EDITORIAL

Hot Bam on Cellular Cardiomyoplasty

Follow up of congestive heart failure (CHF) patients has mobilized a growing number of research teams over the past years. Medical treatment (particularly with ACE inhibitors combined to beta-blockers) as well as electrophysiological procedures (multisite pacing for atrial-biventricular resynchronization) have proven to be effective, improving the prognosis of the CHF patient. However, these treatments remain palliative and a lot of cardiovascular diseases still evolve towards the deficiency of the cardiac muscle.

Cardiac transplantation remains the only curative treatment of CHF, but has remained limited in its application secondary to shortage of donated organs, age of recipients, and other strict selection criteria. Surgical alternatives such as the dynamic cardiomyoplasty for left ventricular failure using the latissimus dorsi muscle and left ventricular geometry/remodeling interventions also remain limited in their applicability as well. Implantable cardiac assist devices are still in evolution, and xenotransplantation is in the early phase of research with no clinical applications as of yet.

Ischemic myocardial disease, the main cause of heart failure, is a major public health and economic problem. Given the aging population, heart failure is becoming a bigger clinical issue and bigger financial burden. Thus, research in heart failure is of relevant interest and importance, involving specialties as cellular and molecular biology, genetics, biophysics and biomedical engineering.

Historically, tissue regeneration techniques based in cell transplantation technology had been used for the treatment of hemopathies (chronic lymphocytic leukemia, aplastic anaemia, immunodeficiencies, myeloma), in ophthalmology (transplantation of limbal stem cells for corneal regeneration), and in orthopedics (implantation of chondrocytes for articular defects). Current clinical investigations concern the following specialties: endocrinology (transplantation of Langerhans islets in diabetes mellitus), neurology (Hungtington and Parkinson diseases, spinal cord regeneration), hepatology (implantation of hepatocytes as a bridge to liver transplantation), myology (transplantation of myoblasts in Duchenne dystrophy), and in dermatology (implantation of cultured keratinocytes in burned patients).

The prevalence of severe heart failure and the clear clinical limitations of conventional interventions have encouraged the development of new methods based on the regeneration of the pool of myocardial contractile cells. This approach is supported by recent advances in cellular and molecular biology. New technologies for cell implantation, derived from interventional cardiology procedures, are emerging. Intracoronary and endoventricular catheter-based cell delivery for therapeutic angiogenesis and myogenesis have been performed.

The encouraging results of experimental studies have opened the way to the clinical application of cellular cardiomyoplasty in patients with akinetic and non-viable post-infarction scar and low ejection fraction. Cultured autologous cells do not raise immunological, ethical, tumorogenesis or donor availability problems. Thus, the development of cell therapy for heart failure is progressing according to a rigorous scientific methodology, from observation to experimentation to a careful evaluation of preliminary clinical results.

In this special BAM issue the research and development of cellular therapy for myocardial regeneration is presented. Preliminary results are carefully analyzed.

Most of the authors contributing with articles for this issue are the pioneers of cardiac bioassist procedures (latissimus dorsi and cellular cardiomyoplasty, dynamic aortomyoplasty, skeletal muscle ventricles).

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