The 150th Anniversary of Nagasaki University School of Medicine: Recovery from the atomic disaster and evolution of the Department of Neurosurgery

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Abstract

Nagasaki is located on the western edge of Japan, closer to the Asian continent. Because of this geographical proximity, Nagasaki became a gateway for the introduction of continental culture and civilization to Japan. After the port of Nagasaki was opened for trade with the Portuguese in 1571, Nagasaki played a central role in cultural exchange with the West and China until the latter half of the 19th century. As a result of the political situation, students came to Nagasaki from all over Japan to obtain information on Western science especially in medicine, turning Nagasaki into a hub for modern academic studies. The first medical faculty in Japan educating doctors in the Western style was founded in Nagasaki in 1857. Despite World War II tragedy, the medical school arose again and more than 10,000 physicians have completed their studies at the medical school since its founding. The Department of Neurosurgery at Nagasaki University had its origins within the Second Department of Surgery and became an independent department in 1973. The post of professor was assumed by Kazuo Mori and succeeded in 1991 by Shobu Shibata and 2003 by Izumi Nagata, who holds the post at the time of this writing. Neurosurgery is a dynamic and constantly changing at Nagasaki University with work still in progress on technological, diagnostic, and surgical innovations that permit the treatment of highly complex cases. In 2007, the 150th anniversary of the founding of Nagasaki University School of Medicine was cerebrated with a numbers of commemorative events.

Key Word: Department of Neurosurgery, History, Nagasaki University

History of Nagasaki University School of Medicine

Japan is thought to have an indigenous medical system from ancient times, but medical treatment according to the methods of traditional Chinese medicine became prominent in Japan from about the beginning of the 5th century. Surgical operation based on Western medicine, however, were performed by the Portuguese Jew Luis de Almeida (1525-1583). He came to Japan in 1555 and visited various place including Nagasaki and instructed the Japanese in surgical techniques (17).

During the Edo period (1603-1867), information from abroad was severely limited by the xenophobic policies of trade and diplomacy adopted by the Shogunate government. Fortunately, however, communication with the outside continued in Nagasaki, the only port allowed to conduct foreign trade. The Chinese and Dutch resided here, the former in the Chinese Quarter and the latter on a manmade island called Dejima. The study of surgery in Nagasaki began with the introduction of European surgical techniques through the physicians stationed at the Dutch East India Company factory on Dejima. The Dutch interpreter and Nagasaki native Chinzan Narabayashi (1648-1711) studied surgery at Dejima using as a textbook a Dutch translation of Ambroise Pare's book by Carolus Battus or an Armamentarium Chirurgicum by Johannes Sclutetus. On the basis of these studies, Chinzan Narabayashi published a book entitled "Koigekasoden" (Compendium of European Surgery) in 1706. The burr-hole operation and the instrumentation were also introduced (Fig. 1).

In 1823, German, Philipp F. B. von Siebold (1796-1866) arrived at Nagasaki to serve as Dejima physician, following year, opened a private medical school in the

Narutaki suburb of Nagasaki. Siebold conducted not only lectures on basic subjects such as anatomy, physiology and pharmacology but also clinical lectures on surgical operations and other treatments (Fig. 2A). With the help of his Japanese students, Siebold later introduced Japan in Europe with his three great works "Nippon" (Fig. 2B), "Flora Nipponica" and "Fauna Nipponica".

One of the most important figures in the history of medical education in Nagasaki and in the dissemination of medical education in Japan is Dutch naval physician J. L. C. Pompe van Meerdervoort (1829-1908). He landed at Dejima in 1857 and was greeted by four Japanese doctors including Ryojun Matsumoto (1832-1907) who had been sent to Nagasaki by the Shogunate government to study Western medicine (Fig. 3A). The day of the first lecture, November 12, 1857, has been designated as the anniversary of the foundation of Nagasaki University School of Medicine, and Pompe, along with Ryojun Matsumoto, is honored as founder. The course table prepared by Pompe included lectures on physics, chemistry, bandage medicine, system anatomy, histology, physiology, pathology, pharmacology, internal medicine, surgery and ophthalmology. Four years later, on the basis of plans laid out by Pompe, a full-fledged Western-style hospital (Yojosho; Renamed as Seitokukan in 1865, Fig. 3B) and medical school were founded in Nagasaki and regulations established, an event that inaugurated the modern system of medical education in Japan. During the years leading up to 1892, the Japanese government invited a series of medical instructors from the Netherlands, Germany, Great Britain and the United State.

