

Special article

Update on Interventional Cardiology

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ABSTRACT

This article provides a detailed review of the most important studies on interventional cardiology reported in publications or presentations during the year 2012. With regard to coronary interventions, ST-elevation myocardial infarction is extensively addressed in studies focusing on the relevance of reducing the reperfusion time and the utility of various devices and pharmacological strategies in primary angioplasty. Multiple comparative studies involving different generations of drug-eluting stents are available and indicate a favorable progression in terms of safety and efficacy. The risk of late thrombosis with the new generations of drug-eluting stents seems to be equivalent to that observed with bare-metal stents. The clinical outcomes with these stents in the elderly, in left main coronary artery, or in multivessel disease have also been the subject of important trials. Among the studies on intracoronary diagnostic techniques, those correlating imaging and pressure-based techniques are of special interest. The percutaneous treatment of structural heart disease, particularly transcatheter aortic valve implantation, followed by mitral repair, continues to be the subject of a great number of publications. Finally, renal denervation is currently being widely discussed in the literature.

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Actualización en cardiología intervencionista

RESUMEN

En el presente artículo se hace una revisión de las publicaciones y los estudios presentados más relevantes en el ámbito de la cardiología intervencionista en el año 2012. El intervencionismo coronario en el contexto del infarto con elevación del ST ocupa un lugar destacado con estudios que confirman la importancia de reducir los tiempos de reperusión y otros que evalúan diferentes dispositivos y estrategias farmacológicas en la angioplastia primaria. Los estudios comparativos entre *stents* farmacoactivos de diferentes generaciones son múltiples e indican una progresión positiva en eficacia y especialmente en seguridad. Con las nuevas generaciones de *stents* farmacoactivos, la trombosis tardía resulta casi equivalente a la de los *stents* metálicos. Los resultados con *stents* en la lesión del tronco común o en la enfermedad multivasa también se han abordado en importantes ensayos. Entre las técnicas de diagnóstico intracoronario, destacan los estudios de correlación entre técnicas de imagen y de presión intracoronaria. El intervencionismo cardiaco estructural y concretamente el implante de válvula aórtica y la reparación mitral continúan generando muchas publicaciones, especialmente la primera. Finalmente, la denervación renal ocupa ya un lugar destacado en la literatura médica.

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Abbreviations

DES: drug-eluting stents
EES: everolimus-eluting stents
FFR: fractional flow reserve
PCI: percutaneous coronary intervention
SES: sirolimus-eluting stents

CLINICAL SITUATIONS

ST-segment Elevation Myocardial Infarction: Implementation of Primary Percutaneous Coronary Intervention

The importance of delays in reperfusion by means of primary percutaneous coronary intervention (PCI) has again been well established in a registry of 107 028 patients treated with fibrinolysis or transferred to another center for PCI.¹ It was observed that a delay of over 120 min resulting from patient transfer negated the survival benefit. The PROGALIAM group, a pioneer in Spain in the design of these network programs, demonstrated that their application has made it possible to

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increase the proportion of patients treated with primary angioplasty, while maintaining the results of this therapy.²

Stents

With respect to the devices employed in PCI, specifically the drug-eluting stents (DES), Hofma et al. have published the results of the XAMI trial, which compared everolimus-eluting stents (EES) with sirolimus-eluting stents (SES), showing that the former were not inferior to the latter and were even associated with a trend toward better outcomes.³

The Spanish ESTROFA-MI registry compared EES and paclitaxel-eluting stents in 734 patients. The investigators observed a lower incidence of thrombosis and myocardial infarction and a strong trend toward a reduced need for revascularization with EES.⁴

Other devices used in this context are the paclitaxel-eluting balloons. In the DEB-AMI trial, a randomized study, the use of these balloons together with bare-metal stents (BMS) was associated with a higher rate of restenosis than that observed with DES and an incidence similar to that resulting from the use of BMS alone.⁵

Vascular Access

Vascular access was evaluated in the RIFLE study, a large trial in which 1001 patients with acute coronary syndrome were randomized to radial or femoral access.⁶ The use of the radial approach was associated with a lower 30-day incidence of adverse events (13.6% vs 21%; $P=.003$).

