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Abstract

Background: Currently, Japan does not have a national standardized program for surgical residency. Therefore, surgical education information and strategies are not shared among teaching hospitals. This was the first study aiming to clarify the current situation of surgical residency in Japan.

Methods: A questionnaire survey investigating the present situation of surgical residency was sent to the 76 teaching hospitals in Hokkaido Prefecture, Japan.

Results: The response rate was 64.5%. Data from the 36 hospitals with active residency programs were analyzed. Most of the program directors (79.4%) were in charge of educational work for less than 5 hours per week. While half of the hospitals had skills laboratories or simulation centers, only two used them routinely for their residency program. Half of the hospitals evaluated the residents' competency and the quality of their educational programs.

Conclusions: Structured programs and evaluation systems have not been integrated well into surgical residency in Japan.

Where do we start?

The first survey of surgical residency education in Japan

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Introduction

With increases in medico-legal concerns and awareness of efficient surgical education, leaders in surgery are faced with the challenge of providing high quality programs for surgical trainees. The Accreditation Council for Graduate Medical Education (ACGME), Residency Review Committees and the Surgical Council on Resident Education oversee the quality of residency program in the United States (US) (1, 2). In addition, educational societies such as the Association of Program Directors in Surgery (APDS) and the Association for Surgical Education (ASE) cooperate with surgical societies to foster innovative research and development in surgical education (3). Due to the lack of supervisory organizations such as the ACGME that oversee postgraduate surgical education in Japan, each teaching hospital creates and conducts its own residency program without a national standardized syllabuses and curricula to follow. The graduates of medical school will be eligible to take the National Medical Practitioners Qualifying Examination, which is under the jurisdiction of Ministry of Health, Labour and Welfare in Japan. The examination is consists of multiple-choice questions, and the national average of pass rate was 91.2% in 2015. After passing the National Medical Practitioners Qualifying Examination, residents are obligated to complete a 2-year

structured postgraduate clinical training. This includes a rotation of internal, emergency and community medicine as compulsory subjects (4). The 2-year clinical training is equivalent to the internship year of American medical graduates or foundation programs in the UK. The training is followed by a core 3-year surgical residency program. After completing the postgraduate clinical training and surgical residency, residents can then apply to be accredited by the Board Certification of Surgery. One of the concerns with this system is that information and surgical education strategies are not being shared among teaching hospitals. The purpose of this study was to conduct the first survey aiming to clarify the current situation of surgical residency and the problems related to surgical education in Japan.

Methods

Survey development

The questionnaire items were created after three roundtable discussions among the authors, each of whom were senior staff surgeons and in charge of teaching medical students and surgical residents at Hokkaido University Hospital. Items were selected after consensus by all authors was reached. The survey contained 29 items consisting of

single answer questions, multiple-choice questions, and scaled responses. The questionnaire investigated the basic information about the teachings hospitals, tasks of the program directors, contents of the residency programs, simulation training, evaluations of residents and the residency program, and program directors' level of satisfaction with the residency program at their institution (Table 1).

Subjects

The questionnaires were sent by mail to the persons responsible for the surgical residency programs at the 76 teaching hospitals with university-based or community-based programs in Hokkaido prefecture. Hokkaido prefecture is the northernmost island in Japan, with a population of 5.4 million and the area of 32,210 square mile. The subjects of the residency programs of these 76 hospitals included general surgery, gastroenterological surgery, thoracic surgery and cardiovascular surgery, and each hospital had capacity for one to five postgraduate year (PGY) surgical residents.

Results

Demographics

Of the 76 surveys distributed, a total of 49 were returned (response rate 64.5%). Data from the 36 teaching hospitals that had active residency programs at the time of the survey were analyzed in this study. Of these 36 residency programs, six were university-based programs, 16 were conducted at hospitals affiliated with a university, and 14 were community-based programs.