In 1901, the name was changed to the Nagasaki Professional School of

Medicine. In accordance with an imperial decree issued in 1923, the Nagasaki Professional School of Medicine was abolished and replaced by the Nagasaki Medical College with special medical and pharmacological divisions attached. In 1934, the surgery course at the college was divided into two departments. During this period, neurological surgery was performed by general surgeons, as in other countries. Nagasaki Medical College was instantaneously reduced to ruins by the explosion of an atomic bomb on August 9, 1945. The buildings of Nagasaki Medical College were located only 500 to 700 meters form the hypocenter of the explosion where the blast is estimated to have reach a velocity of 250 meters per second. The most characteristic feature of the atomic bomb is the release of large quantities of radioactivity from nuclear fashion. Anyone outside within one kilometer of the hypocenter was exposed to a lethal dose of radiation. And it is estimated that the Nagasaki Medical College was showered with radiation at the dose of more than ten gray. 73,884 people were killed and 74,909 injured. More than 850 faculty members and students died along with a large number of patients, and the school buildings and hospital wards collapsed and burned (Fig. 4A). Documents charts, teaching materials, instruments, equipment and all other facilities were pushed into a state of annihilation, paralyzing medical treatment and education.

Postwar struggle for the construction of a new Japan made slow progress in Nagasaki because of the tremendous damage caused by the atomic bombing. The reconstruction of the college required many years to reach completion. In 1949, the enactment of the national school establishment law resulted in the inauguration of Nagasaki University School of Medicine as successor to the former Nagasaki Medical College. The Atomic Bombe Disease Institute was established in 1962 for the purpose of universal basic research with regard to radiation medicine and to the late effects of radiation on the human body, and the institute has studied the effects of residual radiation, pathological and epidemiological approaches to various atomic bomb disease, and clarification of the relation ship between radiation dose and radiation-induced leukemia and other malignant diseases. In term of Neurosurgery, we have investigated intracranial meningioma among atomic bomb survivors (23). A global research network in Radiation Medical Sciences has been established with research institutes around the world including Chernobyl and internationally renowned organizations such as WHO, Twelve-story hospital building was completed in 1976 and renewed in 2008 (Fig. 4B). On November 12, 2007, the 150th anniversary of the founding of Nagasaki University School of Medicine was cerebrated with a numbers of commemorative events.

The Foundation of Neurosurgery in Nagasaki

The Department of Neurosurgery originated within the Second Department of Surgery of Nagasaki University. In 1960, Masashichi Kawano (Fig. 5A) was promoted as associate professor of the Second Department of Surgery. He experienced atomic bomb explosion when he was medical school student. Although he was blown away by the explosion and irradiated, he devoted himself to the medical treatment and relief of injured. He received his surgical training there and subsequently at University of Oregon under Professor George M. Austin. His return marked the birth of modern neurosurgery at Nagasaki University (7-9).

The Department of Neurosurgery advanced from division to department status in 1973. Kazuo Mori (Fig. 5B) was invited from Kyoto University as the first professor and chairman of the Department of Neurosurgery. He had great interest in neurophysiology and subsequently led to the development of epilepsy surgery (16, 20, 21). He contributed development of both the Department of Neurosurgery and the Japan Neurosurgical Society. He served as the chair of the Japanese Board of Neurosurgery. Thus, he hosted the 44th Annual Meeting of the Japan Neurosurgical Society.

In 1991, Shobu Shibata (Fig. 5C) was chosen to lead the Department of Neurosurgery as second professor and chairman. He was trained at the Second Department of Surgery, and joined the newly established Department of Neurosurgery. He was known as an expert of brain tumor and blood-tumor barrier (10, 22, 23). Thus, his interest was not limited to surgical approach and he introduced linear accelerator radiosurgery to the Nagasaki University Hospital (12). In recognition of these works, he organized the 6th Annual Meeting of the Japanese Congress for Brain Tumor Surgery and the 8th Annual Meeting of the Japanese Society of Stereotactic Radiosurgery.

Following Professor Shibata's retirement, Izumi Nagata was appointed as the third professor and chairman of the Department of Neurosurgery in 2003. He was educated in microsurgery under the supervision of Professor Haruhiko Kikuchi at the National Cardiovascular Center and has been recognized as one of the most prestigious neurosurgeon in Japan (13-15). He has served as the member of Japanese Board of Neurological Surgery and the Research Committee on Spontaneous Occlusion of the Circle of Willis (Moyamoya disease) of the Ministry of Health and Welfare of Japan. In 2008, the 7th Annual Meeting of the Japanese Society for Treatment at Neck in Cerebrovascular Disease and the 17th Annual Conference on Neurosurgical Techniques and Tools were held in Nagasaki (Fig. 5D).

