

# 心筋組織酸素飽和度の光学的測定による心拍動下心臓手術の研究

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# 1998 Fiscal Year Final Research Report Summary

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## Study of off-pump heart surgery by measurement of myocardial tissue oxygen saturation using near-infrared spectroscopy

Research Project

### Project/Area Number

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09671370

### Research Category

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Grant-in-Aid for Scientific Research (C)

### Allocation Type

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Single-year Grants

### Section

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一般

### Research Field

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Thoracic surgery

### Research Institution

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Kanazawa University

### Principal Investigator

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### Project Period (FY)

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1997 - 1998

### Keywords

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Cardiac surgery / Myocardial ischemia / Myocardial oxygen metabolism / Ischemic preconditioning

## Research Abstract

During off-pump beating heart surgery, myocardial injury due to normothermic myocardial ischemia is concerned. The present study was performed to examine the effect of transient myocardial ischemia in an experimental model of coronary artery occlusion. In dogs, myocardial tissue oxygen saturation and hemoglobin plus myoglobin concentration were measured using near-infrared spectroscopy. Left ventricular function was measured by a conductance catheter and a tip-transducer in the left ventricle. Left ventricular function was assessed by left ventricular pressure-volume loops. Dogs were divided into two groups. In group 1, the left anterior descending coronary artery was occluded for 30 minutes and then was reperfused for 3 hours. In group 2, dogs received ischemic preconditioning by 3 episodes of 5-minute ischemia and subsequent 5-minute reperfusion and then received a 30-minute ischemia and 3-hour reperfusion. Myocardial tissue oxygen saturation was decreased by coronary occlusion and was increased by reperfusion. In group 2, myocardial tissue oxygen saturation was increased at the second and third reperfusion than that at the first reperfusion. Myocardial tissue oxygen saturation during 30-minute ischemia was increased than that at the first coronary occlusion. This phenomenon was recognized as so-called ischemic preconditioning. During 30-minute ischemia, left ventricular end-systolic and end-diastolic volumes were increased and stroke work was decreased. During 3-hour reperfusion, those parameters of the ventricular function were restored quickly in group 2 compared with group 1. Maximal systolic elastance of the left ventricle at 3-hour reperfusion was higher in group 2 than group 1. Measurement of myocardial oxygen saturation enable us to assess myocardial oxygen metabolism at coronary occlusion. The effect of ischemia preconditioning by transient myocardial ischemia and reperfusion was determined using near-infrared spectroscopy and left ventricular function.

## Research Products (8 results)

All Other

All Publications (8 results)

- [Publications] Michio Kawasuji: "Myocardial oxygenation during terminal warm blood cardioplegia" Ann.Thorac.Surg.65 · 5. 1260-1264 (1998) ▼
- [Publications] Tamotsu Yasuda: "Ultrastructural assessment of the myocardium receiving intermittent antegrade warm blood cardioplegia" Cardiovasc.Surg.6 · 3. 282-287 (1998) ▼
- [Publications] Takeo Tedoriya: "Coronary hypass flow during use of intraaortic balloon pumoing and left ventricular assist device" Ann.Thorac.Surg.66 · 7. 477-481 (1998) ▼
- [Publications] 池田 真浩: "近赤外分光法による Ischemic Preconditioning 効果の診断" 胸部外科. 51 · 13. 1095-1097 (1998) ▼
- [Publications] Michio Kawasuji, et al.: "Myocardial oxygenation during terminal warm blood cardioplegia" Ann.Thrac.Surg.65(5). 1260-1264 (1998) ▼
- [Publications] Tamotsu Yasuda, et al.: "Ultrastructural assessment of the myo-cardium receiving intermitternt antegrade warm blood cardioplegia" Cardiovasc.Surg.6(3). 282-287 (1998) ▼
- [Publications] Takeo Tedoriya, et al.: "Coronary bypass flow during use of intraaortic ballloon pumping and left ventricular assist device" Ann.Thorac.Surg.66(2). 477-481 (1998) ▼
- [Publications] Masahiro Ikeda, et al.: "Diagnosis of ischemic preconditioning using near-infrared spectroscopy" Kyoubu Geka. 51(13). 1095-1097 (1998) ▼

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