complications were also higher (Figure). The multivariate analysis (adjusted for age, sex, ACS type, risk factors, previous cardiovascular disease, GRACE score, and treatment at discharge) showed an independent association between the ICR and the addition of antianginal drugs (odds ratio, 2.62; 95% confidence interval, 1.34-5.14; $P < .001$) as well as with recurrent cardiovascular complications (IRR, 1.49; 95% confidence interval, 1.10-2.01; $P = .01$).

The analysis of this cohort of patients with ACS reflects aspects of ICR that have not been widely studied to date. Coronary revascularization has become one of the pillars of ACS treatment, but ICR is a reality that generates a high-risk patient group in which medical treatment is highly relevant.[5] The patients with ICR in this series received a lower number of stents and fewer drug-eluting stents, indicating that the percutaneous revascularization was less aggressive, both quantitatively and qualitatively. Some antianginal drugs are widely used in clinical practice due to the improvement observed in quality of life,[3] despite the lack of evidence to support an improvement in prognosis. The patients with ICR in this series received more antianginal drugs at discharge, and others were added during the follow-up period. This is partly related to the treatment by the professionals involved in this phase, and may also be related to demand among patients who generally have more frequent angina, which impairs their quality of life to varying degrees.[3]

In conclusion, a significant percentage of patients with ACS undergo ICR, which is associated with an increased addition of antianginal drugs and the adjusted recurrence of cardiovascular complications during the follow-up period. The 2 priority objectives to be taken into account in the treatment of patients with ACS are maximum optimization of the degree of revascularization, and pharmacological treatment.

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Mapping the Conceptual Structure of Cardiovascular Research: An Analysis Based on *Revista Española de Cardiología*

Mapas de la estructura conceptual del campo de investigación cardiovascular: un análisis basado en Revista Española de Cardiología

To the Editor,

Database unit processing is used in bibliometric studies to visualize scientific activity in a given knowledge domain via scientific or bibliometric maps. These maps are constructed from the analysis of co-occurrence relations, ie, relationships between 2 co-occurring units of analysis.[1] Bibliometric indicators of relatedness have been used to build bibliometric networks based on cocitation analysis (to measure intellectual structure) coauthorship analysis (to measure social structure), and coword analysis (to measure knowledge or conceptual structure). The conceptual structure of the field of cardiovascular research has been previously analyzed using predictors of knowledge domains.[2]

To visualize the conceptual structure and development over time of cardiovascular research in Spain, we analyzed articles published in *Revista Española de Cardiología* between 1997 and 2006 and 2007 and 2016. The articles were extracted from Science Citation Index Expanded, a scientific and medical index that is available through the Web of Science platform.[3] In total, 2197 documents were retrieved. From these, we selected 202 keywords with a frequency of occurrence of 7 or more: 111 from the period 1997 to 2006 and 94 from the period 2007 to 2016. The method employed consisted of the following stages[4]: selection of keywords used by the authors of the articles, calculation of keyword co-occurrence frequency, clustering analysis, and visualization of results in density or heat maps. The maps were constructed using the VOSviewer software tool.[5] In bibliometric density maps, areas with the highest density of co-occurrence relations between keywords are shown by a color close to red, while those with a lower density are shown by a color closer to yellow or green.

The conceptual structure of cardiovascular research between 1997 and 2006 is reflected in the bibliometric map shown in Figure 1. The keywords with the highest impact were related to 3 knowledge domains: cardiomyopathies/ischemic heart disease, heart disease/heart failure and echocardiography, and interventional cardiology. The domains related to the keywords with the lowest impact were electrophysiology/arrhythmias and epidemiology/risk factors and preventive cardiology. There were 2 very dense areas in the center of the map: *a*) an area related to the knowledge domain of cardiomyopathies (labeled with the keywords *myocardial infarction*, *prognosis*, and *unstable angina*), which was closely connected to the domain of interventional cardiology (labeled with *coronary angioplasty*, *stent*, and *restenosis*) and *b*) an area related to the domains of heart disease/heart failure and echocardiography (labeled with the keywords *heart failure*, *echocardiography*, and *surgery*).

