

S. Kawada • T. Ueda • H. Shimizu (Eds.)

# Cardio-aortic and Aortic Surgery

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International Symposia for  
Life Sciences and Medicine**

**Volume 7**



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S. Kawada, T. Ueda, H. Shimizu (Eds.)

# Cardio-aortic and Aortic Surgery

With 108 Figures, Including 4 in Color



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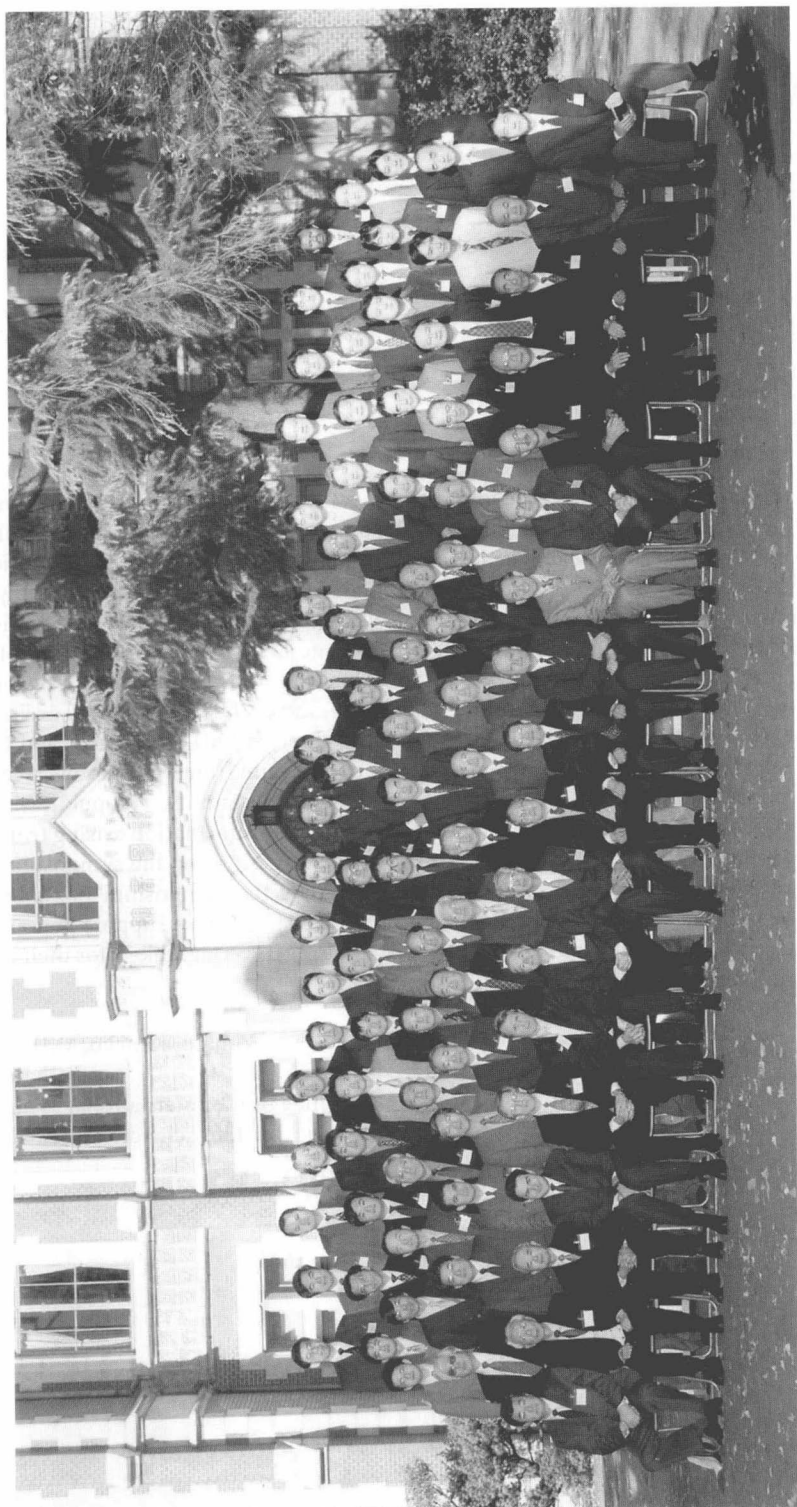
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# Foreword

This volume contains the proceedings of the seventh symposium of the Keio University International Symposia for Life Sciences and Medicine under the sponsorship of the Keio University Medical Science Fund. As stated in the address by the President of Keio University at the opening of the symposium, the fund was established by the generous donation of Dr. Mitsunada Sakaguchi. The Keio University International Symposia for Life Sciences and Medicine constitute one of the core activities of the fund. The objective is to contribute to the international community by developing human resources, promoting scientific knowledge, and encouraging mutual exchange. Every year, the Committee of the International Symposia for Life Sciences and Medicine selects the most interesting topics for the symposium from applications received in response to a call for papers to the Keio medical community. The publication of these proceedings is intended to publicize and distribute information arising from the lively discussions of the most exciting and current issues during the symposium. We are grateful to Dr. Mitsunada Sakaguchi, who made the symposium possible, the members of the program committee, and the office staff whose support guaranteed the success of the symposium. Finally, we thank Springer-Verlag, Tokyo, for their assistance in publishing this work.