Program directors

Most (n=29, 81%) residency programs had directors, and all of them were surgeons. Regarding the amount of working time the directors dedicated to education, most (79.3%) focused on education for less than 5 hours per week. As shown in Table 2, program directors were responsible for various aspects of the residents' education. Most (72.4%) of the program directors had interviews with residents only when necessary, while some (17.2%) had interviews with residents several times each month.

Residency programs

Of the 36 hospitals analyzed, 31 (86%) had teaching activities outside of clinical settings. The teaching programs included content to teach residents both cognitive and technical skills (Table 3). There was no program with mandated times for special

training scheduled during working hours on weekdays like academic half day that is popular in North american residency programs. Most of the cognitive and technical skills were taught either in patient care activities or during special seminars held outside of normal working hours.

Skills laboratories and simulation centers

Sixteen of the 36 (44%) residency programs had skills laboratories or simulation centers at their institutes. Regarding the use of tools in simulation training, most (93.8%) of the hospitals had video box trainers for practicing laparoscopic surgery, six (37.5%) used animal tissue, and a few used porcine (18.8%), procedure-specific physical simulators (18.8%), and high fidelity mannequins (12.5%) (Table 4). While only two of the 16 hospitals (12.5%) integrated simulation-based training into their surgical residency programs, most of the hospitals used skills laboratories or simulation centers irregularly. The sources of funding for the set-up and maintenance of skills laboratories or simulation centers are shown in Table 5. The most common funding source was hospitals (43.8%), but there were several funding sources supporting skills laboratories and simulation centers.

Evaluation of residents' competency

About half (55.6%) of the programs evaluated the competency of residents, such as their knowledge, skills and scholarly achievements. Most (75%) of the programs used checklists to record residents' achievements during their residency (Table 6).

Evaluation of residency programs

Evaluation system of the residency program existed in nineteen of the 36 residency programs (52.8%). They were evaluated by questionnaires completed by the residents and/or educators, or by program committee or scholarly achievements (Table 6).

Satisfaction of residency program directors

According to the questionnaire, only 8.3% of the directors were satisfied with the residency program at their institution. The main reasons for dissatisfaction were insufficient teaching time, dysfunctional curriculum, lack of training environment and insufficient budget (Table 7).

Discussion

In Japan, becoming certified by the Board Certification of Surgery consists of a preliminary written examination and an oral examination, which is conducted by the board committee of Japan Surgical Society. Surgical residents are eligible to take the

preliminary examination, which consists of multiple-choice questions about basic general surgery knowledge, at the last year of surgical residency (PGY5). They qualify to take the oral examination the following year after passing the preliminary examination and after completing 350 cases including gastrointestinal, thoracic, cardiovascular, breast, pediatric, trauma, and endoscopic surgeries. The oral examination evaluates the applicants' professionalism, communication skills, scholarly attitude, teaching and cooperative personality as part of the surgical team. The number of successful candidates in 2014 was 949 (pass rate 82.1%) for the preliminary examination (5) and 731 (pass rate 100%) for the oral examination (6). There has been a lot of discussion about the objectivity and quality of discrimination for the oral examination owing to the high passing rate. These issues were put to arguments not only in the field of surgery but also in the field of other medical specialties. Under these circumstances, Japanese Medical Specialty Board has been established as a third party licensing body in 2014. While the Board started preparation to evaluate and maintain the quality of medical specialty and its certification system, the quality of residency programs and the surgical residency environment were still unknown. This was the reason why we conducted the first survey aiming to clarify the current situation of

surgical residency in Japan.

Program directors

The ACGME in the US states that 30% of surgical residency program directors' time must be dedicated to education and this may require their institutions to release them from clinical and other activities during their work schedule (7). Since the role and efforts of "program directors" have not been established for surgical residency programs in Japan, most of the surgeons who are responsible for the residency programs at their hospitals can only work on educational matters in the extra time between clinical work meaning that there is little incentive for excellence in teaching. This situation was consistent with the results obtained in the present survey. Most (79.3%) of the directors were in charge of surgical education for less than 5 hours per week, and they met with or interviewed residents irregularly. This demonstrated that program directors are not able to adequately manage their residency programs due to the lack of time dedicated solely to education.

