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EDITORIAL

Lessons learned by atherosclerotic plaques at necropsy

Lecciones aprendidas mediante el estudio de las placas ateroscleróticas durante las necropsias

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Cardiovascular diseases are the primary cause of death and disability worldwide. It is estimated that, next year, seven out of every ten deaths will be due to noncommunicable diseases, with coronary heart disease being the primary cause. Clinical manifestations can be controlled through different mechanisms. The most common treatment is coronary artery bypass grafting, aimed at improving coronary flow in areas served by arteries with significant stenosis.[1] The large number of patients requiring this type of intervention, along with the high cost per patient, leads to considerable expenses for the health services of different countries. Evaluating patient risk is therefore an important aspect to be taken into account in current practice and a very useful tool for both physician and patient. Currently, there are risk models for assessing the immediate, short-to-medium and long-term results (in-hospital, at 30 days or after one year) of surgical interventions. There are also adverse event risk stratification methods (based on clinical risk or anatomical complexity) which are of great use in the decision-making process, as they provide information for predicting significant adverse events and mortality. While these models do not predict the patients' future quality of life, coronary artery bypass grafting increases patients' likelihood of living with coronary artery disease.[2]

The development of atherosclerotic lesions is a complex process that can begin in childhood and continue progressively for decades. In the early stages, lipids accumulate in the tunica intima of the blood vessels where they infiltrate the smooth muscle cells, proliferate and deposit extracellular matrix, leading to a gradual loss of the concentric structure of three layers of healthy vessel. In the tunic intima, the smooth muscle cells can be infiltrated through the recruitment of circulating precursor cells or migration from the tunica media of the vessel wall. This thickened tunica intima will recruit macrophages and lymphocytes, becoming a site of inflammation and acquired immune response. The continuous flow of cholesterol-rich lipoproteins at the site of the developing lesion exacerbates innate immunity, cell migration and inflammation. Over time, plaque forms that can invade the vessel lumen, which inhibits blood flow and causes pain, angina or a myocardial infarction in the case of coronary artery thrombosis. In some people, atherosclerotic plaques show increased macrophages and calcification, as well as reduced extracellular matrix, making them unstable. These unstable plaques are prone to rupture, leading to the formation of thrombi and the obstruction of the affected vessel. If the vessel lumen is not quickly redirected (either through a primary percutaneous coronary intervention or naturally), a fatal infarction can occur.[3] Currently, atherosclerosis is a global

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health problem and despite considerable financial resources allocated for research into the subject, more needs to be done to characterise and strengthen knowledge on the condition.

In the current issue of *Clínica e Investigación en Arteriosclerosis* Dr Fleites Medina et al.[4] have published an article with the objective of characterising atherosclerotic lesions in the coronary arteries of deceased patients after coronary artery bypass graft surgery in order to establish a relationship with clinical variables. The variables studied were atherogenic risk factors, including hyperlipidaemia, diabetes mellitus, obesity, hypertension and smoking, with the latter being the most common risk factor detected (66.7%). The cause of death (basic and direct), grade (fatty streak, fibrous plaque or severe plaque) and obstruction (mild, moderate or severe) of the atherosclerotic lesion were also taken into account, as well as whether this was located in the portion proximal or distal to the graft insertion site. The above variables were used to characterise 149 atherosclerotic lesions from 21 deceased patients after coronary artery bypass grafting. As expected, due to the fact that only deceased patients were studied, severe atherosclerotic plaques (77.8%), those in the arterial segment prior to the graft (90.5%) and those in males (87.9%) predominated. The other atherogenic risk factors were not significant, most probably due to the small sample size. For the same reason, no statistical significance was detected between severe plaques and the left anterior descending artery (unlike[5,6]), although the authors did find this to be the artery most affected by atherosclerosis. The distribution of the 149 atherosclerotic plaques shows that most of the severe plaques were found in the proximal region, predominantly in the left anterior descending artery. Likewise, the presence of thrombi was observed, which led to obstructions in 11.2% of the sample. Finally, the authors highlight that calcification and neovascularisation were the most commonly observed complications in the most severe plaques. Hospital necropsies are useful clinico-diagnostic confrontation tools which have been progressively declining over the past 30 years.[7] Only in countries such as Austria, Belgium and Cuba are they still practised routinely, while usage in the rest of the world has decreased from 60% to 10% at present.[8] This is mostly due to the existence of more modern diagnostic techniques, as well as the reluctance of family members. However, the information obtained from clinical necropsies in mortality analyses after coronary artery bypass grafting is of unquestionable use, since it allows atherosclerosis severity to be related to clinical variables. Consequently, although treatments and the different surgical interventions to stop or slow down the atherosclerotic process are improving, the ''final consultation'', i.e. the valuable information provided at necropsy, must always be taken into account.

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