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Original Article

Induced Myocardial Infarction Using Ligation of the Left Anterior Descending Coronary Artery Major Diagonal Branch: Development of an Ovine Model

Shahram Rabbani, DVM*, Hossein Ahmadi, MD, Ehsan Fayazzadeh, MD, Mohammad Sahebjam, MD, Mohammad Ali Boroumand, MD, Maryam Sotudeh, MD, Mehdi Nasiri, DVSc

Tehran Heart Center, Tehran University of Medical Sciences, Tehran, Iran.

 Corresponding Author:

Shahram Rabbani, Animal Research Unit, Tehran Heart Center, Tehran University of Medical Sciences, Tehran, Iran. 1411713138.
Tel: +98 2188029733. Fax: +98 21 88029256. E-mail: shrabbani@gmail.com.

Abstract:

Background: We report experimental myocardial infarction by occluding coronary arteries in ovine models.

Methods: Twelve ewes were included in the study. After the chest was opened by left lateral thoracotomy incision, the second diagonal branch of the left anterior descending coronary artery was ligated at a point approximately 40% distant from its base. Prophylactic antiarrhythmics were administered. Animals were mechanically ventilated during surgery and stayed in the ICU for 24h afterwards. Experiments were then evaluated by echocardiographic, electrocardiographic, hemodynamic, serologic and morphologic investigations. Echocardiographic measurements were repeated after two months and animals were then sacrificed for postmortem cardiac examinations.

Results: All animals survived the surgical procedure. Cyanotic discoloration and hypokinesia in the cardiac tissue in an area of 3×4 cm plus ST-segment elevations was detected immediately after vessel ligation. More over, there were pathologic Q-waves 2 months later. Echocardiographic evaluations revealed an average of 22% relative decrease in cardiac ejection fraction. Wall motion analysis demonstrated anteroapical hypokinesia and akinesia in all animals one day and two months after operation. Thin walled infarcted areas with tissue fibrosis were evident in pathologic investigations two months after surgery.

Conclusion: In conclusion, we developed a practical and safe method of producing myocardial infarction in large animal models.

Keywords:

Myocardial infarction . Animal models . Sheep . LAD

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