Skeletal Myoblast Transplantation Through A Catheter-Based Coronary Sinus Approach: An Effective Means Of Improving Function Of Infarcted Myocardium

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Aims This study was designed to assess the functional effects of a transvenous coronary sinus technique of skeletal myoblast delivery in infarcted myocardium.

Methods and results An anterior myocardial infarction was created percutaneously in 14 sheep. Simultaneously, a muscle biopsy was harvested and expanded. Two weeks later, sheep were instrumented percutaneously with a dedicated catheter incorporating an extendable needle for puncture of the venous wall and, under endovascular ultrasound guidance, a microcatheter was advanced through the needle into the target scar for cell delivery. Following the baseline echocardiographic assessment of left ventricular (LV) function, sheep were randomly allocated to receive four-staged in-scar injections of either autologous cells (n=7) or culture medium (n=7). Two months later, LV function was reassessed blindly and hearts were explanted for subsequent histological and immunohistochemical analysis. There were no acute procedural complications. Baseline LV ejection fraction (EF) was significantly lower in transplanted sheep than in controls [38% (35–48) vs. 51% (38–55), respectively, P=0.03; median (range)]. Two months later, LVEF was significantly higher in the transplanted group than in controls [50% (47–56) vs. 39% (36–47), respectively, P=0.002]. Clusters of myoblasts were identified by histology and immunohistochemistry in three of the seven transplanted sheep.

Conclusion These data suggest the functional efficacy of the transvenous coronary sinus technique as a less invasive means of cell delivery to infarcted myocardium.