Pre- and Postgraduate Medical Education at Juntendo University and Ultrasonography Use in Respiratory Diseases

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I graduated from Juntendo University in 1976. Until my retirement, I have belonged to Jichi Medical School and Juntendo University for approximately 10 and 30 years, respectively. My 30-year activity at Juntendo University is divided into 15 years in the Department of Respiratory Medicine and 15 years in medical education and the Department of General Medicine. I also worked for the Postgraduate Clinical Training Center for 14 years. As my "Farewell Lectures of Retiring Professor on March 30, 2016", this paper reports my activities related to medical education of pre-/postgraduate and the application of ultrasonography in the respiratory diseases at Juntendo University.

Key words: pre- and postgraduate medical education, Juntendo University, postgraduate clinical training, ultrasonography, respiratory disease

Introduction

I graduated from Juntendo University in 1976, and participated in postgraduate clinical training at Jichi Medical School. Subsequently, I began to work in the Department of Respiratory Medicine, and conducted studies for the use of ultrasonography in respiratory diseases as a new attempt. After returning to my old school Juntendo University in 1985, I performed activities as a pulmonologist. In 2001, when assigned to the Division of Medical Education as a professor, I was charged with the task of providing pre- and postgraduate education.

As I presented during "Farewell Lectures of Retiring Professors" on March 30, 2016, this paper reports my activities related to pre-/postgraduate education and ultrasonography use in the chest area at Juntendo University.

Medical education at Juntendo University

1. From the viewpoint of the National Examination for Medical Practitioners

The rate of graduates of Juntendo University who passed the National Examination for Medical Practitioners is markedly higher than the national mean (Figure-1). Based on the mean pass rates over the past 3 and 10 years, Juntendo University has been the top 3 and 2, respectively, among 80 universities throughout Japan. Such a favorable outcome is highlighted by a mean national examination pass rate of 99% of students who graduated from the university after completing a 6-year medical curriculum without repeating a year or
taking leave from school. Those who do not pass the National Examination for Medical Practitioners within the 6–year period account for approximately 3% of all freshmen in each year. In short, 1% of our students cannot pass the national examination during the 6th year, and 2% repeat a year, take leave from school, or do not pass the national examination. Therefore, as a measure to help them pass the national examination, it is important for all teaching staff members to not only support them when taking the graduation and national examination scores. There was a correlation between CBT–based and graduation examination scores.

A significant correlation is observed between Juntendo University students’ graduation and national examination scores (Figure–2). In line with this, it is possible to predict the probability of students passing the national examination based on their graduation examination scores to a certain

**Figure–1** Rates of graduates who passed the national examination for medical practitioners (national means and those at Juntendo University)

The rates of graduates who passed the national examination for medical practitioners during the period between 2006 and 2015 are shown. The solid and broken lines indicate the values at Juntendo University and national means, respectively.

(Annual Health, Labour and Welfare Report)

**Figure–2** Relationship between graduation and national examination scores at Juntendo University

Graduation and national examination scores showed a significant correlation.


**Figure–3** Relationship between Juntendo University students’ CBT–based and graduation examination scores

There was a correlation between CBT–based and graduation examination scores.

Figure 4 Relationship between admission examination scores (mathematics, science, and English) and undergraduate achievement levels


A: Admission examination scores related to mathematics
No correlation was observed among admission examination scores related to mathematics, undergraduate achievement levels in various courses, and performance assessment scores.

B: Admission examination scores related to science
There was no course in which the achievement level showed a correlation with admission examination scores related to science.

C: Admission examination scores related to English
Admission examination scores related to English were correlated with achievement levels in a large number of courses.
extent. If students with a low probability of passing the national examination are accurately identified earlier than the 6th year, they can receive more intensified guidance. At present, the standardized examination conducted in the 4th year using CBT (computer-based testing) is regarded as a useful index to predict students’ graduation examination scores (Figure-3)\(^1\)-\(^4\).

2. Relationship between admission examination scores and undergraduate achievement levels

To the present, there have been no studies examining the relationship between admission examination scores (mathematics, science, and English) and undergraduate achievement levels at Japanese medical schools. The following paragraphs report the results of my study, involving Juntendo University students (Figure-4, 5)\(^5\).

