TELECARDIOLOGY AND E-HEALTH

77 Routine outpatient 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, yet fundamental amid the current crisis, resource to bridge the gap between physicians and patients.

Methods and results: We report our experience with telediagnosis 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 up about their therapy 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 could better improve outpatient management of the patients suffering from PAH.

Conclusion: The perception of the health status (both physical and emotional), of patients with PAH can be improved by telediagnosis 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; 0.806; 0.911 [p < 0.001]). The reliability of the QTc measurements was tested with Bland-Altman analysis using Bazett’s, Friederica’s, and Framingham’s formulae 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 telediagnosis 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 health-care resources towards the management of COVID-19 patients. This has led, on the
other hand, to a progressive decrease in hospital admissions due to conditions not associated with SARS-CoV-2 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.

Hypotheses 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 55.16%. In the Lombardy Region, during lockdown period, were reported 194 cases of tachycardia in territorial pharmacies (about 50.52% of all cases in Italy). Among these, 93 cases of tachycardia were in the Brescia area (about 47.9%), whereas 23 cases were in the Bergamo province (25.77%).

Conclusion: These data shown 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, in this scenario; however, this service aimed 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 pandemic

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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 recent 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-19 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 and, at the same time, the telemedicine outpatient consultations. 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 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 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 to at least somewhat of a disadvantage. Poor internet connectivity was 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; IP — 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 national 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 specialties. Tele is a viable alternative to 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: 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: A commercially available Apple Watch series 4 (Apple Inc, Cupertino, CA, USA) introduced an integrated electrocardiography (ECG) feature that allows the recording of a single-lead ECG. We studied 256 Multichannel electrocardiograms obtained by a smartwatch for the diagnosis of the acute coronary syndromes: the smart AMI trial. The study included 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 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 to at least somewhat of a disadvantage. Poor internet connectivity was 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; IP — 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 national 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 specialties. Tele is a viable alternative to 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.
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 NSTE 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), NSTE 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.