Multivessel Disease

The optimal approach in patients with acute myocardial infarction and multivessel disease was the subject of an extensive meta-analysis. The results demonstrated that multivessel revascularization performed during the primary PCI procedure had adverse effects and that, in contrast, deferred intervention in the nonculprit vessel lesions produced favorable outcomes.⁷

Support in Primary Percutaneous Coronary Interventions

With respect to concomitant drug therapy, the AIDA STEMI trial, involving 2065 patients, did not demonstrate that intracoronary versus intravenous abciximab reduced the primary endpoint of death, myocardial infarction, and heart failure at 90 days (7% vs 7.6%), but intracoronary administration was associated with a lower incidence of heart failure (2.4% vs 4.1%; $P=.04$); thus, given that it is a safe approach, its use can be recommended.⁸

Thrombectomy devices and the intracoronary administration of abciximab with the ClearWay[®] site-specific microcatheter were the topics of a randomized factorial trial (INFUSE AMI), in which the primary endpoint was the size of the myocardial infarction after 30 days, measured by magnetic resonance imaging.⁹ No benefit was observed with thrombectomy, but there was an evident benefit with intracoronary abciximab (an absolute reduction of 2.8%), especially when combined with thrombectomy.

Acute Coronary Syndrome Without ST Segment Elevation

With respect to antiplatelet therapy, a study of 302 patients who received a loading dose of prasugrel found that a fourth of

them had suboptimal platelet inhibition 6 h to 12 h later, a circumstance that was related to an increase in clinical events.¹⁰

A substudy of the PLATO trial with ticagrelor showed that the benefit in the patients enrolled in North America was inferior to that observed in the rest of the world, a difference that could be explained, at least in part, by the fact that the North American patients received higher doses of acetylsalicylic acid, which reduced the positive impact of the drug.¹¹

With regard to anticoagulants, in the ATLAS trial involving more than 15 000 patients with acute coronary syndrome, the dose of rivaroxaban of 2.5 mg twice daily reduced the 13-month mortality with respect to placebo and the 5-mg dose, but there was a significant increase in major bleeding and intracranial hemorrhages, with no increase in fatal hemorrhages.¹² A study with apixaban was interrupted prematurely due to a significant increase in bleeding, with no benefit in terms of ischemic events.¹³

Elderly Patients

The performance of PCI in acute coronary syndrome without ST-segment elevation in octogenarian patients was the subject of a study carried out by a Spanish group that observed clinical benefits in its application.¹⁴ The majority of the patients had a high-risk profile and, after propensity score matching, revascularization was found to be associated with reductions in the composite of death, myocardial infarction, and major adverse cardiac events.

Diabetic Patients

Surgery was compared with DES in a Korean registry of 891 diabetic patients with multivessel disease who were followed for 5 years. After statistical adjustments, no significant differences were observed between the 2 approaches in terms of death, myocardial infarction, or stroke, but revascularization was performed more frequently with DES.¹⁵

TYPES OF CORONARY LESIONS

Left Main Coronary Artery

The results of a second phase of the PRECOMBAT trial, which compared surgery with SES, have been published. In the PRECOMBAT-2 trial, these 2 groups were compared with a group treated with EES. The patients who received the EES had an overall rate of events at 18 months comparable to those recorded for SES and surgery.¹⁶ The need for revascularization was less frequent with surgery and was similar with both DES. A large international registry (DELTA), with 2775 patients, compared surgery and DES and, after 3 years of follow-up, found differences only in the need for repeat revascularization, which was less frequent following surgery.¹⁷

The results of 2 Spanish multicenter studies were also reported. In the first, the authors studied 226 patients who were not candidates for surgery.¹⁸ There was a high incidence of events during follow-up; the adverse predictors were female sex, ventricular dysfunction, and the use of BMS. The other study was the ESTROFA-LM registry,¹⁹ which compared PES with EES in 770 patients. No clinically significant differences were found between the stents, even after propensity score matching. The use of 2 stents in distal lesions proved to be an adverse predictor.

Finally, a meta-analysis of 4 available trials revealed no differences between DES and surgery in terms of total events at 1 year (14.5% vs 11.8%; $P=.1$), although the need for revascularization was less frequent with surgery and the incidence of stroke was

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