

The Telemedicine in the Management of ST Elevation Myocardial Infarction Saves Lives and Costs in the Public Health System. Insights from 4-Years of the LATIN Program in the Hospital Santa Marcelina.

The LATIN Program has been developed by Lumen Global and ITMS Telemedicine Network.

The LATIN Program is sponsored by Medtronic.

Target:

This technology has been used by all patients with chest pain at admission in the five public primary care units and three public secondary hospitals, frequently without cardiologist on duty. After the ECG acquired by technicians, nurses or general medical doctors, the ECG has been submitted to ITMS for Cardiologist analysis (24/7) and in case of ST-Elevation changes that patient has been referred to the Cath Lab in the Hospital Santa Marcelina to perform Primary PCI.

Description:

Acute myocardial infarction (AMI) is a worldwide public health problem and it represents the main cause of death. In 2015, the World Health Organization estimated 8.76 million deaths of ischemic heart diseases. In Brazil, additionally to being the main cause of death, regardless of gender or country's region, AMI mortality has remained high in the last decade, at around 15%. The southeastern region of the country, which has the largest population in Brazil, accounts for about 46% of all heart attacks. From 2012 to 2015, the city of São Paulo, which is the ninth most populous city in the world, with about 12 million inhabitants, accounted for 26,073 hospitalizations due to AMI. Of these patients, only 39.9% had access to coronary angiography at hospital admission.

It is estimated that about 80,000 annual deaths occur in Brazil because of AMI, with an annual expenditure of US\$ 22 million. Therefore, not only is AMI the main cause of death, but also an important factor of economic impact on the Health System.

The creation of a "Spoke-Hub" network and activation by Telemedicine, with early referral to centers prepared for coronary angioplasty can reduce the time between the ECG and the coronary artery opening between 40% and 60%, but few studies have evaluated how the impact of this management in costs and mortality rate in STEMI patients treated by Telemedicine.

In June 2014, the Hospital Santa Marcelina, the biggest hospital of São Paulo East Zone was invited by Lumen Global, in person of Dr Sameer Mehta and ITMS Telemedicine Network, in person of Dr Roberto Botelho to start this pioneer program in Brazil, using the Telemedicine in the Public Health System, called LATIN (Latin America Telemedicine Network).

Briefly, this program is a communication system between Spokes and Hub. **Spokes** are the centers that receive patients with chest pain and perform the 12-lead electrocardiogram. They currently comprise 5 public

primary care units and 3 secondary public hospitals. All generated ECG traces were sent via web, stored in the "cloud" and analyzed by dedicated cardiologists located at ITMS Telemedicine Network, located in Uberlândia, 337 miles from São Paulo. In patients with ST segment elevation ≥ 1 mm in two or more contiguous leads, a text message alert, a copy of the ECG by e-mail along with a summary of the clinical history and the telephone contact where the patient is, are sent to all interventional cardiologists participating in this study. **Hub** is the Department of Interventional Cardiology located at Hospital Santa Marcelina, São Paulo, Brazil. It is a tertiary hospital with 742 beds (117 of intensive care) and one of the three largest in volume of primary angioplasties. The Hemodynamic Service consists of 3 interventional cardiology rooms, with 24/7 operations. Patients diagnosed with STEMI are transferred by ambulance with a physician, as soon as possible, after the initial dose of chewed ASA 200 mg and clopidogrel 600 mg, unless contraindicated; in the absence of immediate transport, the strategy of thrombolysis and transfer to the Hub is recommended.

After 4 Years of this Program more than 135,000 ECG was performed and 800 STEMI patients received adequate treatment on the Hub. The preliminary analysis of 558 STEMI patients transferred and treated, the Primary PCI occurred in 382 (68.5%) patients; Non-Primary PCI occurred in 46 (8.2%) patients; Pharmacoinvasive strategy in 60 (10.8%) patients; Coronary Artery Bypass Graft in 18 (3.2%) and 52 (9.3%) patients performed isolated Coronary Angiography. Besides the "big-data" creation about demographic and researches purposes data, this program showed the in-hospital mortality in STEMI reduction from 11.4% to 7% or 38.6% of reduction compared to historical in-hospital mortality in the São Paulo East Zone. Allied to this in-hospital mortality reduction, the Telemedicine Program increased the angioplasty "mind-set" and early transportation to Cath Lab of STEMI patients in the Public Healthcare System. Of the 428 patients treated by angioplasty (the sum of primary and non-primary PCI) after the program has started and the current price of the thrombolytic agent of US\$ 1,500 there was a reduction of US\$ 642,000.00 to the Public Healthcare vaults only in thrombolytic. The former STEMI Program in the São Paulo East Zone was thrombolysis and then coronary angioplasty and this Program changed it.

Nowadays, after the LATIN Program in the Hospital Santa Marcelina has been developed, we became the benchmark of the LATIN Program and we are still spreading our results to other countries, like Mexico, Colombia and soon to Argentina and Venezuela.