Akimichi Kaneko, M.D., Ph.D.  
Chairman  
Committee of the International Symposia  
for Life Sciences and Medicine



The 7th Keio University International Symposium for Life Sciences and Medicine

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*Third row:* Dr. A—,\* Dr. Usui, Dr. Kuribayashi, Dr. Ando, Dr. Kiso, Dr. Nishikawa, Dr. Myojin, Dr. Okita, Dr. Adachi, Dr. Shin, Dr. Amano, Dr. Ikeshita, Dr. Tominaga, Dr. Nishigami, Dr. Naito, Dr. Otubo, Dr. Shimizu;

*Fourth row:* Dr. Kashima, Dr. Shimoyama, Dr. Hashizume, Dr. Nakao, Dr. Ootani, Dr. Cho, Dr. B—, Dr. Kokaji, Dr. Minatoya, Dr. Mori, Dr. Higashi, Dr. Nagumo, Dr. C—, Dr. Inada, Dr. K. Koizumi, Dr. Tsutsumi;

*Fifth row:* Dr. Ookura, Dr. Haga, Dr. Moro, Dr. D—, Dr. E—, Dr. Kuniyara, Dr. Shiiya, Dr. Aeba, Dr. H. Inoue, Dr. Yozu, Dr. Nakamichi, Dr. Kumamaru, Dr. T. Ito, Dr. F—, Dr. G—, Dr. Suda, Dr. H—, Dr. Muhamad.

\*—: The editors regret that some participants shown in the photograph could not be identified at the time this volume went to press.



# Preface

With the gradual aging of society, the nature of diseases has also changed, and in particular, the prevalence of arteriosclerosis and thereby aortic diseases has undergone a rapid increase. Measures to combat aortic dissection and aneurysm are needed more than ever, and the recent advances in diagnostic imaging, such as ultrasonography and computed tomography, have contributed to a better understanding of the pathology of aortic disease. In the field of surgical medicine, prosthetic tube grafts suitable for replacement of blood vessels and several new techniques in adjunctive methods for surgery have been developed, by which surgical outcomes have significantly improved. However, some problems remain to be resolved.

In terms of diseases of the aortic root, since the introduction of the revolutionary Bentall procedure, which uses a composite tube graft with a prosthetic valve, various modifications have been made, and in recent years, such new techniques as remodeling to conserve aortic valves have been introduced. The time has now come to investigate the long-term effectiveness, including durability, of these techniques. In addition, brain protection is an important issue in aortic arch aneurysm surgery, and it is important to verify the effectiveness of selective brain perfusion, hypothermia, and circulatory arrest, as well as retrograde brain perfusion, which has been developed primarily in Japan. Furthermore, there is an urgent need for an effective spine protection technique in thoracoabdominal aortic aneurysm surgery, which carries a risk of paraplegia.

Stent-grafts are receiving much attention as a low-invasive technique for the treatment of aortic disease, but it will be necessary to ascertain the advantages and disadvantages associated with stent-grafts, including chronological changes in the nature of stents, and the incidence of regional complications. Finally, prosthetic tube graft infection is a clinically important complication, and the establishment of effective measures against methicillin-resistant *Staphylococcus aureus* is urgently needed.

In this Keio University International Symposium for Life Sciences and Medicine, strategy for cardio-aortic and aortic surgery and the current status of these issues in different countries are discussed, and the outlines of these discussions are recorded to serve as a reference for future clinical research.

THE EDITORS  
Shiaki Kawada  
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# Opening Remarks

Professor Yasuhiko Torii  
President, Keio University  
Chairman, Keio University Medical Science Fund  
December 1, 1999

Dr. Randall Griepp of the Mount Sinai Medical Center, distinguished guests, ladies and gentlemen:

On behalf of Keio University, I take great pleasure in welcoming all the guests and participants at the 7th Keio University International Symposium for Life Sciences and Medicine. I am particularly grateful to the distinguished scientists who have traveled such long distances to participate in this meeting.

The topic of our symposium is "Strategy for Cardio-aortic and Aortic Surgery." Although remarkable progress and breakthroughs are reported almost every day in the fields of cardio-aortic and aortic surgery, it is also true that there are still many who suffer from diseases of the aorta. This symposium therefore seems an opportune moment to review the present state of knowledge of this subject and to exchange and investigate the clinical experiences and findings on aortic surgery. My profound gratitude to all the participants who kindly accepted our invitation to contribute to our symposium on aortic surgery. I believe that this unique meeting will prove both exciting and successful.

