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The Sheep as a Model for Coronary Artery Surgery Experiments on Beating Heart

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Abstract:

Background: A good animal model for coronary surgery experiments has been difficult to establish. An ideal model should have the closest morphological resemblance to human beings. The objective of this study is to establish sheep as a model for these experiments. Methods: The anatomical aspects of left anterior descending coronary artery (LAD) and right internal thoracic artery (RITA) in the sheep are studied. Coronary artery bypass grafting between the RITA and LAD coronary artery was performed. Patency of the anastomosis was evaluated by follow-up angiography. On a beating heart, the RITA was anastomosed to the LAD in adult sheep. A left anterior thoracotomy in the fifth intercostals space gave good access to both vessels. Ventricular fibrillation (VF) was a major intra-operative problem. Its incidence and relation to ischemic time was studied. The anastomosis patency was tested immediately and at follow-up by a modified technique of angiography. The morphological anatomy of both LAD and RITA was studied in detail and analysed. Surviving sheep were studied for 6 months or more. Results: RITA was easy to harvest. The most common anatomy for the LAD was presence of two diagonal branches and absence of an overlying vein. The incidence of ventricular fibrillation (VF) during LAD snaring was 10.8% (mean ischemic time before VF occurrence was 4 minutes). The modified angiography technique produced good quality angiograms. Wound infection was initially a problem but controlled with prophylactic antibiotics. Conclusion: Favorability of RITA and LAD anatomy prove sheep as a good animal model for coronary artery surgery experiments. VF incidence is acceptable. Wound infection is controlled. Good quality follow-up is feasible.

Keywords:

Model ، Coronary artery surgery

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