

## Case Report

# Long-term survival after a massive left ventricular infarction evidenced by FDG-PET and leaving intact only the septal wall

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**Abstract:** There is evidence that survival remains possible for infarction greater than 50% of the left ventricle in human, as well as in the rat infarct model. To our knowledge, survival has not been documented for infarctions involving the anterior, inferior and lateral wall leaving intact only the septal wall. An adult rat underwent a ligation of the left anterior descending coronary artery. ECG-triggered <sup>18</sup>F-fluorodeoxyglucose Positron Emission Tomography revealed that 72% of the left ventricle was necrotic and totally akinetic. Although the left ventricular ejection fraction was severely impaired (9%), this rat survived and was asymptomatic after 2 months. The exact reasons for this incredible survival are still unclear.

**Keywords:** Myocardial infarction, FDG-PET, survival

The minimal amount of intact left ventricular (LV) myocardium, which is required for survival after myocardial infarction (MI), is still debated in man and in animals [1, 2]. This surprising observation gives evidence that a survival is possible after a dramatic LV infarction leaving intact only the septal wall.

As a part of an experimental protocol [3, 4], an adult Wistar rat underwent a ligation of the left anterior descending coronary artery and was subsequently referred to ECG-triggered <sup>18</sup>F-fluorodeoxyglucose Positron Emission Tomography (FDG-PET) at 48 hours, 1 month and 2 months.

More than 70% of LV exhibited a < 50% of FDG uptake, the conventional criterion for defining necrotic non-viable myocardium [3, 5], leaving intact only the septal wall (**Figure 1**). LV ejection fraction (LVEF) was severely decreased (9% at 2-month), and there was a marked enhancement in LV end-diastolic (LVED) volume between 48 hours and 2 months. After sacrifice, dramatic wall thinning and collagen deposition were

documented in necrotic areas.

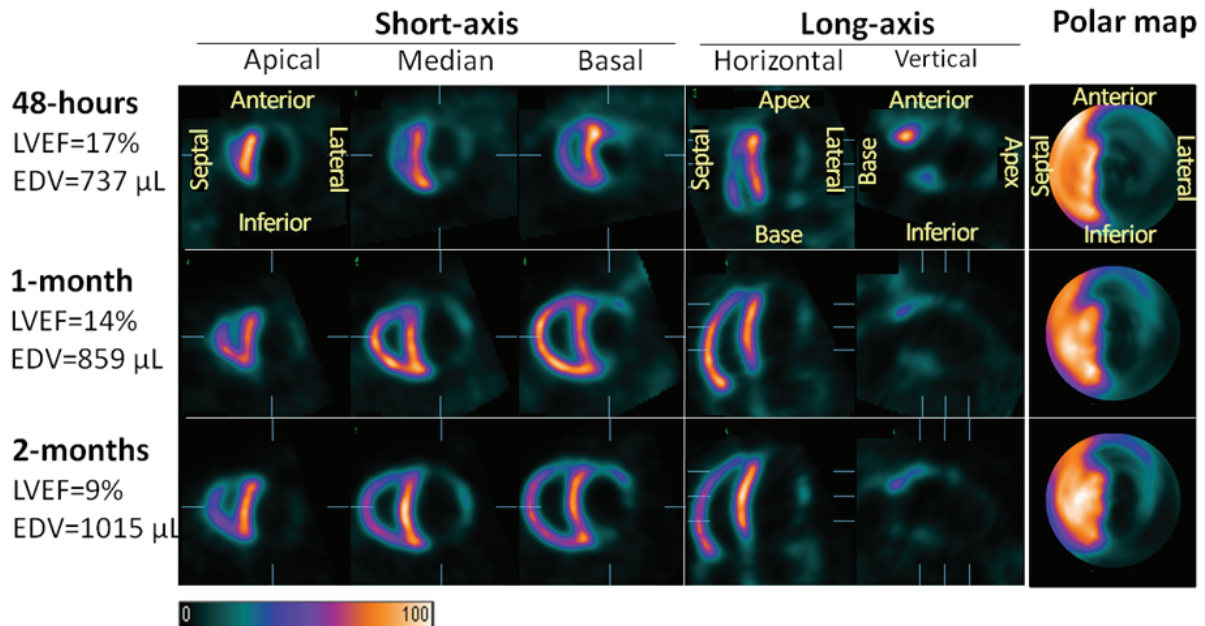
It is not clear how this rat survived but this might at least partly relate to: 1) initial preservation of the entire right ventricle (septal wall and right ventricular free wall), because right ventricular function has a major prognostic impact in severe heart failure, and 2) the fact that this animal was totally healthy before MI, contrary to MI patients.

Further studies might help to determine whether therapeutic strategies, leading to preserve or restore the septal myocardium, have a particular impact on outcome after MI.

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## Survival after a massive left ventricular infarction



**Figure 1.** FDG-PET images recorded at 48-hours, 1-month and 2-months after ligation of the left anterior descending coronary artery. Short- and long-axis slices and polar maps are shown. Corresponding movie clips are available in the online-only supplement. Left ventricular end-diastolic volume (EDV) and ejection fraction (EF) are indicated. Color scale represents the percentage of FDG uptake according to the maximal voxel value.

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