Hybrid cardiac procedure: the ultimate cooperation

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In medical terms, a hybrid therapy or procedure is a mixture of therapies from different subspecialties. By these definitions, a hybrid cardiac procedure is a combination of surgical and catheter-based intervention to the heart. Hybrid coronary artery revascularisation is a combination of surgical and catheter-based intervention to the diseased coronary arteries.

In the daily practice of both cardiologists and cardiac surgeons, the hybrid procedure can resolve certain cardiac and revascularisation problems in patients. The hybrid procedure can be divided into 'planned' and 'unplanned' procedures.

A 'planned' hybrid procedure is a treatment of the patient discussed in a heart team and is a combined approach by the interventional cardiologist and the cardiac surgeon. The goal is to make the overall treatment of the patient more feasible and to reduce the risk.

Examples are:

- Revascularisation with a left internal mammary artery (LIMA) to the left anterior descending artery (LAD) by a small anterolateral thoracotomy and a percutaneous coronary intervention (PCI) for a circumflex artery (CX) and/or right coronary artery (RCA) stenosis. This treatment can be done in both a primary and redo operation.
- Primary operation LIMA LAD and a vein graft to CX and RCA. After many years, the patient suffers from aortic stenosis with a patent LIMA and a diseased vein graft. Reoperation is only planned for an aortic valve replacement (AVR) and PCI on native CX. Also, performing surgical revascular-

isation on CX gives a potential extra risk to the patent LIMA. In this particular case, percutaneous aortic valve replacement and PCI of the coronary vessel is another option or the hybrid approach with transapical aortic valve replacement and PCI.

An 'unplanned' hybrid procedure is a treatment for either a planned PCI or a planned cardiac procedure, but with an unexpected outcome and therefore the patient is treated with an additional therapy of cardiac surgery or PCI.

Examples are:

- The patient presents with an inferior infarction and is scheduled for a primary PCI. During catheterisation, a left main (LM) stenosis is also diagnosed. Primary PCI is performed on the RCA and during the same recovery, advanced treatment with CABG for LM stenosis is carried out.
- Failure of grafts in the direct postoperative period after a CABG operation is treated with PCI on the failed graft itself or on the native vessel where the graft was anastomosed.¹
- During CABG one of the target vessels is not found or is too small but represents an important ischaemic area with a severe proximal stenosis in the main vessel. In these cases an additional PCI of the native coronary vessel is performed.

In the early period of beating-heart surgery, when it was still difficult to revascularise the posterior part of the heart, more hybrid revascularisations were carried out. Another reason for this is the expected results of drug-eluting stents (DES). There was and is nothing better than a LIMA to the LAD² and the DES should beat the vein graft in other territories of the heart.³ Nowadays, with the modern tools and the experience of the surgeons in performing off-pump revascularisation, it is possible to reach all territories of the heart, even with arterial grafts.⁴⁻⁶ In our daily practice we are doing less hybrid coronary interventions and more and more complete total arterial off-pump CABG operations for three-vessel disease. Numbers of distal anastomoses vary from three to six, even in patients

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with impaired left ventricular function. In elderly patients we try to avoid clamping the aorta (no-touch technique). The overall mortality in the group of only coronary interventions is less than 1% (with an expected EuroSCORE of 4.8%).

The number of 'unplanned' hybrid procedures in this group is also extremely low.

In our strategy to reduce the risk for the patient, we discuss different hybrid cardiac approaches in the heart team, but these strategies are now more based on a different pathology of the valve and coronary-related disease, often combined with a history of previous heart surgery, and especially in elderly patients.

In the article by Peels et al. it is not very clear in which of the subgroups of planned or unplanned hybrid approaches the different procedures are carried out. This is not really important. The message of the article is that cardiologists and cardiac surgeons are complementary in the treatment of patients with cardiac disease.⁷ A good relation between both groups is the basis of success in patient outcome and satisfaction. ■

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