Skills laboratories and simulation centers

According to the survey results regarding program contents, 44.4% (16/36) of the residency programs conducted basic technical surgical skills training (Table 4). For the last decade, there have been more skills laboratories and simulation centers established for surgical training at teaching hospitals in Japan. Although many of the programs in the present survey had simulation centers or skills laboratories in their hospitals, only 12.5% (2/16) actually used the simulation centers or skills laboratories routinely in their residency programs. With regard to the use of surgical training facilities in the US, a survey by Kondorffer and colleagues demonstrated that only 55% of teaching hospitals had dedicated skills labs in 2006 (8). Since the importance of simulation training for the acquisition of surgical skills in a safe environment has become more apparent, the ACGME has stated that surgical residency program resources must include simulation and skills laboratories at teaching hospitals, and they must be used in conjunction with a competency-based method of evaluation (7). A 2013 national survey of surgical skills laboratories conducted in the US demonstrated that 99% of surgical residency programs had a simulation laboratory, 63% of the programs had organized simulation curriculum, and 77% of them utilized the mandated scheduled time for surgical training in the laboratory (9). Successful simulation centers can complement appropriate curriculum

and scheduled time for training. Since the concept of mandated scheduled teaching time during academic hours has not been introduced into residency programs in Japan, it should be considered for the safe and efficient simulation training of surgical residents.

Evaluation of residency programs

Evaluation is one of the essential components of educational curriculum. Our survey included questions about the evaluation of residents' competency as well as the residency programs themselves. Surprisingly, only 55.6% (20/36) of the programs evaluated the competency of residents and most of these (75%, 15/20) used a checklist to record the residents' achievements in surgical procedures (Table 7).

Competency-based evaluations, such as testing technical skills or cognition, were conducted by few institutes (15%, 3/20). Generally, comprehensive evaluation of residency programs requires enormous effort because such programs consist of various components. In our survey, 52.8% (19/36) of the hospitals evaluated the quality of their programs by referring to the results of questionnaires completed by residents or educators. The concept of surgical training has shifted toward a competency-based model to preserve the quality of residency programs (1) (10,11,12). The environment

surrounding surgery, which involves technological innovation and increasing consideration of the safety and ethics for patients, requires competency-based training and successful outcomes. Since an objective scale is indispensable to evaluating and giving feedback to residents during competency-based training, a reliable and valid assessment scale should be developed and introduced to evaluate the competency of residents and residency programs. In addition, although assessing the effectiveness of the curriculum is difficult and does not always reflect the comprehensive impact of education (13), we need to verify the effects of the existing curriculum in order to maintain or reform it with appropriate assessment analysis and deliberation.

Satisfaction of residency program directors

The results of the present survey demonstrated a low satisfaction rate with residency programs among the directors, representing the current situation of and problems with surgical education in Japan. The directors indicated that the main reasons for their dissatisfaction were insufficient teaching time, dysfunctional curriculum, insufficient environment and budget. These seemed to be common problems and ones that most teaching hospitals in Japan are facing. The problems may be due to the traditional

teaching style of surgery and the view of institutes about education. In Japan, most of the surgical training has been conducted as “on the job training” without structured curriculum for a long while, and more priority has been given to clinical work and research compared to resident education in teaching hospitals. While recently, there is a tendency for the university-based teaching hospitals to have more resources and teaching staff available for resident education, most community hospitals cannot afford to employ dedicated teaching staff for resident education. Acquiring an adequate budget and dedicated time for educational matters are issues that should not be tackled only by program directors, but should be addressed by the entirety of teaching hospitals.

Educational work such as curriculum development and management requires a great deal of expertise and labor. A surgical education society or organization where surgical educators can obtain and share surgical education knowledge and principles is necessary.