The bibliometric map corresponding to the second period, 2007 to 2016, is shown in Figure 2. The knowledge domains with the highest keyword impact were heart disease/heart failure and echocardiography, cardiomyopathies/ischemic heart disease, and epidemiology/risk factors and preventive cardiology. The domains

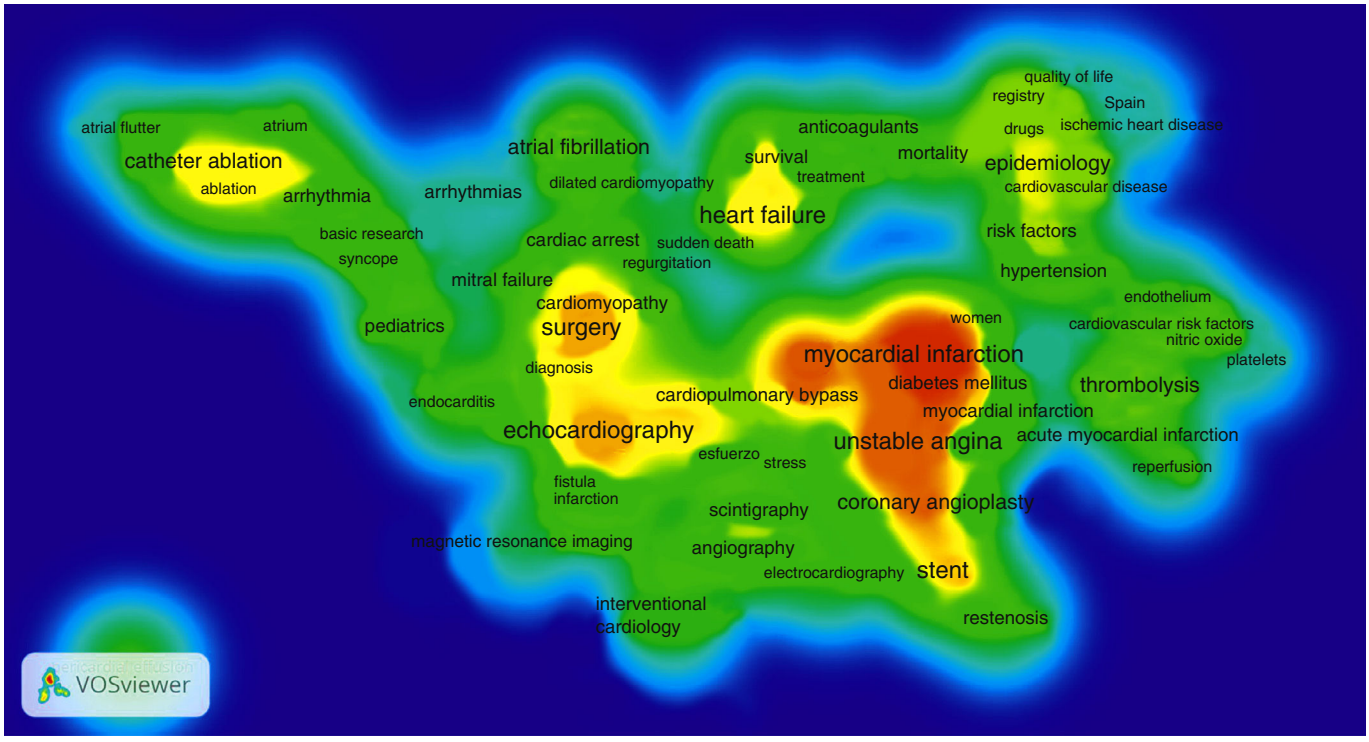

Figure 1. Density map (1997-2006). The areas showing keywords with the strongest connections are shown in colors close to red, while those containing keywords with weaker connections are shown in colors close to green.

with the lowest keyword impact were electrophysiology/arrhythmias and interventional cardiology. Again, there were 2 high-density areas in the map containing the predominant keywords used during this period. The first contained 2 central areas: one related to heart failure (labeled with the keywords *heart failure* and *prognosis*) and another related to cardiomyopathies (labeled with *myocardial infarction* and *acute coronary syndrome*). The second high-density area contained interconnected keywords associated

