Development of Clinical Engineering in Japan

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Abstract—The qualification of CE, incorporating both engineering and medicine, was first established in 1987. The CE is a health care professional who ensures the safety and effectiveness of medical equipment. A basic duties guideline for CEs was devised in 2010. The main duties of the CE are classified as respiratory therapy, cardiopulmonary bypass, dialysis units, intensive care units, cardiac catheterization, hyperbaric oxygen therapy, pacemakers and medical equipment management. To enhance the ability of CEs to engage in more extensive duties and develop specialties, there is a certification system in each field. The CE plays a role that is socially important by ensuring the safety of medical equipment and its effective maintenance.

Purpose of establishment of CE

Recent progress with medical equipment has extended the range of medical care, and specialists who can operate and maintain many complex pieces of equipment are required.

The qualification of CE, incorporating both engineering and medicine, was first established in 1987, and CEs began to work in Japan from 1988. The CE is a health care professional who ensures the safety and effectiveness of medical equipment.

Current state of CE education

A CE must graduate from a CE training school (university, junior college, or technical school) and pass a national examination. The training schools devised guidelines for the national examination to maintain a certain standard of CE education.

The examination covers questions from the fields of medicine, engineering, and medical technology. The number of questions is 180 (90 in the morning and 90 in the afternoon) and the examination is carried out over 2 sessions of 2.5 hours each.

There are some universities setting up graduate schools for CE education, and there are some CEs who already have a master’s degree or a doctorate in the field of BME.

Present status of CEs

As of 2012, there are approximately 12,000 CEs in Japan. A basic duties guideline for CEs was devised in 2010[1]. The main duties of the CE are classified as respiratory therapy, maintenance of cardiopulmonary bypass units, dialysis equipment, and surgical equipment, intensive care units, cardiac catheterization, hyperbaric oxygen therapy, other treatment (defibrillators, pacemakers, and implantable cardioverter defibrillators) and medical equipment management. A team of CEs are involved in dialysis. The duties of CEs in the dialysis unit are preparation of the dialysis sets, blood access, operation of the equipment and monitoring patient during treatment, and maintenance of the dialysis equipment.

Certification for CEs in each field

To enhance the ability of CEs to engage in more extensive duties and develop specialties, as well as provide better health care services, there is a certification system in each field. This involves certification by the Japanese CE Society and the Associated Societies. Regarding certification by the Japanese CE Society, there is a CE certification system for specialization in blood purification, a pacemaker-related CE specialty, and a respiratory treatment specialty. Regarding certification by the Associated Societies, there are qualifications in dialysis technology, extracorporeal circulation technology, respiratory therapy, clinical medical engineering equipment technologist, hyperbaric oxygen therapy, and apheresis treatment.

Future prospects

Since the CE was born in 1988, 24 years have passed. The CE plays a role that is socially important by ensuring the safety of medical equipment and its effective maintenance. In addition to technology, we must develop managerial skills for medical equipment like CEs in the USA. Therefore it is important to establish an advanced CE education system in Japan like that of the American College of Clinical Engineering[2].

References

[1] Japanese Association for Clinical Engineers : http://www.ja-ces.or.jp

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