

The Telecardiology Revolution : Cardiology emergency management within territorial hospital network. Eight years activity results

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We aimed to report the design and development of a telecardiology system in the sanitary district, one of the largest in Italy, with a complex orography, and healthcare reorganization needs, for the management of the emergency network and daily clinical practice. This project is one of the largest in Europe.

Our telecardiology network connects 8 hospitals, 9 first aid centers, 20 local 118-EMS stations, 1 helicopter station, 8 hospital emergency departments (ED), 59 hospital departments, and 3 catheterization laboratories. All data are centralized on a dedicated server, accessible from any location for real-time assessment. The quality, source, and timing of the electrocardiograms transmitted were evaluated.

The objectives of our telecardiology :

- a real-time connection between local 118 and coronary care units for a fast diagnosis of cardiovascular emergencies, thus limiting extra- and intra-hospital delay and referring the patient not to the nearest structure but to the most suitable one;
- to provide all structures in the area with electrocardiographs connected in real-time with cardiology departments, with a unique database, thus supporting clinical decision-making.

Results: From October 2014 to December 2022, a total of 765,970 ECGs were transmitted. The quality of ECGs was optimal in 52%, acceptable in 42%, and poor in 6% of the cases. The number of poor-quality ECGs was only 3% in the last 2 years. Out of the total, 284,940 (37.2%) were transmitted from the ED and 10,720 (1.4%) from the 118-EMS. Of interest, a sizable part of the ECG was related to routine clinical practice, comprising 214,556 (28.3%) from the cardiology department and 153,256 (20.3%) from other non cardiovascular departments. The average reporting time was significantly decreased compared to reporting times without a telecardiology (5–10 vs. 45–90 min).

A direct comparison between the time from the diagnosis of STEMI and the beginning of the procedure in Hemodynamics room, before and after the telecardiology era, showed that the use of the telecardiology allowed to save 11 min for patients received in ER, 29 min for patient from First PS and 75 min for patients arriving with Ambulances

Conclusion: The telecardiology represents a revolutionary road to providing healthcare assistance. The application of this technology for a daily clinical practice was not easy, because of infrastructural constraints and lack of cooperation from healthcare workers, who in certain cases were reluctant to leave the old for this new way to provide clinical assistance. The telecardiology is still primarily applied for the prehospital triage of acute myocardial infarction. We observed that the majority of the ECGs underlined routine clinical activities. In our system, ECGs are transmitted to a central database, where the cardiologist in charge of reporting can review and make teleconsultation. This observation is of paramount importance because it supports telecardiology not only for the management of emergencies but also for a routine basis in order to achieve a more efficient clinical practice. Our telecardiology provides efficient cardiology assistance for all types, settings, and phases of cardiovascular diseases.