Organization

Currently, 80 board-certified neurosurgeons and seven residents are working at Nagasaki University and its affiliated hospitals. Five neurosurgeons are researching basic science in Nagasaki University Postgraduate School. The current research theme includes molecular biological analysis for glioma (11, 19, 24), pathophysiology of the blood-brain barrier (2, 3), and imaging study and pathological evaluation of the carotid atheromatous plaque (4, 6). Two board-certified neurosurgeons are researching abroad as postdoctoral research fellows at Stanford University and National Institute of Health in the United State. Thus, current subspecialization includes linear accelerator radiosurgery led by Takayuki Matsuo and Yukishige Hayashi (18), endovascular treatment led by Naoki Kitagawa and Kentaro Hayashi (1, 5), pediatric neurosurgery led by Ryujiro Ushijima, and spinal surgery led by Keishi Tsunoda.

The numbers of inpatients treated at the Department of Neurosurgery of the Nagasaki University Hospital are approximately 500 per year. During each year, eight faculty members and three or four residents perform approximately 300 operation. Approximately 70 endovascular treatment and approximately 70 radiosurgery are performed per year. A total of 2500 operations were performed at 15 affiliated hospitals in 2007.

Facilities

In University Hospital, 870 beds are run by approximately 500 doctors, 600 registered nurses. The neurosurgery services, located on the ninth floor of the new building, houses 30 regular floor beds; additional beds are available in the intensive care unit. The surgical suite is equipped with an operative microscope, neuronavigation system, intraoperative angiography system, electrophysiological monitoring system, and facilities for awake craniotomy. The Hospital is equipped with one 3.0-T and three 1.5-T magnetic resonance scanner, four computed tomographic scanner, one single photon emission tomography. A flat panel biplane digital angiography system with three-dimensional reconstruction capability recently became available. Stereotactic radiosurgery is performed with a linear accelerator-based system. Laboratory facilities include a microsurgery laboratory that are always available to trainees and faculty members to improve their microsurgical skills.

Closing Remarks

The modernization of Japan started from the study of Western medicine in Nagasaki. During a 150-year period, Nagasaki University School of Medicine has survived challenging circumstances and has remained an excellent clinical and academic center. Such an accomplishment requires the efforts of many dedicated people involved in the care of thousands of patients. We have to promote training and ongoing research to produce capable neurosurgeons able to provide excellent service to patients. Finally, facing difficulties, we remember the Pompe's words "Medical doctors should know their vocation well. Once he chooses his profession as a vocation, the doctor belongs not to himself but to the patient. If you do not like this, you should find another profession."

Disclosure

The authors have no personal financial or institutional interest in any of the drugs, materials or devices described in the article.

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Figure Legends

Fig. 1

Illustrations from "Koigekasoden" published by Chinzan Narabayashi learned Dutch surgery from several factory surgeons. Techniques and instruments for burr-hole operation were described. (Medical Library Nagasaki University)

Fig. 2

A: Philipp F. B. von Siebold conducting phlebotomy. (Nagasaki Museum of History and Culture)

B: Illustration from "Nippon" published by Siebold, in which Japan was introduced to Europe. The fan-shaped manmade island Dejima was shown. (Medical Library Nagasaki University)

Fig. 3

A: Ryojun Matsumoto (front, left), J. L. C. Pompe van Meerdervoort (front, right) and medical school students (Medical Library Nagasaki University)

B: The first Western-style hospital, Seitokukan and Nagasaki city (Medical Library Nagasaki University)

Fig. 4

A: Nagasaki Medical College Hospital in ruins after the atomic bombing.

(Biostatics Sections, Division of Scientific Data Registry, Atomic Bomb Disease Institute, Nagasaki University School of Medicine)

B: Current Nagasaki University Hospital.

Fig. 5

A: Masashichi Kawano, associate professor of the Second Department of Surgery, 1960.

B: Kazuo Mori, the first chairman of the Department of Neurosurgery, 1973.

C: Shobu Shibata, chaired the department from 1991 to 2002.

D: Izumi Nagata, chairman of the Department of Neurosurgery, and his staff at the 17th Annual Conference on Neurosurgical Techniques and Tools held in Nagasaki. Front left to right; Ryujiro Ushijima, Takayuki Matsuo, Kazuhiko Suyama, Izumi Nagata, Naoki Kitagawa, Keishi Tsunoda and Kentaro Hayashi.

Fig. 1



Fig. 2

А



В









В

