Autologous Stem Cell Transplantation in severe ischemic heart disease patients
(N=21)

Zimmermann, A. | Vlieland, N. | De Munter, J.P.J.M. | Beythien, C. | Happich, D. | Kleinbloesem, C.H.

Introduction

Numerous studies have demonstrated a beneficial effect of autologous bone marrow stem cells in heart disease patients. The majority of patients treated were post myocardial infarction patients. These cells are easily accessible from patients and can be expanded on a therapeutic scale[1]. Clinical studies have shown that a treatment with autologous stem cells can inhibit the adverse remodeling of the left ventricle and improve the function of the heart in a safe and effective way[2,3].

Methods

24 Patients with heart disease were treated with autologous bone marrow stem cells. The left ventricular ejection fraction (LVEF), which is a parameter for the heart function[4], was measured in 14 patients before transplantation and after treatment. The stem cell samples were prepared by centrifugation techniques and their quality was checked. The stem cells were administered intra-arterially by angiography. The patients were either evaluated by their treating physician and with the help of a self-reporting follow-up questionnaire. The follow up period was up to 6 months.

Results

From the 24 treated patients with heart disease 21 patients (87.5%) were evaluated. Clinical improvements were observed in 88.0% of the patients (Figure1). The patients reported about general improvements, reduced medication, less shortness of breath, less tiredness, less weakness and less edema. In one case the pacemaker could be turned down. The mean percentage of improvement (Delta percentage) of the LVEF was 24.2% (Figure 2-3). The box plot in figure 4 summarizes the LVEF data before and after ASCT01 treatment.

Conclusions

Autologous stem cell transplantation seems to offer a powerful treatment for patients with heart disease. The treatment is able to improve the function of the heart as measured by ejection fraction and to reduce morbidity in the treated patients[5]. There were no severe adverse events reported. Therefore, the autologous stem cell treatment was very well tolerated.

References

1. Malgieri A, Kantzari E, Patrizi MP, Gambardella S. Bone marrow and umbilical cord blood human mesenchymal stem cells: state of the art. Int J Clin Exp Med. 2010 Sep 7;3(4):248-69.

2. Sanz-Ruiz R, Gutiérrez Ibañes E, Arranz AV, Fernández Santos ME, Fernández PL, Fernández-Avilés F.Phases I-III clinical trials using adult stem cells. Stem Cells Int. 2010 Nov 4;2010:579142.

3. Schächinger V, Assmus B, Erbs S, Elsässer A, Haberbosch W, Hambrecht R, Yu J, Corti R, Mathey DG, Hamm CW, Tonn T, Dimmeler S, Zeiher AM; REPAIR-AMI investigators. Intracoronary infusion of bone-marrow-derived mononuclear cells abrogates adverse left ventricular remodeling post-acute myocardial infarction: insights from the reinfusion of enriched progenitor cells and infarct remodeling in acute myocardial infarction (REPAIR-AMI) trial.

4. Owan TE, Hodge DO, Herges RM, Jacobsen SJ, Roger VL, Redfield MM. Trend in prevalence and outcome of heart failure with preserved ejection fraction. N Engl J Med. 2006 Jul 20;355(3):251-9.

5. Meyer GP, Wollert KC, Lotz J, Steffens J, Lippolt P, Fichtner S, Hecker H, Schaefer A, Arseniev L, Hertenstein B, Ganser A, Drexler H.Intracoronary bone marrow cell transfer after myocardial infarction eighteen months' follwow-up data from the randomized, controlled BOOST (BOnemarrOw transfer to enhance ST-elevation infarct regeneration) trial. Circulation. 2006 Mar 14;113(10):1287-94. Epub 2006 Mar 6.

Percentage improved heart disease patients

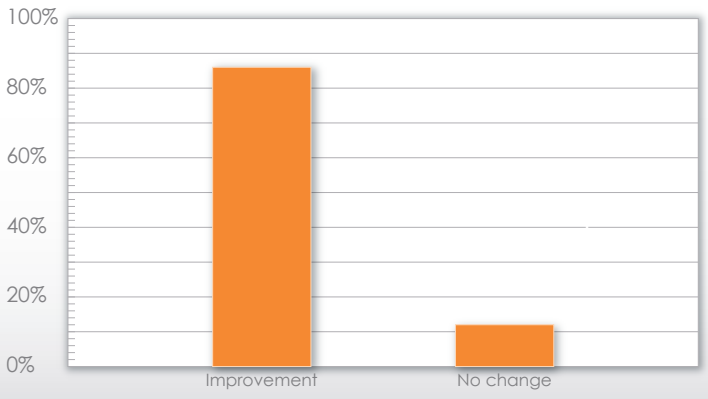

Figure 1

Improvements of LVEF

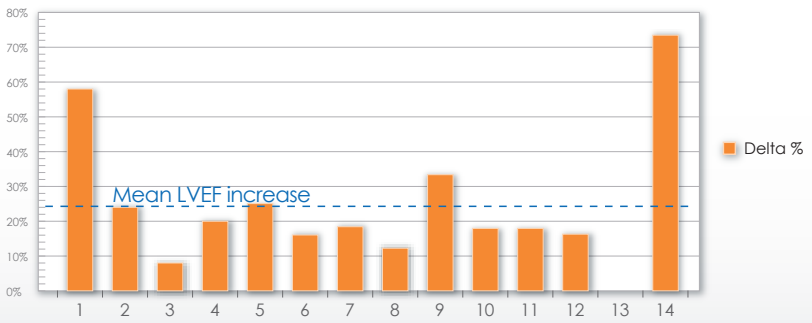

Figure 2

LVEF-Values before and after treatment

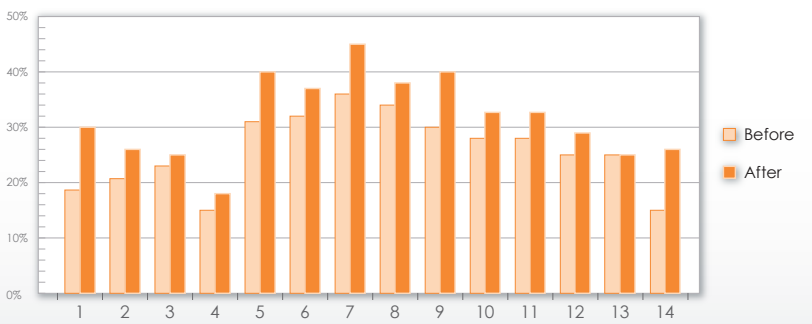

Figure 3

LVEF before and after ASCT01 treatment

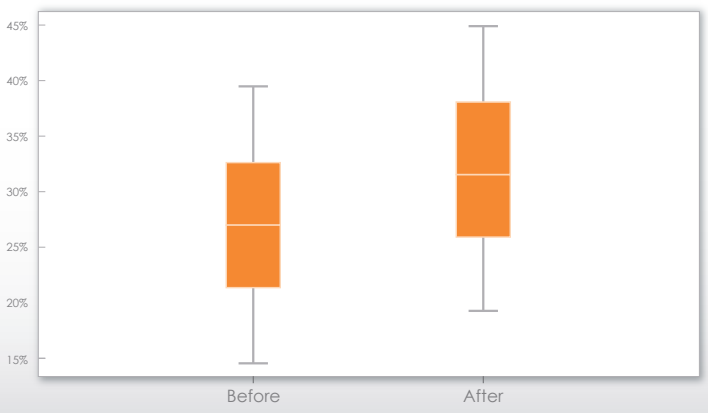

Figure 4

XCell-Center