



HEART FAILURE

Prevention and treatment

FDB, A NEW ELECTRIC STIMULATION OF THE HEART THAT IS ESSENTIAL FOR THE PREVENTION OF HEART FAILURE AND FOR THERAPY OF PATIENTS WITH AN IMPLANTED PACEMAKER OR DEFIBRILLATOR

The Ethical Committee of Rome University "Sapienza" – Policlinico Umberto I Organization, expresses its favorable opinion to carry out a pilot study for clinical validation of the FDB methodology.

Heart Failure (HF): a disease suffered by over one million Italians over 50 years of age. It occurs when the heart is unable to pump blood in quantity necessary to supply oxygen to meet the body's needs.

The cardiac muscle is an electro-mechanical pump with four chambers: Right Atrium (RA), Left Atrium (LA), Right Ventricle (RV) and Left Ventricle (LV).

In patients with an implanted pacemaker (PM) or defibrillator (Def), the modalities of electric stimulation of the cardiac chambers have a determinant effect on the blood pumping capabilities.

In nature the LV contracts a few milliseconds (msec) before the RV; if the RV contracts before the LV, this event is considered an anomaly called Left Branch Block (LBB).

Patients carrying a PM or Def have two implanted electrodes, one in the RA and the second in the RV. In order to induce the cardiac contraction, the PM (or Def) delivers an electric pulse in the RA and a second electric pulse in the RV.

Obviously, by stimulating only the RV, the LV will contract later, thus inducing an LBB more or less severe according to the delay of the contraction of the LV; the longer the delay, the more important is the LBB.

The LBB, either natural or induced by electric stimulation of the RV, is one of the main causes of the HF.

After 5 years of experience at the UOS of Cardiac Electro-stimulation of the “Sapienza” University of Rome, De Bellis and colleagues have discovered that the performance of the cardiac pump greatly improves when delivering - instead of only one pulse - two electrical pulses in the RV with a well-defined sequence

- the first electrical pulse (V1) shall not absolutely induce the cardiac contraction and is in fact called pre-excitation pulse (stimulus below threshold);
- the second electrical pulse (V2), capable to induce the cardiac contraction, not only propagates much faster but also in a more physiological way as compared with the electrical stimulation of the right ventricle RV with only one pulse.

This new cardiac electro-stimulation, bi-cameral with three sequential pulses, *one pulse RA in Right Atrium, one pulse V1 in Right Ventricle and another pulse V2 also in Right Ventricle (RA+V1+V2)*, has been named “FDB stimulation”.

FDB stimulation eliminates the negative hemodynamic effect of LBB and considerably increases both the stroke volume (SV) and the cardiac output (CO).

FDB stimulation is not only fundamental in preventing the HF in patients with PM or Def undergoing right cardiac electro-stimulation, but also has a therapeutic effect on said HF patients.

FDB stimulation also is an improvement with respect to the tri-cameral stimulation CRT (Cardiac Resynchronization Therapy).

At the UOS of Cardiac Electro-stimulation of the “Sapienza” Rome University, directed by Prof. Antonio Ciccaglioni, in the Cardiovascular and Respiratory Science Department headed by Prof. Francesco Fedele, a research program has been initiated, aiming to evaluate the new FDB stimulation, a procedure created by Biomedical Engineer Ferruccio De Bellis.

Preliminary results are very promising.

The research on FDB stimulation is a bona fide 100% Italian program; not only are the researchers Italian, but so is the final product, with research carried out in close collaboration between Italian university experts and private funding.

The research does not avail of any public funding nor, surprisingly (given current trends), of any foreign consultants.