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SCIENTIFIC LETTER

The STEMI reperfusion status in Guatemala: An unanswered question

Estado de reperfusión de IAMCEST en Guatemala: una interrogante sin respuesta

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Guatemala is a middle-income country with roughly 17 million people and 108,890 km^2 which corresponds to 159 people/km^2 of land area. In the country, poverty and disparity are persistently pervasive. In 2014, about 60% of the population lived below poverty threshold. In 2018, Guatemala's gross national income (GNI) per capita was USD 4,400 (as compared with Uruguay and Denmark GNI per capita in 2018 was USD 15,650 and USD 60,140, respectively)[1,2]. Guatemala´s Gini index is 48.3[3], cero being perfect income equality, while an index of 100 implies perfect income inequality.

The health budget in Guatemala is assigned to four entities: The Ministry of Health, the National Social Security Institute (IGSS), the Ministry of Defense, and the Ministry of Interior. The Ministry of Health takes responsibility for 75.6% of the country's health services[4]. By 2015, around half of the health expenditure was paid out directly by the patient[4].

Guatemala is undergoing an epidemiological transition; therefore, undernutrition and maternal/child mortality are no longer the most common cause of death. Instead, non-communicable diseases have become the four main causes of death[5]. In 2016, the Ministry of Health stated that the second cause of general mortality in Guatemala was cardiovascular disease, and 43% of those were classified as acute myocardial infarction[4]. By 2015, the potential years of life lost measured by the number of premature deaths were 6,048 and acute myocardial infarction was the first and third specific cause for men and women, respectively[4].

The Acute Coronary Event Strategies Survey (ACCESS) trial is an international observational registry that evaluated the management of acute coronary syndromes (ACS) in developing countries, including Africa, Latin America, and the Middle East[6]. Data showed that among the 12,068 studied subjects, 289 were from Guatemala and were diagnosed with ACS admitted to third-level hospitals in the country. The results showed that most (64%) of ACS were ST-segment elevation myocardial infarction (STEMI), followed by unstable angina and non-STEMI. The majority of patients (80%) who died had a STEMI, only 28% received thrombolysis, and none of them received primary percutaneous coronary intervention (PPCI). Moreover, elective PCI was performed in 12% of patients, all of them in private and semi-private centers[7]. A cross-sectional study proved that hospitals from the Ministry of Health in Mexico have wide disparities in demand, supply, and health outcomes of acute myocardial infarction. Other low- and middle-income countries report similar results[8].

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Early myocardial reperfusion therapy using a fibrinolytic or primary PPCI is the most effective strategy for enhanced clinical outcomes[9]. The STREAM trial (Strategic Reperfusion Early After Myocardial Infarction) demonstrated that the pharmacoinvasive strategy (PS), together with contemporary antithrombotic therapy (clopidogrel, aspirin, and enoxaparin), has similar efficacy to PPCI[10]. Furthermore, a cohort from the PHASE-MX trial proved there is no difference in survival and mortality in STEMI patients treated by means of PPCI or PS[11]. In Guatemala, there are no public 24/7 PCI centers, and thrombolytic therapy is not generally available among public hospitals.

Since there are no quality data and the ACCESS registry does not represent all the country's regions, we designed a registry that collects patients treated in everyday clinical practice to provide complementary information from newly diagnosed patients with ACS and offer insights into the outcomes of non-reperfused patients. The registry was designed to be representative of Guatemala as it takes place in public hospitals in six out of eight regions of the country. The results are expected to demonstrate the importance of the prognosis of invasive and pharmacologic reperfusion in ACS.

The main objective of the study is to describe the factors that influence the health outcomes of patients with ACS. Furthermore, to outline the demographic and clinical characteristics of patients with ACS in six regional and referral hospitals in Guatemala, clarify the process and structure of the health-care system, and determine the clinical outcomes of ACS in Guatemala.

Registration began in February 2020, with 11-month recruitment. The ethics committee approved the protocol in all participating hospitals, and patients are allowed to withdraw from the registry at any time. All patients sign an informed consent.

The trial population includes adult patients with signs or symptoms compatible with acute coronary syndrome confirmed with an electrocardiogram and/or cardiac biomarkers according to the operational definition. Patients were managed at the Public Health System; one national reference hospital: Hospital General San Juan de Dios (Department of Guatemala) and five regional hospitals: Hospital Regional de Occidente (Department of Quetzaltenango), Hospital Regional de Zacapa (Department of Zacapa), Hospital Nacional de Cobán (Department of Alta Verapaz), Hospital Regional de San Benito (Department of Petén), and Hospital Nacional Pedro de Bethancourt (Department of Sacatepéquez), during February 2020-January 2021 (Fig. 1)

Patients included at admission are under surveillance during their hospital stay monitored for any cardiovascular and non-cardiovascular events. The follow-up takes place within 30-days and 1 year from the time of the event through a telephone call. The survey data are collected electronically, reviewed weekly by the collector and researcher assigned to each hospital, and validated according to inclusion criteria, ensuring that the data are complete, accurate, and correct. Given that it is a descriptive trial there is no minimum estimated sample but a time period of data collection. SPSS version 24 will be used for data analysis.