Limitations

The limitation of this study was that it was a regional survey conducted only within Hokkaido Prefecture. It is possible that the data did not reflect the situation throughout Japan. A national survey, covering all 1191 surgical residency programs is necessary in

order to investigate nationwide conditions of surgical resident education in Japan.

However, we collected data from university hospitals as well as hospitals affiliated with university and community hospitals, and residency programs in other regions of Japan are comprised of the same types of institutions. In addition, the lack of sharing information about surgical education obviously proved that a firm structure for surgical residency education has not yet been established in the country. This means that the lack of resources for surgical education is a general problem that needs to be solved. In order to overcome this situation, we conducted the first Japan Surgical Education Conference in July 2014. The conference consisted of various workshops similar to those conducted in previous APDS/ASE annual conferences. We discussed several issues that were revealed in the present survey. It is hoped that the Japan Surgical Education Conference will work towards developing the surgical education field by providing educators with expertise of surgical education and promoting the science of surgical education.

Conclusions

The results of this survey clarified the current situation of surgical education in Japan. It indicated the lack of sufficient circumstances and a standardized system for surgical education. Sharing of information and ideas related to surgical education and the

development of surgical educators are required to establish a high-quality education system in Japan.

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Table 1: Contents of the questionnaire

Categories	Item contents
Demographics	Classification of the teaching hospital, number of beds, case volume of operations, number of residents
Program director	Existence of a program director, work schedule, contents of education, frequency of meeting with residents
Residency program	Program contents, education tools, academic half-days
Skills laboratories/ Simulation centers	Existence of a skills laboratory or simulation center, frequency of use, access, variety of simulators, financial resources
Evaluation of residents	Existence of an assessment system, method of evaluation, frequency of evaluation, frequency of feedback
Evaluation of program	Existence of an assessment system, method of evaluation
Satisfaction of directors	Satisfaction of educators with their system of surgical residency and reasons for satisfaction/dissatisfaction

Table 2: Responsibilities of 29 program directors regarding educational activities in residency programs.

Educational activities	n (%)
Teaching presentations and writing	23 (79)
Didactic lectures	22 (76)
Training of technical skills	20 (70)
Interviews with residents	14 (48)
Evaluation of residents	13 (45)
Program development	7 (24)
Educational research	5 (17)

Table 3: Content of educational activities of 36 residency programs

Educational activities	n (%)
Case conferences	25 (69)
Training of basic technical skills	16 (44)
Journal clubs	13 (36)
Didactic lectures	12 (33)
Advanced skills training in wet laboratory	7 (19)

Table 4: Types of simulation training models

Training models	n (%)
Video box trainer	15 (94)
Animal tissue	6 (38)
Live porcine	3 (19)
Procedure-specific models	3 (19)
High fidelity mannequin	2 (13)

Table 5: Funding sources of a total of 16 skills laboratories and simulation centers

Funding sources	n (%)
Hospitals	7 (44)
Medical schools	3 (19)
Industry	3 (19)
Department of Surgery	2 (13)
Grants	2 (13)

Table 6: Types of implemented evaluation methods for residents and residency programs

Resident evaluation		Program evaluation	
Methods	n (%)	Methods	n (%)
Checklist	15 (44)	Questionnaires completed by residents	12 (60)
Scholarly achievements	6 (30)	Program committee meeting	8 (40)
Knowledge test	3 (15)	Scholarly achievements	8 (40)
Scale for technical skills	3 (15)	Questionnaires completed by educators	5 (25)
Other	1 (5)		

Table 7: Reasons of dissatisfaction with residency programs (33 respondents)

Reasons	n (%)
Insufficient teaching time	18 (55)
Dysfunctional curriculum	13 (39)
Insufficient training environment	13 (39)
Insufficient budget	10 (30)
Insufficient learning time for residents	8 (24)
Insufficient number of teaching staff	7 (21)
Teaching methodology	6 (18)
Lack of a person in charge	4 (12)
Other	2 (6)