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Original Article

The Practice of Emergency Medicine in Fukuoka City Hospital, A Secondary Emergency Facility in Japan

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Abstract

Objective : The transition of emergency departments and the current situation of emergency medicine (EM) in Fukuoka City Hospital (FCH) were reviewed.

Methods : The data concerning emergency medicine, such as the transition of intra-hospital emergency systems, were obtained from annual reports published in our hospital. Additionally, the data regarding educational programs for emergency room staff, the number of patients taken to the emergency room by ambulances, the activities regarding the Fukuoka Medical Rally (FMR) and the disaster relief team (DRT) were also reviewed and analyzed.

Results : Departments of neurology, neurosurgery, emergency, and cardiology were opened sequentially, starting in 2003, with an establishment of facilities of an emergency room (ER), intensive care unit (ICU), stroke care unit (SCU), and coronary care unit (CCU). Regarding educational programs, lectures and demonstrations on basic and advanced life support techniques were given to all staff annually starting in 2004, and resident doctors completed rotations in the ER and the ICU for three months. FCH staff consistently obtained excellent results at the FMR. Ambulance crews attended lectures and received training on EM and intra-tracheal intubation. The numbers of patients taken by ambulance to FCH increased from 129 in 2002 to 2,316 in 2011. The DRT was dispatched to respond to disasters that occurred in Japan.

Conclusions : As a secondary emergency hospital, FCH has developed a system to accept emergency patients. This project will contribute to the improvement of the EM system in the area.

Key words : Emergency medicine, Japan, A secondary facility, Intra-hospital system, Education for the staff, Contribution to the society

Introduction

The emergency medical service in Japan was created in the 1930's. In 1977, the Ministry of Health and Welfare of the central government of Japan established the role of emergency medical service centers as tertiary facilities in order to manage the facilities efficiently. Primary-care facilities were designated for walking patients only, secondary-care facilities were designated

for moderately critical patients requiring admission to a regular inpatient bed, and tertiary-care facilities were designated for highly critical patients requiring emergency surgery or admission to the intensive care unit¹⁾.

In 1963, the number of ambulances dispatched totaled approximately 200,000. This figure increased steadily each year, reaching 5,000,000 in 2003²⁾. One reason for this trend is that not only traumatic injuries, but also complications from general endogenous diseases prompted ambulance calls starting in 1986. A second reason is the progressive aging of Japanese society.

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Elderly people generally have a higher prevalence of diseases and have begun to call ambulances frequently³.

Another problem is that the number of specialists in emergency medicine (EM) is low. In 2011, there were an estimated 3,200 emergency physicians in Japan, which accounted for 1.2% of all physicians (264,000)². This figure is smaller than that reported in other countries. For example, there are 40,000 emergency doctors in the United States of America⁴.

This issue has caused a shortage of sources of critical care medicine, and brought about an imbalance between demand for and supply of EM⁵. During the 1980's, more than 50% of people who called an ambulance received help within five minutes; however, in 2010, the waiting times increased to eight minutes or more due to a deluge of calls from non-emergency patients and the elderly combined with an inadequate number of emergency physicians. The ambulance arrival time at hospitals after the first call from a patient also increased from twenty-six minutes to thirty-seven minutes on average⁶.

Fukuoka City Hospital (FCH), a locally independent administrative institution of the city of Fukuoka, one of twelve million cities in Japan, was

established in 1989 as a 200 bed hospital located in the downtown of the city (Fig. 1). Previously, FCH was not active in EM. However, in response to the social demands, a project to allow the hospital to accept emergency patients was implemented. Various plans were made for increasing the hospital's ability to treat such patients as one of the secondary-care facilities.

We reviewed the hospital's transition and its attempts to strengthen intra-hospital facilities and implement educational systems for staff. The number of patients taken to the emergency room (ER) and the nature of disaster relief activities undertaken by FCH staff were also reviewed.

Materials and methods

We annually accumulate many clinical data base in detail from each department of our hospital. We have also published these data as an annual journal each year from 2000 to 2011. In the current study, we obtained the data regarding emergency medicine, such as the transition of intra-hospital emergency systems and the educational programs for emergency room staff members, resident doctors and ambulance crews from those data base. Additionally the number of patients taken to the emergency room by ambulances, the activities regarding the Fukuoka Medical Rally (FMR) and the disaster relief team (DRT) were also reviewed and analyzed.

Results

The strengthening of systems for supporting emergency patients in FCH

Departments of neurology, neurosurgery, emergency, and cardiology were opened sequentially from 2003 to 2006. The emergency room (ER), intensive care unit (ICU), stroke care unit (SCU), and coronary care unit (CCU) were also established sequentially from 2005 to 2011 (Table 1).



Fig. 1 Fukuoka city, with a population of 1.4 million, is located in the south of Japan.