Baseline and survey data are being collected and will be tabulated and coded according to the responses and entered into a specific data program and app for this research. Continuous variables will be described according to their distribution and, the categorical variables will be expressed in frequencies and percentages. The analysis, according to the type of the variable on the sub-variables of structure, process, and outcomes, will answer the main goal of the study. Furthermore, the information gathered will be assessed in relation to articles from the same region, for example, the PHASE-MX trail, PERSTEMI trial, and among others.

Standardized definitions, meetings among the investigators, electronic data collection, data reports, weekly meetings to review data collection, ethics review, and transparency of funds for any publication improve quality data. Moreover, a committee team reports monthly newsletters to the funding academic organization. The report includes monthly activities, weekly data review, reached products, percentage of execution, limiting aspects, and funding execution.

Given that Guatemala is a multiethnic country besides the marked differences between geographic regions, a second phase of the trial has been accepted. The aim is to measure seven regions of Guatemala to search for possible differences in the process, structure, and outcomes of ACS. This second phase will be accomplished between February 2021 and January 2022, a supporting grant has been approved by Universidad de San Carlos de Guatemala.

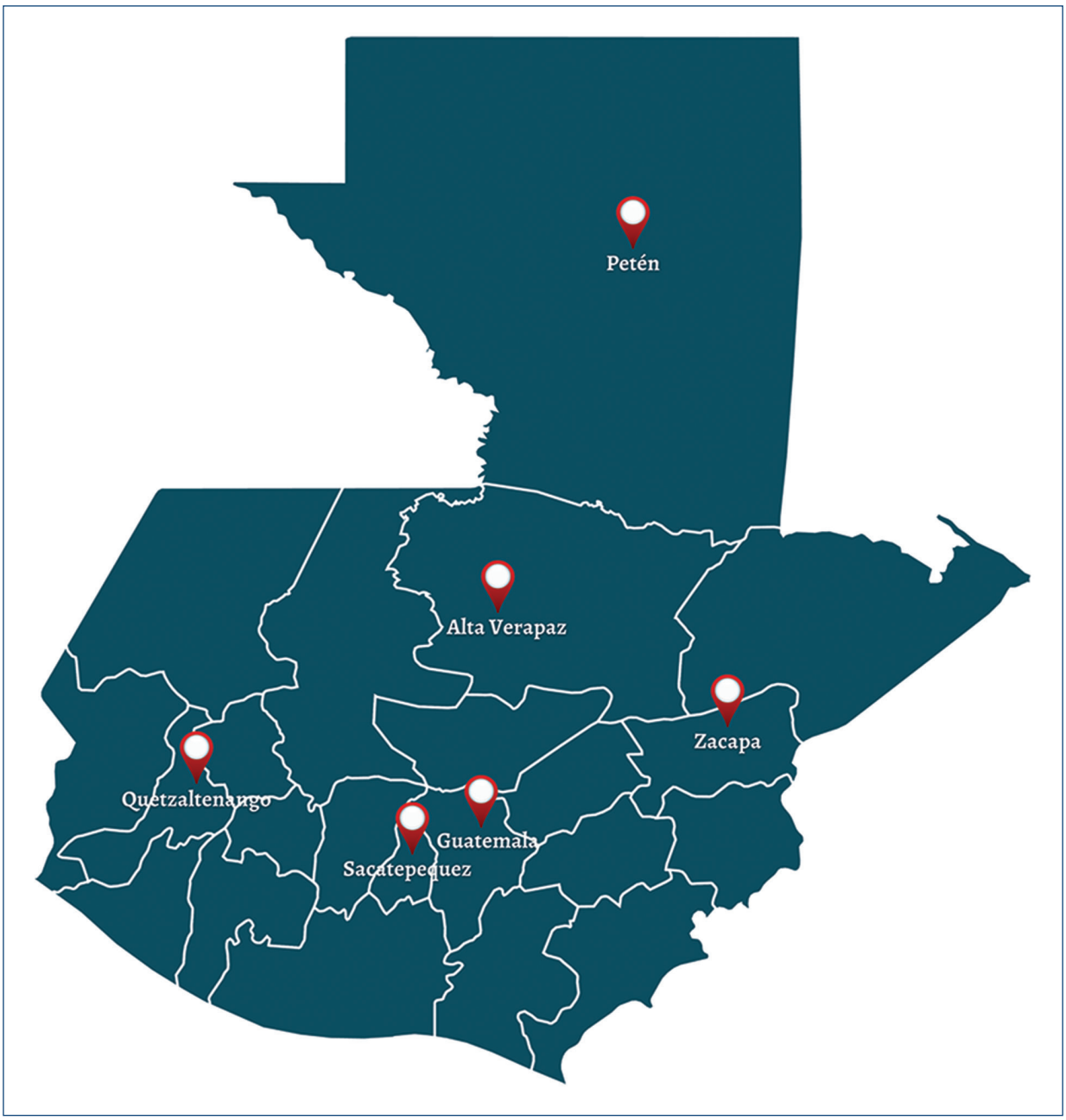

Figure 1. Hospitals participating on the registry located on a map of Guatemala.

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Conflicts of interest

The authors declare that they have had no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

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