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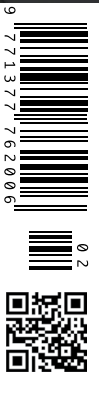
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The Role of Telecardiology - Lessons from COVID-19

A Missed Opportunity or a New Hope?

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At the beginning of the COVID-19 pandemic, with lockdowns and restrictions of physical contact, many editorials in scientific journals started to speak about the telemedicine solutions but no telemedicine programme can be created overnight. In cardiology, the branch of telecardiology is well developed and the COVID-19 pandemic showed us the potential of this tool and the need for improvement in the months to come.



Key Points

- Telemedicine is not something new; it is well known from the beginning of the twentieth century.
- Cardiology has clearly covered all formats of telemedicine.
- Teleconsultation is not the Holy Grail; advantages, disadvantages and limitations have been well described.
- Main lessons on telecardiology during the COVID-19 pandemic: key for safety for patients and physicians, unmasked many clinical visits as unnecessary, in some ways a return to the days of personal home visits, big capacity for adaptation in the cardiovascular field.

Telemedicine Something Unknown?

At the beginning of the COVID-19 pandemic, with lockdowns and restrictions of physical contact many editorials in scientific journals started to speak about the telemedicine solutions (Hollander 2020), but many highlighted that no telemedicine programme could be created overnight. Due to this, only the health systems that have already implemented telemedical innovations can leverage them for the response to COVID-19.

Telemedicine is not something new. It is well known from the beginning of the twentieth century. One of the first examples was electrocardiography. In the early 1900s, Einthoven transmitted heart tracing via telephone lines from the local hospital to the laboratory where his string galvanometer was located (Einthoven 1906). The importance of this tool started to grow in 1960s with some initial experiences.

Telemedicine is defined as “medicine at distance.” Another way to define this could be “the practice of medicine without the usual physician-patient physical confrontation, via an interactive audio-video communications system.” But unfortunately for us, before the pandemic, telemedicine was not a history of success. Problems mentioned in 1984 by Higgins (1984) were still present in 2020:

- 1) There is resistance from many doctors who feel threatened by alternative approaches to the practice of medicine.
- 2) The initial expense in setting up telemedicine systems is high and it is difficult to justify the costs.
- 3) Physician reimbursement and legal implications need to be resolved.

Telecardiology Before COVID-19

Cardiology has clearly covered all the formats of telemedicine and we can discuss telecardiology as something real in daily

practice, but not properly implemented. The current formats of telemedicine used in cardiology are:

A) Synchronous (live)

- Remote consults or Teleconsultation
- Live Video/Audio

B) Asynchronous (store & forward)

- E-Consultation
- Imaging Documents

In the field of cardiology there have been multiple experiences on telecardiology and probably the main target was establishing a link with primary care through teleconsultation or e-consultation tools with different results. Teleconsultation is not the Holy Grail. Advantages, disadvantages and limitations have been well described (Table 1).

Advantages	Disadvantages	Limitations
They avoid exposure to contagion	Difficulty in correctly identifying the patient	Lack of legal coverage
They reduce the need for resources	Communication problems due to sensory deficits	Lack of coverage by some liability insurance
Waiting list deadlines are shortened	Impossibility of physical examination	Obtaining signature for informed consent
Greater ability to prioritise patients	Impossibility of complementary examinations	Difficulty expressing oneself due to lack of experience before a teleconsultation
They facilitate the organisation of care circuits	Loss of non-verbal communication	Lack of generalised access to video calls

Table 1. Advantages, disadvantages and limitations of teleconsultation
Adapted from Rev Esp Cardiol (Barrios 2020)

The value of establishing a teleconsultation with primary care is known from previous experiences as Olayiwola and his team have shown (Olayiwola 2016). They tested the usefulness of electronic consultation as a way to improve the relationship between primary care and cardiology in areas with difficult access to healthcare. In this study, approximately half of all referrals to cardiology met the study criteria to be sent through electronic consultations, and two thirds of them did not require a face-to-face visit; furthermore, electronic consultation reviews were completed, on average, almost

a month before those sent for a face-to-face consultation, even those considered urgent by the sending physician. With these data, the authors suggested that teleconsultation does not put patients at risk and that, in fact, it may be a way to improve access to specialised care. Further studies showed that the associated costs are lower in the long term (Anderson 2018).