There was no correlation between the students’ admission examination scores related to mathematics/science and undergraduate achievement levels (Figures-4A, B). In contrast, English-related scores were correlated with achievement levels in a large number of courses after admission to the Faculty of Medicine (Figure-4C). Although the cause remained unclear, this suggests the necessity of considering students’ admission examination scores related to English when determining their admissibility to the Faculty of Medicine.

3. Relationships among admission examination scores, undergraduate achievement levels, and postgraduate clinical training outcomes

Residents are assessed, focusing on their knowledge, skills, attitudes, medical safety, professionalism, and co-medical staff assessment ability, as well as compressively (comprehensive resident assessment). I conducted a study, involving those who had graduated from Juntendo University, and subsequently participated in junior residency in Juntendo University Hospital\(^6\).

No correlation was observed between admission examination (mathematics, science, and English) and (comprehensive) resident assessment scores. On the other hand, there was a correlation between achievement levels in a large number of 1st to 6th courses and (comprehensive) resident assessment scores (Figure-5), indicating that the latter is under the influence of achievements in various courses throughout the undergraduate period, in addition to learning about clinical medicine. On examining the relationships among resident assessment items and achievement levels in different medical courses, OSCE (objective structured clinical examination) scores and clinical clerkship outcomes were correlated with a large number of resident assessment items, confirming their importance in clinical clerkship programs (Table-1).

4. Postgraduate clinical training

As junior residency became compulsory in 2004,
the Postgraduate Clinical Training Center was newly organized. In November 2002, I was appointed as the chief of the center. The following paragraphs report the outcomes of junior resident matching and number of residents who became Juntendo University staff after completing clinical training, as well as the achievement levels of students admitted to the graduate schools.

Table 1 shows the outcomes of junior resident matching in 2016. The total quota for Juntendo University Hospital, Shizuoka Hospital, Urayasu Hospital, and Nerima Hospital staff was 154, and 145 were actually matched. The numbers of residents matched to work in each hospital within the period between 2004 and 2016 were as follows: Juntendo University: 781, Shizuoka: 242, Urayasu: 435, and Nerima: 251; the total number of residents was 1,709, 849 and 860 of whom were graduates of Juntendo University and others, respectively.

Such an extensive manpower promotes clinical services, research, and education at Juntendo University.
Figure 6 Number of doctors who became Juntendo University staff after junior residency (2006-2016)
The line graph indicates total numbers, while the bar graph shows the values of graduates of Juntendo University and others. The total number of residents who became Juntendo University staff within the period between 2006 and 2016 was 1,525 (Juntendo University: 598; others: 927). The mean number during this period was 153, 60 and 93 of whom were graduates of Juntendo University and others, respectively.

Figure 7 Number of students admitted to the Graduate School, Faculty of Medicine, Juntendo University (total number, quota, and number of those who completed junior residency in the 4 Juntendo Hospitals)
The values shown in the upper and lower parts of the bar graph are the numbers of students admitted to the graduate school and those who were admitted to it and subsequently participated in junior residency in the 4 Juntendo Hospitals, respectively. The line graph indicates student quotas set by the graduate school. With an increase in the number of graduate students, the quota gradually increased from 80 to 100 in 2010, 120 in 2013, and 140 in 2016. Last year, the number of students admitted to the graduate school, who completed junior residency at Juntendo University, accounted for half of all graduate students.
5. Current status of residents after completing postgraduate clinical training

Those who have completed junior residency continue to receive training in medical departments of universities or hospitals they select. Ten years have passed since residents initially completed clinical training based on the new clinical training system. Figure-6 shows the number of residents who became Juntendo University staff (entered the medical office) after completing junior residency during the 10-year period. The total number was 1,525, 598 and 927 of whom were graduates of Juntendo University and others, respectively. The mean number was approximately 150, 60 and 90 of whom were graduates of the university and others, respectively.

Juntendo University promotes research activities with its graduate school as an important basis. The number of excellent graduate students markedly affects the academic development of the university. Figure-7 shows the number of students admitted to the graduate school. With an increase in the number of graduate students, the annual quota gradually increased from 80 to 120, and it reached 140 in 2016. The number of students admitted to the graduate school in 2015 was 142, nearly half of whom had completed their junior residency in the 4 hospitals belonging to the university. As future perspectives, further increasing the number of excellent young doctors, and activating research at the graduate school are crucial for the development of Juntendo University.

