Since its implementation, coronary angiography has been the reference test for the diagnosis of coronary disease. Despite the development of several methods for morphological and functional assessment of coronary lesions, angiographic evaluation, whether visual or through programs for digital measurement, is the method used in the majority of procedures undertaken in clinical practice. In most studies, measurement of the angiographic image is considered sufficient to safely determine the significance of a coronary lesion, to orient coronary interventions, to assess the immediate results of a procedure, and to perform follow-up studies.

Although it has an unquestionable, well-recognized value, angiography presents a series of limitations that are a consequence of its inherent characteristics. Among these is the fact that it provides a 2-dimensional view of the vessel lumen, although, an attempt is made to simulate a 3-dimensional study by acquiring several views. The limitations of angiography may even impede correct decision-making in specific situations. The presence of branching vessels, diffuse arteriosclerotic involvement or angles, and location of the lesion in the ostium or bifurcation may make proper lesion assessment impossible. Because of remodeling phenomena, stenosis may be detectable by angiography only when it exceeds 40% to 50% of the total area of the artery, and may go unnoticed in the earliest stages of the disease. In addition, angiography offers little information on the composition of the atheromatous plaque and has little sensitivity for the detection of calcium. Angiographic quantification of the degree of stenosis of a lesion, based on ratios established using reference segments considered to be healthy according to the coronary angiography, can sometimes be erroneous. In cases of diffuse involvement, the reference segments may be considerably diseased and this fact may not be evident on angiography; hence, the grade of stenosis might be underestimated. Despite the use of automatic measurement methods, the intraobserver and interobserver correlations with this technique remain low, particularly in situations of poor visualization, moderate lesions, in-stent restenosis, or presence of calcium.

Technological developments over the years in catheterization laboratories have provided tools that complement and improve the quality of the information offered by angiography. Although other diagnostic techniques are available and currently in use, only intracoronary pressure measurement with a pressure monitoring guidewire and intracoronary ultrasound are in clinical use for coronary interventions. According to data from the Registro de Actividad de la Sección de Hemodinámica y Cardiología Intervencionista (Activity Registry of the Catheterization and Interventional Cardiology Section) of the Sociedad Española de Cardiología (Spanish Society of Cardiology), in 2005, 2871 intracoronary ultrasound examinations and 1138 intracoronary pressure measurements were performed among a total of 103 646 coronary angiographies and 51 689 angioplasties. Thus, 2.8% and 5.6% of intracoronary ultrasound studies and 1.1% and 2.2% of pressure guidewire studies were performed over the total of coronary angiographies and angioplasties carried out in that year. Considering that a varying percentage of intracoronary ultrasound use (>50% at some centers) is prompted by research protocols, the use of these ancillary diagnostic techniques is very low, despite the aforementioned limitations of angiography.

Based on the results observed in the CASS 8 (Coronary Artery Surgery Study), patients with more than 50% angiographic stenosis of the left main coronary artery (LMCA) have traditionally been considered to have greater survival with revascularization than with pharmacological treatment alone. Since then, more than 50% stenosis of the LMCA diameter on angiography has been considered the cut-off for significant disease in this location. In clinical practice there are usually no doubts as to the importance of stenosis observed in the LMCA; nevertheless, situations in which it is difficult to determine the contribution of stenosis to the patient’s clinical status...
are not uncommon. In up to 19% of cases in the CASS study, a second observer did not detect significant stenosis in patients considered to have >50% by the first observer. A number of circumstances can invalidate angiography for treatment decisions, such as moderate stenoses at a range of 35% to 50% in situations of diffuse atheromatosis over the entire LMCA, which reclassifies availability of a suitable reference segment to perform the measurements. cvt locations in which the angiographic image depends on the position of the catheter, eccentric plaques, particularly those that are strongly calcified, and distal locations in the bifurcation of the left anterior descending and circumflex arteries, with overlapping of these branches.

In LMCA lesions of uncertain significance, a fractional flow reserve >0.75 obtained with an intracoronary pressure guidewire has been associated with an excellent prognosis at 3 and 4 years (100% survival). Measurement of the minimal lumen area by intracoronary ultrasound (minimal lumen area <6 mm²) to decide treatment for angiographically moderate LMCA lesions. Based on the intracoronary ultrasound findings, the authors reported a rate of events in nonvascularized patients similar to, or lower than, that observed in revascularized cases, and keeping with the prognosis of patients with chronic ischemic heart disease. Among 31 patients in this study with a minimal lumen area on intracoronary ultrasound indicating significant disease (<6 mm²), angiography had underestimated the importance of the lesion in 18 patients (59%) with angiographic stenosis <50%. Although it is not specified in the study, the most frequent causes of this discrepancy are usually poor visualization or unrecognized disease in the segment considered as the reference.

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operator lacks sufficient training, and the ease with which uncertain lesions can be treated are some of the reasons cited to justify their limited use.²⁰

Among the 117 public hospitals with a catheterization laboratory in Spain in 2005, only 50% performed intracoronary pressure measurements or intracoronary ultrasound in that year (58 and 59 hospitals, respectively). Studies such as the one by de la Torre et al support the use of these techniques (perhaps in a small number of cases) because they can be essential to establish a precise diagnosis. In the case of LMCA lesions, for which the therapeutic options may be surgical revascularization or medical follow-up depending on the coronary angiography findings, a diagnosis of moderate or intermediate lesion does not resolve the patient’s clinical situation. Although it is possible to carry out non-invasive tests following an ambiguous coronary angiography, the patient and physician requesting catheterization generally expect the technique to yield conclusive information for the diagnosis because of its invasive nature. In these cases, the data presented by studies such as the one published in the current issue of Revista Española de Cardiología and future studies in this line can be an aid to effectively diagnosing these patients in the catheterization laboratory and provide the information needed to make appropriate therapeutic decisions.

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796 Rev Esp Cardiol. 2007;60(8):794-6