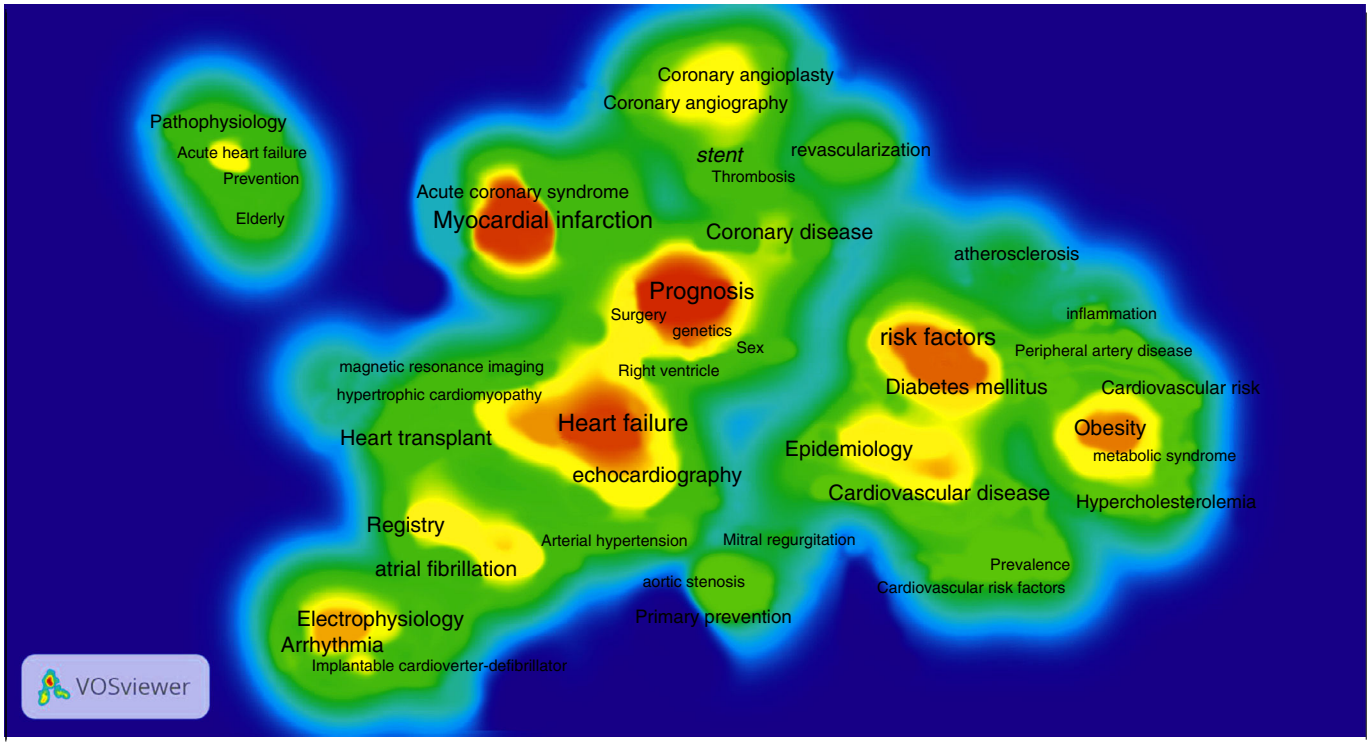

Figure 2. Density map (2007-2016). The areas showing keywords with the strongest connections are shown in colors close to red, while those containing keywords with weaker connections are shown in colors close to green.

with cardiovascular risk factors, namely, *risk factors*, *diabetes mellitus*, *epidemiology*, *cardiovascular disease*, *obesity*, *cardiovascular risk*, and *metabolic syndrome*.

