KALIOS, THE FIRST ADJUSTABLE MITRAL VALVE REPAIR DEVICE

Problem – Challenge

Mitral valve regurgitation is a progressive disease that prevents valve leaflets from closing properly. Over time, this leakage leads to heart failure.

Mitral regurgitation or mitral insufficiency affects 8% of people aged over 65. The existing effective treatment consists in reshaping the valve annulus by implanting a Carpentier ring. This requires the surgeon to choose the ring size that best fits the valve. However, since this open-heart surgical procedure is performed under cardiopulmonary bypass, which is not a physiological condition, it is impossible to assess the quality of the mitral repair before the heart beats again. As a consequence, up to 30% of patients leave the operating room with some residual mitral regurgitation and up to 20% may need either medication or a second open-heart surgery within two years.

Solution

Initially designed by Prof. Tozzi in the Cardiac Surgery Department of the CHUV, the adjustable mitral ring "Kalios" was then developed with the support of the company Affluent Medical SA. This innovative device is to be implanted in open surgery with a technique very similar to that of the classical Carpentier ring. However, unlike a conventional ring, it always remains accessible after implantation so that adjustment of the ring shape can be performed. This invention offers the possibility of reshaping the mitral ring multiple times to optimize valve repair using a minimally invasive percutaneous approach within months following the surgery.

Kalios is therefore aimed at improving the coaptation of mitral leaflets in order to correct residual and recurrent mitral regurgitations without further surgery. This procedure is considered a major advance in the non-invasive treatment of mitral insufficiency. Kalios was successfully implanted in five patients at the Vienna University Hospital (pilot study).