to 17,280 ECGs done in the same period in 2019. Chest pain symptom represented the cause of recording ECG in 298 patients (4.88%) during the lockdown period, compared to 402 patients (2.33%) in the same period in 2019, with an increase of 109.86%. In the Lombardy Region, during lockdown period, were reported 118 accesses to territorial pharmacies for chest pain (about 39.50% of total cases in Italy). Among these, 36 accesses were in the province of Brescia (about 30.50%), whereas 28 of them were in the province of Bergamo (about 23.73%). Among ECGs performed, 8 showed typical abnormalities of acute myocardial infarction with ST elevation (STEMI, 2.68%) in the lockdown period, compared to 7 STEMI (1.74%) detected in the same period in 2019, with an increase of 54.17%. These patients were referred to Emergency Department (ED) suddenly, for the therapeutic intervention.

**Conclusion:** These data show that a large number of patients with cardiovascular symptoms preferred to go to territorial pharmacies rather than hospitals during the COVID outbreak period. Telemedicine played a prominent role in managing patients with cardiovascular symptoms at home. Moreover, this service allowed patients with STEMI to access to the hospitals faster, avoiding the risks of a serious diagnostic delay. Furthermore, by analyzing the data of Lombardy Region, it was possible to show how a significant component of access to local pharmacies for chest pain occurred in the region most affected by the COVID-19 outbreak.

### 422 Patient satisfaction with telehealth in cardiology: lessons and caution from the response to COVID-19 restrictions

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**Aims:** The rise of COVID-19 and the issue of a mandatory stay at home order in March 2020 led to the utilization of a direct to consumer model for cardiology telehealth (tele). Kentucky serves as a unique study location. Besides practice specific restrictions, Kentucky contributes to the state's top 10 ranking in age adjusted total cardiovascular deaths per 100,000 persons. This is further compounded by the fact that Kentucky is in the bottom 10 states in the country for household income and about 1 in every 4 households do not have a broadband internet connection. The utilization of cardiology tele in this unique Kentucky population is not well represented in the literature.

**Methods and results:** We constructed an online survey through Qualtrics and invited all patients who had a visit scheduled during the COVID-19 tele only time frame to participate. Questions were mostly Likert or Likert-type, and included factors for declining tele appointments, advantages and disadvantages associated with tele, and patient satisfaction ratings of tele and in-person (IP) visits in the key areas of patient-centered communication, clinical competence, interpersonal skills and supportive environments. We had 193 responses to our survey (9.5% response rate).

**Advantages and Disadvantages of Telehealth:** Reduced travel time, lower visit wait time and cost savings were seen as big advantages with tele. Fewer than 10% rated any of the potential issues as a big disadvantage; by contrast, individual survey items were rated as 'Not a Disadvantage' by 67-86% of respondents. Privacy concerns were the least problematic, with only 14.2% of respondents reporting this as at least somewhat of a disadvantage. Poor internet connectivity was of most concern rated as at least somewhat of a factor by 33.0% of respondents. **Comparison of In-Person and Telehealth:** Both IP and tele were viewed favorably, but IP rated somewhat higher across all 11 domains. Only the clinical competence domain generated a significantly lower mean score for tele (3.7 Vs 4.2, p=0.007), and this was driven entirely by the low rating on the thoroughness of the clinical exam. No significant differences were seen for Patient-Centered Communication (Cronbach's alpha: Tele = 0.920; IP = 0.973), Supportive Environment, & Interpersonal Skills (Cronbach's alpha: Tele = 0.931; In-P = 0.927). There was also high reliability among items within each survey domain, as Cronbach's alpha values ranged from 0.879 to 0.973.

**Conclusion:** This study takes advantage of the natural experiment provided by the COVID-19 pandemic to provide a comparative assessment of patient satisfaction with tele and IP appointments. Tele offers both opportunities and challenges. Patterns of satisfaction are consistent across modalities. Tele is a viable alternative to IP cardiology appointments. Physicians seem to be able to adapt well. The clinical exam is an issue that needs to be addressed. The dangers of COVID-19, especially for these patients, nearly ensures a positive bias toward tele. This may disappear entirely in a "normal" situation. As a result, we might have seen less difference between tele and in-person than we might have originally expected. It highlights the need for RCTs to truly evaluate differences between IP and tele experience.

### 256 Multichannel electrocardiograms obtained by a smartwatch for the diagnosis of the acute coronary syndromes: the smart AMI trial

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**Aims:** Smart watches are increasingly popular and used for digital health information. Apple watch series 4 (Apple Inc, Cupertino, CA, USA) introduced an integrated ECG tool which allows recording a single-lead ECG. The aim of the present study was to prospectively investigate the feasibility and the accuracy of the Apple Watch in patients admitted in our CCU with the diagnosis of Acute Coronary Syndrome compared with a standard 12-lead ECG.

**Methods and results:** A commercially available Apple Watch series 4 (Apple Inc., Cupertino, CA, USA) was used positioning the sensor in different body positions to obtain nine bipolar ECGs (corresponding to Einthoven leads I, II and III and Precordial leads V1-V6) that were compared with a simultaneous standard 12-lead ECG. The DI

was recorded with the Apple Watch on the left wrist and the right index finger on the crown, recording DII was performed with the watch on the left lower abdomen and the right index finger on the crown, and DIII with the watch on the left lower abdomen and the left index finger on the crown. The pseudo-unipolar Wilson-like chest leads were recorded corresponding to the location of V1-V6, (V1 = fourth intercostal space right parasternal, V2 = fourth intercostal space left parasternal, V3 = between V2 and V4, V4 = lead at the fifth intercostal space mid-clavicular line, V5 = lead at the fifth intercostal space anterior axillary line, V6 = lead at the fifth intercostal space mid-axillary line, respectively). All recorded ECGs were digitally stored using the Health Application of an iPhone Series 11 Pro (Apple Inc., Cupertino, CA, USA). One-hundred subjects were included in the study. Fifty-five patients had a STEMI and were treated with primary angioplasty within 60 minutes of hospitalization. Twenty-seven patients had a NSTEMI and 18 age-matched subjects were included as control. A very good agreement was found between Smartwatch ECG and Standard ECG for the identification of normal ECG, ST segment elevation and NSTEMI alterations (Cohen's kappa 0.90 [95% CI 0.78 to 1], 0.88 [95% CI 0.78 to 0.97], 0.85 [95% CI 0.74 to 0.96]), respectively. The sensitivity and specificity of Smartwatch ECG for the diagnosis of normal ECG were 84% (95% CI 60 to 97) and 100% (95% CI 95 to 100), STE deviation were 93% (95% CI 82 to 99) and 95% (95% CI 85 to 99) (figure 1), NSTEMI ECG alterations were 94% (95% CI 81 to 99) and 92% (95% CI 83 to 97), respectively.

**Conclusion:** Our study demonstrated a good correlation between the leads evaluated with the apple watch and the traditional electrocardiogram, both in the recognition of the elevation and the sub-elevation of the ST segment. Obviously, the diagnosis of heart attack is much more complex due to the need of the clinical context and laboratory tests, but this could be an initial and quick method to direct the diagnosis.

