

Cardiac Surgery in the Cancer Patient

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The goal of cardiac surgery is to prolong survival and improve the patient's quality of life. These 2 objectives—longer and better life—run parallel in most cases. There are times, however, when they are clearly dissociated. For example, the indication for valve replacement in a case of chronic aortic regurgitation with left ventricular dysfunction is universally accepted, even though the patient may be asymptomatic.¹⁻³ In this case, the goal is exclusively to prolong the life of a person threatened by progressive and ultimately irreversible ventricular injury. The opposite situation is much less common, since the life expectancy of patients with severe symptoms is often short. Even so, let us imagine an elderly woman with severe, highly calcified mitral stenosis that is not amenable to percutaneous treatment. The patient wants to undergo surgery because she cannot take a step without suffocating. It is certainly true that valve replacement would contribute to lengthening the life of this person, but we would be happy even with something simpler and more immediate: watching the patient walk out of the hospital on her own with no sign of dyspnea.

An essential condition to attain either of these 2 objectives is that the patient survive the operation. The risk of operative death can be estimated by applying the euroSCORE⁴ adjusted for operative mortality at the hospital where our patient is to undergo surgery. It is necessary to know the observed mortality rate in clinical practice and compare it with the expected rate in each of the risk categories established. Readers who are not familiar with the estimation of operative risk can practice with the system's calculator (available at: <http://www.euroscore.org/calc.html>), trying different variables and combinations to see what impact they have on the expected mortality. Two of these variables (advanced age and renal failure) are very common in daily practice. However,

many others may be present (eg, chronic obstructive pulmonary disease, active endocarditis, and pulmonary artery hypertension), thereby increasing the conditional risk of the operation. We highlight the word conditional because, obviously, all this effort will not help to detect an unexpected individual evolution. The value of the euroSCORE lies in the objective approximation it gives patients and their family as to the scope of the operation they will undergo, and in the periodic scrutiny of the surgical team's mortality rate, with the aim to correct any deviations from the standard.

Once patients have recovered from the intervention, it is hoped that their life span will be comparable to that of the age- and sex-matched population without known heart disease. Nonetheless, several factors can hinder fulfillment of this expectation. For example, irreversible left ventricular dysfunction in valve disease or ischemic heart disease; residual pulmonary artery hypertension in congenital heart disease operated when obstructive pulmonary disease was already established; similar pathology in old, inappropriately treated mitral valve disease; thrombosed or infected prostheses; coronary bypasses, such as those performed with the saphenous vein, that do not resist the passage of time; and a long etcetera (arrhythmias of varying severity, right ventricular dysfunction, and complications of chronic anticoagulant treatment) which, in any case, do not cast a shadow on the epic accomplishments of cardiovascular surgery. The writer has lived at a time when no such surgery existed and when rheumatic valve disease cruelly affected young people; therefore, it takes no effort to appreciate the extraordinary advance this surgery implies for our patients. As occurs with all medical advances, the story transpired with highs and lows, but the results achieved in those early times were unimaginable even for the most optimistic. We owe a tribute of admiration to all the pioneers who made these invaluable advances possible (including, of course, the patients) for their effort, dedication, and inventiveness.

In clinical practice we find patients who require surgery, but are affected with, or have had, cancer or hematological disease. Several questions arise when faced with this problem. Will the operative risk be greater because the patient has cancer? Will the neoplastic disease allow sufficiently lengthy survival for the patient to enjoy the outcome of the operation? If the cancer has been diagnosed

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recently, is it better to first operate on the heart or wait until the tumor has been treated? Might there be some type of complication with the use of antithrombotic treatment? Will the systemic inflammatory response that frequently occurs after surgery worsen the course of the cancer?

There is no body of knowledge that provides the answers to these questions and that is why we are grateful for articles such as the one appearing in this issue of *Revista Española de Cardiología*,⁵ which address this issue. In the study referred to, a retrospective comparison is made of 2 groups of patients with cancer—one with an active process (n=33) and the other in remission (n=56)—with a third group of patients without neoplastic disease (n=165). The 89 patients with cancer account for only 4.2% of patients undergoing surgery during a certain period, a fact that points to the rarity of these circumstances. Nonetheless, it is easy to infer the negative bias that must exist when indicating any type of cardiac surgery in patients with cancer. It is surely time to review the conservative approach to this situation, among other reasons because the high survival currently achieved in many types of malignant tumors will result in an increase in the incidence of this clinical duality in the future.