Teleconsultation in cardiology is proving to be a great tool that can improve communication between primary care and cardiology specialists in the areas in which it is implemented. It also has a non-negligible educational value in the long term and reinforces the interaction between professionals.

We must not forget that sometimes very complex strategies are not needed from telecardiology to offer improvements in the cardiovascular field. A very clear example was the Tobacco, Exercise and Diet Messages (TEXT ME) trial, which based its strategy simply on reminder messages of healthy habits via short message service (SMS) in patients with proven coronary heart disease after discharge from hospital (Chow 2015). At six months, levels of LDL-cholesterol were significantly lower in intervention participants, with concurrent reductions in systolic blood pressure and body mass index, significant increases in physical activity, and a significant reduction in smoking. The majority reported the text messages to be useful, easy to understand, and appropriate in frequency.

Lessons From COVID-19 on Telecardiology

The first lesson is security from both ends (patient and physician). All the scientific societies in cardiology (Driggin 2020) went in the same direction as Hollander proposed in New England and adapted for this review: “the central strategy for surge control is “forward triage” - the sorting of patients before they arrive in the hospital. Direct-to consumer (or on-demand) telemedicine, a 21st-century approach to forward triage that allows patients to be efficiently screened, is both patient-centred and conducive to self-quarantine, and it protects patients, clinicians, and the community from exposure. It can allow physicians and patients to communicate 24/7, using smartphones or webcam-enabled computers. Respiratory symptoms - which may be early signs of COVID-19 - are among the conditions most commonly evaluated with this approach. Health care providers can easily obtain detailed travel and exposure histories. Automated screening algorithms can be built into the intake process, and local epidemiologic information can be used to standardise screening and practice patterns across providers” (Hollander 2020).

The second lesson COVID-19 has unmasked is that many clinical visits are unnecessary and likely unwise. Telemedicine has surged; as we suspected social proximity seems possible without physical proximity. Progress over the past two decades has been painfully slow towards regularising virtual care, self-care at home, and other web-based

assets in payment, regulation, and training. The arrival of COVID-19 has changed that in weeks. One open question for the months to come: will the lesson persist in the new normal - that the office visit, for many traditional purposes, has become a dinosaur, and that routes to high-quality help, advice, and care, at lower cost and greater speed, are potentially many? Virtual care, well-scaled, would release face-to-face time in clinical practice to be used for the patients who truly benefit from it (Berwick 2020).

The third lesson is that telecardiology, in some ways, is a return to the days of personal home visits. Elderly patients, those with low health literacy, or those who have limited access to technology can be provided tools and teaching to adapt. For sure, this will be a tactic to help eliminate barriers and increase access. Telemedicine has the potential to make health care more personalised, efficient, and coordinated. It has the potential to improve efficiency, patient and clinician satisfaction, and health outcomes (Poppas 2020).

The fourth lesson is the big capacity for adaptation in the cardiovascular field. Many recommendations have been created in less than a month or two, to help in the management of the pandemic and the cardiology aspects specially focused on telecardiology in many cases. A good example are the dynamic web pages related to COVID-19 created by principal cardiovascular societies:

-European Society of Cardiology: <https://www.escardio.org/Education/COVID-19-and-Cardiology>

-American College of Cardiology: <https://www.acc.org/latest-in-cardiology/features/accs-coronavirus-disease-2019-covid-19-hub>

-American Heart Association: <https://professional.heart.org/en/covid-19-content-an-aha-compendium>

Conclusion

Telemedicine has been with us for a long time but is not properly implemented. Telecardiology provides excellent opportunities. It allows patients to take on a more active role in the healthcare system, facilitates patient-physician collaboration/communication. It has the potential to make smart use of every byte of data (more personalisation, better information, an overall improvement in healthcare services), and shows promising results in cardiovascular prevention.

Obviously the telecardiology organisation is a challenge for the health system, especially in times of a pandemic: We must prevent misuse due to the significant potential for system overload, and we need to evaluate constantly its usability, data accuracy and validation of the results obtained

We will need better and appropriate regulation of its use and we must be ready to overcome the resistance to change to a new cardiology practice.

Conflict of Interest

None. ■

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