Now let me briefly tell you what Keio University is, and why we host such an international symposium for life sciences and medicine. Keio Gijuku, which is an educational corporation including Keio University, was founded in 1858 by Yukichi Fukuzawa, a pioneer of modern civilization in Japan. I assume some of you are already familiar with his personal appearance because his portrait is printed on the Japanese 10 000 yen bank note. Now, 141 years after its establishment, we are proud that Keio, as the oldest university among the 622 universities in this country, has played a major role in developing leading human resources in every field of academic research, social affairs, and culture as well as the life sciences. The former prime minister, Ryutaro Hashimoto, is one of our alumni, for example. Among the eight faculties and nine graduate schools of Keio University, the school of medicine is one of the most highly regarded in Japan and also, we hope, throughout the world.

Fukuzawa, our founder, was a member of the very first mission of the Tokugawa Shogunate government to the United States in 1860 and to European countries in 1862. Until then, the Shogun had closed Japan's doors to the outside world in a period of self-isolation lasting for almost 300 years. Fukuzawa realized, during his visit to the United States and Europe as a member of the Japanese official mission, that education was crucially important and inevitable to the future of Japan. Thus, Keio has its

origins in international exchanges: indeed, international exchanges such as this symposium have been one of the most important academic and social missions of Keio University since its foundation.

Now, let me turn to the Keio University Medical Science Fund. In the fall of 1994, Dr. Mitsunada Sakaguchi, an alumnus of the class of 1940 of our medical school, donated five billion yen to the university. He expressed the wish that his fund should be used to encourage research in life sciences and medicine at Keio University and to promote worldwide advancements in medical science. I fully agreed with his proposal, and thus launched the Keio University Medical Science Fund in April 1995. The International Symposium of Life Sciences and Medicine has been organized as one of several projects supported by the fund. The objective of our symposium is to contribute to the international community by developing human resources, promoting scientific knowledge, and encouraging mutual exchanges of scholars.

We also inaugurated the Keio Medical Science Prize. In 1996 we awarded the Prize to Dr. Prusiner of the University of California, San Francisco, and Dr. Nakanishi of Kyoto University; in 1997 to Dr. Weinberg of MIT and Dr. Taniguchi of Tokyo University; in 1998 to Dr. Folkman of the Harvard Medical School and Dr. Mikoshiba of the Institute of Medical Science, the University of Tokyo; and this year we have just awarded it to Dr. Blackburn of the University of California, San Francisco, and Dr. Yoshikawa of the Himeji Institute of Technology.

This year, Dr. Sakaguchi made an additional donation of two billion yen, making possible the creation of two new departments in the field of life sciences and in this way further enhancing medical science at Keio.

We are now witnessing the dawn of the 21st century and the third millennium. We realize that society faces many problems from this century that will be carried over into the next. In the field of life sciences and medicine alone, we are still unable to cure many cancers, AIDS, and other illnesses. In addition, many new and unknown difficulties await us in the new century. I believe that exploring new horizons in life sciences is one of the most vital tasks facing us at the dawn of the 21st century. It is equally important to ensure that the knowledge gained through such pursuits will be used in a way that brings genuine happiness to humankind.

It is thus more than a pleasure, indeed it is an honor, for me to be able to meet the distinguished medical researchers and clinicians from world-renowned institutions gathered here, and to share in a frank and valuable exchange of views. I am also grateful for the efforts made by the organizing committee, chaired by Dr. Shiaki Kawada, who have devoted themselves to ensuring that this symposium is an auspicious and enjoyable event. I do hope the meeting will prove to be a truly fruitful and productive one for you all.

Let me close by wishing all of you gathered here further success in your research and clinical work. Thank you very much.

# Opening Speech

Shiaki Kawada, M.D.

Chairman of the 7th Keio University International Symposium for Life Sciences and Medicine

December 1, 1999

President Torii, Dr. Sakaguchi, Professor Grieppe, ladies and gentlemen:

On behalf of the Organizing Committee of the Keio International Symposium, I am delighted to welcome you all here today. It is an honor to have people here from all over the world.

I have the privilege of chairing the International Symposium on Strategy for Cardio-aortic and Aortic Surgery here at Keio University. About eight years have passed since the First International Symposium on Diseases of the Aorta, chaired by Professor Emeritus Tadashi Inoue, was held in Japan in 1992.

Since that symposium, remarkable progress and breakthroughs in the field have been reported almost every day. Therefore, it seems an auspicious time to hold a symposium on aortic surgery again in Japan.

