Education of the clinical engineer in pacemaker-related duties

Shinichi Iguchi  Takeda General Hospital

Abstract—Recently, the amount of pacemaker-related duties including pacemakers, implantable cardioverter defibrillators and cardiac resynchronization therapy has increased among the tasks of clinical engineers (CEs). Their duties include support of implantation surgery, pacemaker checking, countermeasures for electromagnetic interference and data management. Evaluation of the progress of CEs in the education program is performed by the senior CE using a checklist. Education about these duties is not only necessary for new CEs. To offer the best medical care to patients, it is important for CEs to acquire new knowledge and polish their techniques.

INTRODUCTION

The duties of the clinical engineer (CE) include clinical tasks such as dialysis treatment, respiratory therapy, operation of the cardiopulmonary bypass machine, and maintenance of equipment from purchase to disposal. Recently, the amount of pacemaker-related duties (including pacemakers, implantable cardioverter defibrillators (ICDs), and cardiac resynchronization therapy (CRT)) has increased among the tasks of CEs. In this report, we introduce the education of CEs for pacemaker-related duties at our hospital.

CURRENT CE STATUS AT OUR HOSPITAL

At our hospital, CEs work in the operating theaters, a hemodialysis units, and medical equipment control center. The number of patients receiving implantation of ICDs and CRT was 72 in 2012, and the total number of cardiac catheterization procedures was 1,554. Such cases are increasing year by year. Pacemaker-related duties are now carried out by four CEs. Their duties include support of implantation surgery, pacemaker checking, countermeasures for electromagnetic interference, education of patients, and data management.

EDUCATION SYSTEM

The new CE learns medical knowledge and engineering knowledge by lectures and acquires the techniques for operating instruments by programmer demonstration. We also carry out case studies such as troubleshooting and on-the-job training (OJT) in the clinics. Because the progress of pacemaker technology is rapid, it is necessary to always improve our skills after we become able to conduct pacemaker-related duties. Therefore, we must participate in the classes run by the manufacturers of equipment and understand their algorithms. We participate in a conference and positively acquire evidence-based medicine (EBM) and the latest information.

EVALUATION

Evaluation of the progress of CEs in the education program is performed by the senior CE (who is the OJT trainer) using a checklist. There is also an authorized examination run by the Japanese CE society. The assessment of CEs specializing in pacemaker-related duties is performed by a person who has passed this examination and objective evaluation is conducted. However, the problem remains that subjective evaluation by the senior CE is also included and the evaluation criteria are not constant. Also, the OJT trainer is not experienced enough.

CONCLUSION

Progress of pacemaker technology is rapid and pacemaker-related duties are becoming complicated. Therefore, education about these duties is not only necessary for new CEs. To offer the best medical care to patients, it is important for CEs to acquire new knowledge and polish their techniques.