

Department of Internal Medicine

Division of Cardiology

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General Summary and Research Activities

Research in every field, both clinical and basic, is being driven daily on the basis of reliable results.

Clinical research

In clinical research, we have been participating in multicenter collaborative studies, including large-scale clinical studies, and conducting research during routine clinical practice. The Nationwide Gender-based Atherosclerosis Determinants Estimation and Ischemic Cardiovascular Disease Prospective Cohort (NADESICO) Study is a multi-center cooperative prospective cohort study of sex differences in risk factors for arteriosclerotic diseases and prevention, which used computed tomographic examinations of coronary arteries. We have converted patient data, including risk factors and lesion morphology, from catheterization examinations and treatment in various clinical research divisions, into a database and performed a study comparing risk factors, outcomes, and other variables of ischemic heart disease, cardiomyopathy, and other conditions. In addition, we have participated in nationwide clinical studies (J-CRAFT, J-DESSERT, CSA, J-LESSON, OPERA trial, NIPPON study, PROPEL study, and REAL-CAD trial), mainly investigating in detail treatment with drug-eluting stents or catheter ablation, and the diagnosis of coronary vasospasm, which is closely related to the etiology of ischemic heart disease.

In regard to heart failure, which is an extremely common form of circulatory pathology, we have been assessing data related to the concentration of plasma brain natriuretic peptide, which is an index of circulatory pathology, and been performing research on standard values that will be of use in clinical practice. In addition, we have reported in detail the pathology of heart failure before and after admission to the hospital and are now assessing clinical data that will serve as a new index.

We have been aggressively treating atrial fibrillation by catheter ablation, and during this fiscal year we have treated approximately 220 patients. In addition, in clinical research we have investigated 1) the usefulness of the pulmonary vein antrum isolation procedure by new mapping systems, and 2) optimal catheter ablation strategies for persistent atrial fibrillation.

Basic research

Research activity, such as studies at other institutions in Japan and abroad by graduate students in basic sciences and clinical sciences and presentation of the results of many studies, is being performed.

In the field of arrhythmias, we have performed research in the form of a study of the basis of the development of atrial fibrillation by using various experimental models in regard to the effects of inflammatory cell invasion and fibrosis on the myocardium.

In the field of cardiomyocyte physiology, we have investigated the physiological and pathophysiological regulatory mechanisms of myocardial contraction and relaxation and performed a study with molecular biology techniques and physiological techniques. We have also investigated a new signal-transmission system in the α -receptor stimulation effect in relation to L-type calcium channels in the rat myocardium, the effect of β -receptor stimulation in sarcoplasmic reticulum function, and cardiomyocyte intracellular calcium kinetics in mice in which dilated cardiomyopathy develops because of troponin T mutations.

In the field of myocardial metabolism, we have investigated the association between ischemia-reperfusion damage and intracellular ion kinetics in isolated perfused hearts of mice with type 2 diabetes.

Publications

- Matsuo S, Yamane T, Hioki M, Tanigawa S, Tokutake K, Ito K, Narui R, Nakane T, Tokuda M, Yamashita S, Inada K, Date T, Sugimoto K, Yoshimura M.** Identification of a conduction gap of the mitral isthmus by using a novel high-density mapping catheter. *Pacing Clin Electrophysiol.* 2012; **35**: e65-8.
- Uehara Y, Shimizu M, Yoshimura M.** A case with successful retrograde stent delivery via AC branch for tortuous right coronary artery. *J Invasive Cardiol.* 2013; **25**: E39-41.
- Uehara Y, Shimizu M, Yoshimura M.** A case of CTO treated with minimum use of contrast media. *Catheter Cardiovasc Interv.* 2013 Jan 29. Epub ahead of print.
- Kawai M, Yoshimura M, Harada M, Mizuno Y, Hiramitsu S, Shimizu M, Shoda T, Kuwahara K, Miyagishima K, Ueshima K, Nakao K.** Determination of the B-type natriuretic peptide level as a criterion for abnormalities in Japanese individuals in routine clinical practice: the J-ABS Multi-Center Study (Japan Abnormal BNP Standard). *Intern Med.* 2013; **52**: 171-7.
- Sekiyama H, Nagoshi T, Komukai K, Matsu-shima M, Katoh D, Ogawa K, Minai K, Ogawa T, Yoshimura M.** Transient decrease in serum potassium level during ischemic attack of acute coronary syndrome: paradoxical contribution of plasma glucose level and glycohemoglobin. *Cardiovasc Diabetol.* 2013; **12**: 4.
- Nagoshi T, Date T, Fujisaki M, Yoshino T, Sekiyama H, Ogawa K, Kayama Y, Minai K, Komukai K, Ogawa T, Yoshimura M.** Biphasic action of aldosterone on Akt signaling in cardiomyocytes. *Horm Metab Res.* 2012; **44**: 931-7.
- Anzawa R, Seki S, Nagoshi T, Taniguchi I, Feuvray D (Univ Paris-Sud 11), Yoshimura M.** The role of Na⁺/H⁺ exchanger in Ca²⁺ overload and ischemic myocardial damage in hearts from type 2 diabetic db/db mice. *Cardiovasc Diabetol.* 2012; **11**: 33.
- Yamashita S, Yamane T, Matsuo S, Ito K, Narui R, Hioki M, Tanigawa S, Tokuda M, Inada K, Date T, Sugimoto K, Yoshimura M.** Improvement of atrioventricular conduction following catheter ablation of atrioventricular nodal reentry tachycardia in a patient with a prolonged PR interval. *Heart Vessels.* 2013; **28**: 120-5.
- Matsuo S, Yamane T, Date T, Tokutake K, Hioki M, Narui R, Ito K, Tanigawa S, Yamashita S, Tokuda M, Inada K, Arase S, Yagi H, Sugimoto K, Yoshimura M.** Substrate modification by pulmonary vein isolation and left atrial linear ablation in patients with persistent atrial fibrillation: its impact on complex-fractionated atrial electrograms. *J Cardiovasc Electrophysiol.* 2012; **23**: 962-70.
- Matsuo S, Yamane T, Hioki M, Narui R, Tanigawa S, Date T, Yoshimura M.** Double potentials of coronary sinus during the mitral isthmus ablation. *J Cardiovasc Electrophysiol.* 2012; **23**: 1037-9.