We are pleased that all members of the overseas and local symposium faculty kindly accepted our invitation to contribute to this year's symposium. As a result, 45 papers will be given in 10 key areas, and every session will review and discuss in depth the recent advances in cardio-aortic and aortic surgery.

Before proceeding to the opening lectures, I would like to briefly present the annual report on cardiovascular surgery in Japan compiled by the Committee of the Japanese Association for Thoracic Surgery.

As shown in Fig. 1, the number of operations for ischemic heart disease and thoracic aortic aneurysm has increased every year over the last decade. In 1998, the total number of cases of cardiovascular surgery was 42 000, excluding abdominal aortic aneurysms and cardiac pacemaker implantations.

You will note that about half of the approximately 4500 cases of aneurysms requiring thoracic aortic surgery were dissecting aneurysms and the other half were nondissecting aneurysms.

The second graph (Fig. 2) shows the number of cardiovascular surgery cases at Keio University Hospital and its affiliated hospitals from 1989 to 1998. The left-hand bar in each pair of bars represents open-heart surgery cases, and the lower, red segment of each these columns indicates thoracic aortic surgery cases. The total number of thoracic aortic surgery cases currently exceeds 200 a year.

The last figure (Fig. 3) outlines landmarks in aortic surgery at Keio University. In 1960, Professor Emeritus Inoue and his colleagues performed the first ascending aorta replacement using a heart-lung machine in Japan. After the introduction of

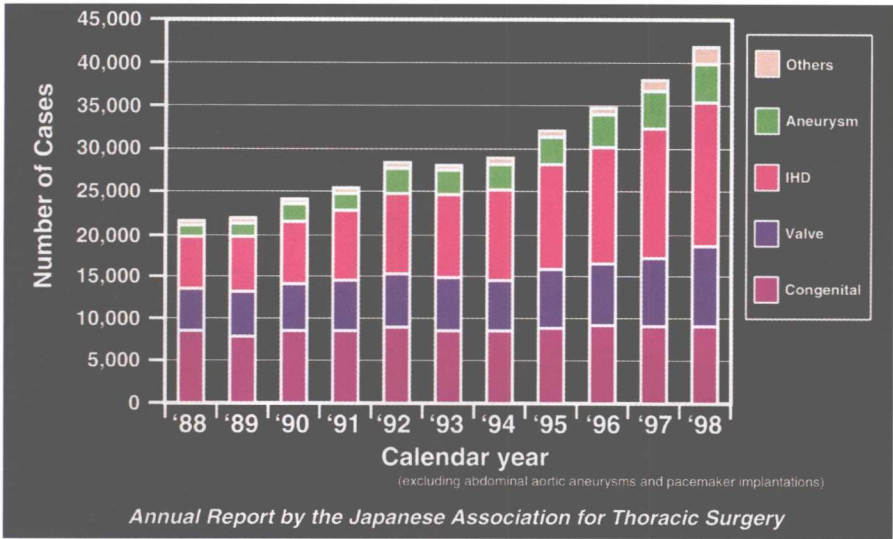


FIG. 1. Cardiovascular surgery in Japan

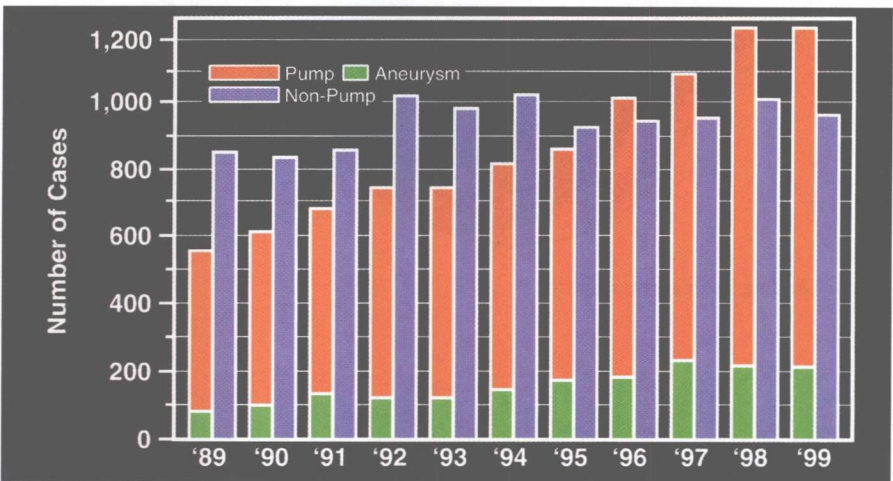


FIG. 2. Cardiovascular surgery at Keio University and affiliated hospitals

temporary long external bypass for the descending aorta and measures for brain protection, such as selective cerebral perfusion for the aortic arch, we can now attempt the replacement of the entire aorta.

In closing, I am confident that this year's symposium in Japan will be both exciting and successful. Thank you once again for attending.



FIG. 3. Landmarks in aortic surgery



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