Three distinct blocks reflecting changes in the field of cardiovascular research between the periods 1997 to 2006 and 2007 to 2016 were observed. The first was a block showing a trend toward consolidation featuring keywords indicative of a relatively stable connection between the 2 periods, such as *acute myocardial infarction, heart failure, coronary disease, and acute coronary syndrome: echocardiography*, *electrophysiology*, *arrhythmias*, and *atrial fibrillation*. These terms were related to the knowledge domains of cardiomyopathies/ischemic heart disease, heart disease/heart failure and echocardiography, and electrophysiology/arrhythmias. The second block showed a decreasing trend for the domain of interventional cardiology, which, based on the keywords used by authors, was more prominent between 1997 and 2006. The third block showed a greater impact for the domain of epidemiology/risk factors and preventive cardiology in the second period. One of the most significant findings shown by the map was the increase in the frequency of occurrence and interconnections between keywords associated with cardiovascular risk factors, such as *diabetes mellitus*, *obesity*, and *metabolic syndrome*. This rise in frequency provides evidence that epidemiology/risk factors and preventive cardiology is an emerging knowledge domain in the field of cardiovascular research.

The main limitation of this study is that our results are based on data from a single journal, *Revista Española de Cardiología*. Nonetheless, we believe that the large number of articles analyzed provides a sufficiently representative picture of the field of cardiovascular research in Spain.

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Selection of the Best of 2017 on Percutaneous Treatment of Chronic Occlusions

Selección de lo mejor del año 2017 en el tratamiento percutáneo de la oclusión crónica

To the Editor,

Chronic occlusion is currently the most complex setting for percutaneous treatment of coronary lesions. Until recently, this type of intervention had a success rate of about 50% to 60%, and the main limiting step was the crossing of the coronary guidewire to the distal true lumen. Despite these poor results, the international interventional cardiologist community was not discouraged and continued to perform new procedures while incorporating new techniques and new materials[1]; the current success rates in specialized units are about 85% to 90%. Notably, during the 30-year history of this type of procedure,[2] no randomized study has compared its outcomes with those of medical therapy. However, 3 such articles have been published in the last year: EXPLORE,[3] DECISION-CTO (NCT01078051), and EURO CTO (NCT01760083). Each of these studies has completely different inclusion criteria, primary endpoints, and results (Table). Crucially, none found a significant reduction in "hard" endpoints such as cardiac mortality, which is why these results have caused some pessimism in the international scientific community about the use of percutaneous revascularization in patients with chronic occlusions. However, before changing our clinical practice, we need to discuss some general and specific aspects that may have influenced the results of these studies. First, there are 3 situations of interest: *a)* the procedural success rate is variable (73%-91%) and lower than that of other types of coronary revascularizations and, of course, if it is low, it greatly penalizes the intervention group; *b)* the number of patients that cross from one group to another, if high, affects the validity of the comparison; and *c)* a long inclusion period in high-volume centers means that many patients eligible for the study have not been included. Therefore, the findings cannot be generalized and are applicable only to a selected group of patients who are often the least symptomatic.

The EXPLORE study[3] randomized 304 patients with AMI treated with primary angioplasty and with chronic occlusion of a vessel in a second stage to medical therapy or percutaneous revascularization of the chronic occlusion. The primary endpoint was an improvement in ejection fraction and ventricular volumes on magnetic resonance imaging at 4 months. In the general study, there were no differences in the ejection fraction between the groups (44.1% ± 12.2% versus 44.8% ± 11.9%; P = not significant). However, in the subgroup of patients with chronic occlusion of the left anterior descending artery, the differences were significant in favor of the group of patients who underwent percutaneous coronary intervention (47.2% ± 12.3% versus 40.4% ± 11.9%; $P < .02$). One of the major limitations was the low rate of primary success (73%), which was below the current standards. The main features of this study are summarized in the Table.

In the DECISION-CTO study, 834 patients with chronic occlusion were randomized to medical therapy or percutaneous intervention. The primary endpoint was the composite of death from any cause, myocardial infarction, stroke, or repeat revascularization at 3 years. Although there were no significant differences between the groups, this study also suffers from some limitations. For example, the predetermined sample size (1284 patients) was not reached due to slow inclusion (6.5 years) in high-volume centers, meaning that a methodological deficit can be added to the above limitation regarding the applicability of the results. In addition, the crossover rate from the medical therapy group was relatively high (18%).