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ENGINEERING HEART TISSUE GRAFTS IMPROVE ELECTRICAL CHARACTERISTICS

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Objective To study electrical characteristics after engineering heart tissue (EHT) transplantation in myocardial infarction (MI) SD rat by a new technique of microelectrode arrays (MEA).

Methods Thirty SD rats of both sexes weighing 220–250g were sacrificed under chlorine hydrate 0.3 ml/100 mg anaesthesia and were randomly divided into three groups: control group (n=10), MI group (n=10) and transplantation group (n=10). The hearts were quickly removed Langendorff-perfused with Tyrode's solution. We recorded field potential (FP) morphology, amplitude, activation-recovery interval (ARI) and activation-conduction duration at local myocardium with microelectrode arrays technique.

Results The MEA clearly recorded FP morphology. FP amplitude is (485±21.21) mV and ARI is (235±7.07) ms in control group. Compared with infarction zone, border zone of MI and opposite zone of MI, FP amplitude and ARI were significantly lower in transplantation group (p<0.05). activation-conduction duration is (6.5±2.12) ms in control group, (17.5±3.54) ms in MI group, and (9.13±1.31) ms in transplantation group. Compared with MI group, activation-conduction duration is significantly shorter in transplantation group (p<0.05).

Conclusion MEA is a sensitive, low noise, long-term, stable and local tissue action with a potential of multiple-channel recording and mapping system in small animal whole hearts. EHT transplantation can improve the function of MI rats.