In the series under discussion,⁵ the percentage of coronary surgery is lower (17%) than the levels seen in the authors' usual practice (34%). It is not hard to imagine that the growing trend toward revascularization by percutaneous interventional coronary procedures⁶ is enhanced when the patient has cancer. Nevertheless, we should underscore certain serious drawbacks that must be faced when choosing a percutaneous intervention for revascularization, particularly when drug-eluting stents are used in the procedure. These devices are known to carry a high risk of thrombosis, when, because of the surgery or other circumstances, early discontinuation of dual antiplatelet therapy is needed.^{7,8} One alternative to avert discontinuation of clopidogrel is to delay surgery; however, many types of cancer will not allow a delay of several months. That is why some authors prefer surgery, particularly procedures performed without on-pump circulation,⁹ since this approach can induce a weaker systemic inflammatory reaction than conventional surgery. It is believed that this will provide benefits for the patient, since a disproportionate inflammatory reaction can disturb immune system function and worsen the course of the cancer. In the case of lung cancer, an added value of surgery as the initial treatment method is that most lung tumors can be resected through a medial sternotomy. Thus, both problems can be resolved in a single surgical session.⁹

By its nature, the study that has prompted these comments cannot provide an answer to most of these questions. But it does offer 2 clear answers, one favorable and the other, merely fair. The first informs us that hospital mortality is similar in all 3 groups; that is, operative risk does not increase in patients with cancer, even when the

tumor is active. In fact, none of the factors investigated were predictive of death with the exception of kidney failure, a classic factor associated with increased morbidity. The second piece of relevant information is that survival at short term (median around, 2.5 years) is compromised by cancer, particularly in the group with active disease at the time of surgery. To have an idea, during the study period, 12 patients died due to neoplastic disease, 16 recurrences were detected, and 2 new neoplasms were diagnosed; that is, a third of the patients with cancer had died or were still battling the disease.

One factor related to death during follow-up of the cancer population was preoperative left ventricular dysfunction. Could the presence of ventricular dysfunction have anything to do with prior chemotherapy? Nothing tells us so, but now may be the appropriate time to remember that clinical cardiologists should place more attention on the prevention, detection, and treatment of this disease.¹⁰⁻¹² Another treatment-derived complication, in this case resulting from the application of intense radiation therapy to the chest, is the so-called "radiation-induced heart disease," a type of pancarditis that increases perioperative morbidity and decreases short- and long-term survival.¹³

The indications for cardiac surgery, particularly in patients with valvular disease, are based on the classic knowledge of the natural history of these diseases. In contrast to most current therapeutic decisions, they are not formulated according to the results of randomized clinical trials. Perhaps for this reason, a great deal of refinement and debate is needed to choose the most appropriate therapy for the patient's needs. If this is the typical situation, how will it be when the patient has a tumor or malignant hematological disease?

In the midst of this quandary, the first thing to do is seek the guidance of an expert in oncology who will inform us of the patient's prognosis. If the prognosis is precarious, it would be wrong to establish an indication aimed at prolonging the patient's life. The natural evolution of heart disease may even spare the patient from unnecessary suffering. At the other end of the spectrum is the patient diagnosed with cancer more than 2 years previously and in whom there has been no evidence of tumor recurrence. Between these 2 extremes there can be every imaginable circumstance. In my ignorance of the subject, I assume that in many cases it would be difficult to establish a definite prognosis that would be a clear guide over the bumpy road of surgical indications.

Studies on the molecular origins of cancer have reported the considerable biological heterogeneity of the disease in humans. A large part of the variation in the outcome of treatment directly arises from the heterogeneity of tumor biology, which dictates the probability, and speed of dissemination of the tumor, as well as its sensitivity to treatment.¹⁴ The current development of a technology known as "lab-on-a-chip" is aimed at biological characterization of tumors, based on the capability to

perform hundreds of biochemical, cellular, and genetic determinations in a simple sample of blood or any other body fluid.¹⁵ This technology will impart fast, versatile information on the biology, prognosis, and adequate treatment of the tumor. This approach will allow the oncologist to provide precise information, with which we can reliably design the most appropriate cardiovascular treatment for the patient's condition. In the meantime, the only thing we can be certain of, thanks to the article that prompted this editorial, is that cancer patients can undergo cardiac surgery with a risk of operative mortality similar to that of other patients.

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