Use of ultrasonography in respiratory diseases

As ultrasound has limitation to the air and bone, the respiratory system comprising airway and osseous tissue had previously been regarded as inappropriate for ultrasonography. Focusing on the feasibility of identifying lesions using ultrasonography while avoiding the ribs and other bone structures in pathological conditions, such as atelectatic lungs adjacent to the chest wall, we started using the technique in respiratory diseases at Jichi Medical School. Figure-8 shows ultrasonographic images of an inpatient with lung cancer treated in the Department of Respiratory Medicine at Jichi Medical School. Figure-8 shows ultrasonographic images of a radiopaque lesion in the right middle lung field. Chest radiography confirmed the presence of a radiopaque lesion in the right middle lung field. Ultrasonography of the intercostal space in the right chest revealed pleural effusion (E), atelectasis (LUNG), a tumor (T), and its invasion (•) to the diaphragm.

Figure-8 Ultrasonographic images of a radiopaque lesion in the right middle lung field.
themediastinum/cardiovascularsystem. Ultraso-
ography allows observation from the body surface,
as well as safely and securely puncturing lesions
while monitoring images. Up to the present, approx-
imately 3,000 ultrasound-guided needle biopsies
have been performed (Figure-10). In the field of
respiratory medicine, ultrasonography has become
a modality indispensable for diagnosing pulmonary
lesions such as lung cancer, mediastinal tumors, and
pleural diseases represented by pleural effusion.

Figure-9 Number of diagnostic ultrasounds for respira-
Until the end of the last year, a total of 7,426 ultrasonographies had
been performed, involving pulmonary lesions, pleural effusion, the
mediastinum/cardiovascular system, diaphragm, and others.

Figure-10 Status of ultrasound-guided needle biopsies
Until 2015, more than 3,000 ultrasound-guided needle biopsies had
been performed.

Conclusion and acknowledgement

When looking back upon my career as a doctor, it
seems to have begun when I met Professor Shiro
Kira in my 4th year at Juntendo University. After
his assignment to the Department of Respiratory
Medicine, Jichi Medical School as a professor in
1975, I belonged to this school for approximately 10
years. During this period, I obtained both opportuni-
ties to learn about diagnostic ultrasound for respira-
tory diseases and acquaintance with a large
number of other doctors who taught me a lot. If
Professor Kira had not been assigned as a professor
of Juntendo University, I would not have been able
to return to my old school. Without his appointment
as the dean of the Faculty of Medicine, I might not
have been engaged in medical education.

Similarly, it is uncertain whether or not I might
have been lucky enough to be guided by Professor Hideoki Ogawa of the Department of Dermatology
that was located on the 9th floor of Hall-9, if the
laboratory of the Department of Respiratory
Medicine had not been located on the same floor.
Under his warm-hearted guidance, I was appointed
as a professor of the Department of Respiratory
Medicine in charge of medical education in 2001
(and a professor of the Department of General
Medicine in 2002).

Until my retirement, I have belonged to Jichi
Medical School and Juntendo University for approxi-
mately 10 and 30 years, respectively. My 30-year
activity at the latter is divided into 15 years in the
Department of Respiratory Medicine and 15 years
in medical education and the Department of General
Medicine. I also worked for the Postgraduate
Clinical Training Center as the chief for 14 years,
and was charged with the task of guiding students
admitted to the university based on a community-
based quota (scholars who are due to provide
medical services in designated communities after
graduation) for 8 years.

I am sure that I could not accomplish each of my
tasks without cooperation or support from many
people. I would like to express my deep apprecia-
tion to Professor Emeritus Yoshinosuke Fukuchi as
the successor of Professor Kira, Professor Kazuhisa Takahashi as the successor of Professor Fukuchi, Visiting Professors Yasuo Hayashida and Hiroshi Isonuma and, Professor Toshio Naito as Director of the Department of General Medicine, staff engaged in medical education and those of the Department of General Medicine, Clinical Training Center, and Medical School Office, and others involved in many other departments.

References


