Cost-effectiveness models in the modern management of coronary syndromes

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In the era of modern healthcare, the concept of economic sustainability has gained paramount importance, the problems of cost-effectiveness being commonly encountered in clinical practice as we go through a period of full economic accountability of therapeutic options.

The present research was conceived as a cost-effectiveness analysis based on the evaluation of two fundamental concepts for the reality of modern healthcare, governed by the concept of economic sustainability, namely high-performance medical units, respectively high-performance imaging techniques.

As addressing health care issues is one of the major concerns of health systems, the current context of market development of healthcare services has required performance to become a key defining element for healthcare activity in recent years.

From this perspective, a first main research pillar of this study was designed around the analysis of cost-effectiveness and clinical efficacy for a tertiary center medical unit for the regional STEMI myocardial infarction treatment network in the Center region, as a defining model for the concept high-performance medical unit, in the context of a special medical and economic circumstance for medical systems around the world, the COVID-19 pandemic.

In this sense, from the perspective of financial profitability, the analysis of key cost-effectiveness indicators characterizes an economically efficient medical unit, which based on complex medical activity, as a tertiary center for cardiovascular emergencies in the Center region, proves its financial sustainability.

However, despite an previous efficient system, the impact of the COVID-19 pandemic created a particular medical and economic context, which required extreme economic measures in terms of financial resource management.

Due to the influence of the COVID-19 pandemic, the volume of clinical activity of the analyzed medical unit was severely influenced by a percentage reduction of approximately 50% of cardiovascular emergencies in cases that define the general emergency profile of the medical unit.

The fluctuations registered in terms of the volume of clinical activity coincide in this respect with the 2 waves of the COVID-19 pandemic, with the most drastic decrease of 75% registered in the quarter corresponding to the period of implementation of the lockdown measures.

Currently, the activity indicators of the ICCU department showed a lower percentage reduction as evidence that cardiovascular emergencies continued to exist and be treated in the therapy department, especially cases of myocardial infarction for which the medical unit is a tertiary management center.

Simultaneously with the reduction in terms of volume of clinical activity, the medical unit treated an increasingly complex profile of cases despite external interventions of special situations such as the COVID-19 pandemic, these results showing that despite the general drastic reduction in the number of cases represented by cardiovascular emergencies, the analyzed medical unit continued to serve as a tertiary center for complex cases within the STEMI network and beyond.

Beyond the preserved functionality of the medical unit analyzed in the pandemic context, the results indicate a trend common to that identified worldwide for the evolution of cardiovascular emergencies in the COVID-19 pandemic, a trend characterized by drastic reduction in the number of presentations due to general reluctance among the population. regarding the presentation in the emergency services, respectively a concomitant increase of the complexity of the cases result of the delay of the initiation of the appropriate treatment, due either to the reluctance of the patients or to the overload of the sanitary system.

Related to the analysis for the medical unit, this research also aimed to follow the evolution of the functionality of the regional myocardial infarction treatment network in the Central region during the COVID-19 pandemic, as a fundamental defining element for the composition and functioning of a high-performance medical system for cardiovascular emergency management. tertiary.

From this perspective, the COVID-19 pandemic had a strong impact on the functionality of the STEMI network in Central Romania. Even a functional network, well organized by STEMI, such as the one in Central Romania, encountered important difficulties aimed mainly at diminishing its capacity to bring in time the critical cases of STEMI to the catheterization laboratory of the tertiary center.

However, the functionality of the intervention center remained unaffected by the pandemic as a result of the extensive experience gained in managing and providing management and treatment of cardiovascular emergencies in general and myocardial infarction in particular.

The second pillar of the analysis of the present research aimed at evaluating the cost-effectiveness and clinical efficacy for CCTA, as a defining model for the concept of high-performance imaging technique, in the worrying context created around the optimal strategy for diagnosing BC among patients with stable angina and intermediate probability for BC.

The clinical context of the optimal diagnostic strategy, regarding the segment of patients with stable angina and suspected BC, which would later guide their treatment, is a problematic issue in the context of current circumstances, subject to a series of discussions due to the extremely important implications of this, both in terms of patient safety and clinical benefit and the related financial issues involved mainly from the perspective of healthcare providers.

One of the key pillars that underpins the need to define new diagnostic strategies based on results based on relevant cost-effectiveness analyzes is the financial dimension of the burden imposed by this clinical context. As an independent aspect, but also as a result of significant financial pressure, the result of huge costs, the correct interpretation of the cause of chest pain and therefore the accuracy of BC diagnosis is a crucial diagnostic attribute that implies extraordinary importance in the management of these patients. Hence another element, still under debate, which concerns the existing uncertainty regarding the optimal diagnostic strategy in CCS management due to the clinical variability of patients who are part of this group. From this point of view, this aspect is a second important pillar that concerns both financial aspects but especially the nature of the clinical benefit obtained by patients.

Given the above, it appears that, at present, in current clinical practice, a worrying clinical context has emerged around the optimal strategy for the diagnosis of BC among patients with stable angina pectoris and intermediate probability for BC, due to the numerous implications, both clinical and financial. Taking into account these circumstances, the current research aimed to conduct a cost-effectiveness analysis of two key strategies currently in the diagnostic strategy of CCS, coronary angiography and CCTA.

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From the perspective of the second pillar of analysis of this research, the thesis is the first cost-effectiveness analysis existing in the country, so far, which aimed to assess the cost-effectiveness and clinical efficacy for CCTA, as a defining model for the concept of high-performance imaging technique, in the worrying context created around the optimal strategy for the diagnosis of BC among patients with stable angina pectoris and intermediate probability for BC.

The results of the cost-effectiveness analysis demonstrated that for the analyzed economic context the non-invasive strategy based on CCTA proved an obvious financial profitability due to the substantial reduction of costs largely due to the outpatient nature of CCTA. The invasive ICA-based strategy has proven to be an extremely costly approach for patients with stable angina and intermediate probability for BC due to the high costs of the hospitalization period due in large part to hotel costs.

From the point of view of the financial component of the cost-effectiveness analysis, the cost of the invasive strategy proved to be superior to the CCTA strategy for all arms of the decision tree, both for the initial investigation period and for the one-year follow-up period of the study.

The main contributing element on the basis of which the CCTA-based strategy dominates the invasive strategy is the outpatient nature of the non-invasive strategy. As such, following the analysis of the costs related to the two analyzed strategies, the main determining element of the higher ICA costs was represented by the important costs resulting from the hospitalization. In addition, the analysis of micro-costing data on the invasive strategy highlighted a surprising aspect of the share of different costs for the total amount. In this sense, regardless of the procedure performed, coronary angiography or interventional revascularization, out of the total amount of hospitalization expenses, the highest share results as a result of hotel expenses, with a percentage of 74%. Therefore, the main contributor to the high costs of the invasive strategy is due not to the medical services themselves or the necessary sanitary materials but to the hotel costs.

Therefore, in the context of the simulated economic microclimate of the study, based on costs and incremental effects, CCTA proved to be an accessible and cost-effective alternative diagnostic strategy to the current standard, represented by coronary angiography, for the health budget available in the economic context of the pilot study. within our country.