

Letters to the Editor

Letter to the Editor

Stem cell therapy for myocardial regeneration: creating hype ignoring reality

Pankaj Kumar Mishra*

Department of Cardiothoracic Surgery, Glasgow Royal Infirmary, 16 Alexandra Parade, Glasgow G31 2ER, UK

Received 12 August 2005; accepted 31 August 2005
Available online 19 October 2005

Keywords: Stem cells; Myocardial; Regeneration; Hype

I read with interest the recent article in *European Journal of Cardio-Thoracic Surgery* by Siepe and colleagues [1] where they have reviewed the work done in the field of stem cell research for myocardial regeneration. It is an excellent review paper. I would like to add a few points which unfortunately have not been addressed in this article.

Despite significant advances in medical and surgical management of heart failure, the mortality and morbidity associated with it continues to be high. Cardiomyocyte apoptosis (programmed cell death) has been implicated in the development of end-stage heart failure [2]. Myocardial regeneration will be the ideal treatment for these failing hearts. It explains the hype created around cellular therapy, more appropriately called 'Cellular Cardiomyoplasty' by many investigators. In fact, while this issue is getting debated, some centres in South East Asian countries have started charging fees from patients for treatment with coronary artery bypass grafting and stem cell therapy as single procedure. It means not only are we stretching things too far but also the fact that it constitutes unethical practice.

The evidence in support of stem cell therapy as means for myocardial regeneration is not flawless, to say the least. We do not know which cell type to inject; how to inject (delivery of cells); where to inject (centre of the scar vs periphery of scar); when to inject (immediately after myocardial infarction vs delayed injection); how much to inject (dosing) and safety, efficacy and long-term results. Recently the critical question of host immune response to implanted cells has started to receive attention from the researchers [3]. Recent studies on immune interactions of bone marrow mesenchymal stem cells have raised doubts over the concept of myocardial regeneration leading to functional recovery. Do they really form new functioning cardiomyocytes or is the improvement in ventricular function cytokine/chemokines mediated [4]? Very few engrafted cells express specific cardiac markers like connexin 43 and cardiac troponin I and only limited gap junctions are formed between grafted and native cells [4]. Even if they form new cardiomyocytes, the question of proper integration and communication with the host tissues remains unanswered.

This is in no way to mean that stem cell therapy has got no future. Stem cells therapy has been on the horizon for quite some time now. This particular area is progressing in mega leaps and hyper bounds. Scientific journals are coming up with promising discoveries in this field, almost every fortnight. Yet, a lot of further research is needed to clarify the cellular and molecular mechanisms involved.

Patient community is being bombarded with too much of information, sometimes quite misleading by the print and electronic media. I have personally seen front-page articles in leading newspapers of developing countries recommending benefits of stem cell therapy when combined with coronary artery bypass grafting. Till we get definitive answers to the questions raised above, I firmly believe that only distilled information should be passed to the patients and general practitioners. Vested interests might lead to premature death of a promising treatment modality. Its time now for the scientific community to learn something from the mishaps of 'Gene Therapy'.

References

- [1] Siepe M, Heilmann C, von Samson P, Menasché P, Beyersdorf F. Stem cell research and cell transplantation for myocardial regeneration. *Eur J Cardiothorac Surg* 2005;28:318–24.
- [2] Khoynzhad A, Jalali Z, Tortolani AJ. Apoptosis: pathophysiology and therapeutic implications for the cardiac surgeon. *Ann Thorac Surg* 2004;78(3):1109–18.
- [3] Tang YL, Zhao Q, Qin X, Shen L, Cheng L, Ge J, Phillips MI. Paracrine actions enhances the effects of autologous mesenchymal stem cell transplantation on vascular regeneration in rat models of myocardial infarction. *Ann Thorac Surg* 2005;80:229–37.
- [4] Blanc KL. Immunomodulatory effects of fetal and adult mesenchymal stem cells. *Cytotherapy* 2003;5(6):485–9.

*Tel.: +44 141 2114689/5645206/7970903342.
E-mail address: mishrapk_25@yahoo.com

doi:10.1016/j.ejcts.2005.08.022

Reply to the Letter to the Editor

Reply to Mishra

Matthias Siepe^{a,*}, Friedhelm Beyersdorf^a, Philippe Menasché^b

^aUniversity Hospital Freiburg, Department for Cardiovascular Surgery, Hugstetter Str. 55, D-79106 Freiburg, Germany

^bDepartment for Cardiovascular Surgery, Hospital E.G. Pompidou, Paris, France

Received 30 August 2005; accepted 31 August 2005
Available online 20 October 2005

Keywords: Cell transplantation; Bone marrow-derived stem cells; Skeletal myoblast; Clinical trials