Table 1 A chronological transition of the emergency medical system of Fukuoka City Hospital

2003	April	Department of neurology was opened Department of neurosurgery was opened
	July	ALS training work-shop started
2004	June	BLS OSCE started
	July	ITI training for ambulance crews started
2005	April October	Department of emergency and ER were opened ICU was opened
2006	June	Department of cardiology was opened
	October	Medical Work Station started
2007	September	Fukuoka Medical Rally started
2010	April	SCU was opened
2011	June	CCU was opened

ALS : advanced life support, BLS : basic life support, OSCE : objective structured clinical examination
ITI : intra-tracheal intubation, ICU : intensive care unit, SCU : stroke care unit, CCU : coronary care unit

Table 2 The results of the Fukuoka City Hospital (FCH) team at the Fukuoka Medical Rally

	year	Number of resident doctors of FCH team	Results of FCH team	Number of total teams
The 1 st	2007	1	The 5 th grade	10
The 2 nd	2008	1	The runner-up	14
The 3 rd	2009	Non-participation	-	15
The 4 th	2010	2	The 4 th grade	17
The 5 th	2011	2	Champion	17

Basic and advanced life support training systems for paramedical staff

Basic life support (BLS) is a technique for saving the lives of patients with sudden cardiopulmonary arrest (CPA), which is an important technique for emergency medical staff. All staff of the departments of nursing, pharmacy, radiology, and rehabilitation received training and was required to pass an objective structured clinical examination (OSCE) of BLS held in the hospital every year. Training regarding techniques of advanced life support (ALS) was held several times per year as a one-day course workshop primarily for nursing staff. Emergency case conferences for paramedical staff were held four times a year.

Education for resident doctors

Resident doctors were obliged to learn EM through a new post-graduate medical education curriculum legislated in 2004²⁾. The educational term of EM for them was three months and the residents examined more than 500 patients during

their rotations in the ER and the ICU. Additionally, the residents received lectures on EM, critical care medicine, and crisis management of patients.

Special training for the Fukuoka Medical Rally (FMR), which was held in Fukuoka as an emergency medical care skills competition once a year starting in 2007, taught the resident doctors many kinds of techniques to respond to emergency cases. Additionally, they learned all about the EM system, especially in regard to disaster medicine.

FCH encouraged them to learn the social EM system through training for the FMR as well as by providing ordinary medical care for patients in the hospital. The resident doctors participated in FMR challenges every year and consistently obtained excellent results (Table 2).

Education for ambulance crews

A unique system in Japan, an operation called Medical Control (MC) has been implemented to

survey the quality of pre-hospital care given by ambulance crews⁷. Ambulance crews that belonged to the Fukuoka Fire Prevention Bureau under the control of the Fire and Disaster Management Agency competed as a MC team on behalf of the hospital.

(i) Emergency Work Station (EWS)

The EWS was regarded as one of the off-line MC of the Japanese EM system established in 1999. The purpose of this system was to dispatch an ambulance as a doctor passenger car in the cases of CPA. While waiting for ambulance calls, crews received lectures on EM by medical doctors in the hospital. These lectures amounted to 350 hours for a total of nine teams every year.

(ii) Intra-tracheal intubation (ITI) technique teaching system

ITI technique instruction was directed by anesthesiologists in the operating room (OR). Ambulance crews were authorized licenses of ITI as EM technicians after they completed thirty cases of successful challenges. From 2004 to 2011, a total of 34 crews received a certification of ITI of EM technicians at FCH.

The numbers and characteristics of ambulance patients

The numbers of patients taken to FCH by ambulance is shown in Fig. 2. Before 2002, that number totaled almost 100 to 200 people every year. The number consistently grew and reached 2,316 in 2011. Of these cases, 44.4% were treated as inpatients as an average. The percentages of patients admitted to neurology and neurosurgery were 25.9% and 18.8%, respectively, which totaled 44.7%. The percentages of patients admitted to general internal medicine, orthopedics medicine, cardiovascular disease, and surgery, were 24.4%, 19.6%, 6.3%, and 4.9%, respectively, as an average from 2005 to 2011 (Fig. 3).

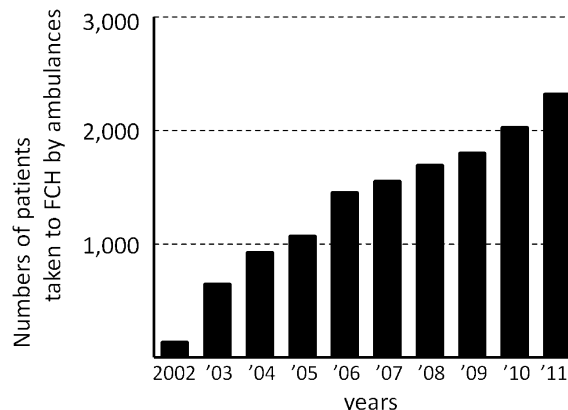


Fig. 2 The number of patients taken to FCH by ambulance. 44.4% of the cases were treated as inpatients after the transportation.

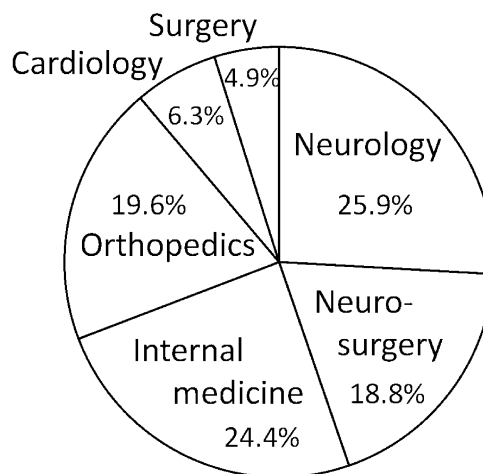


Fig. 3 The proportion of the frequency of patients of each department in average from 2005 to 2011.

Disaster relief activities

The disaster relief team (DRT) of FCH responded to the Fukuoka, Niigata, Tohoku-Pacific Ocean earthquakes, the Fukushima nuclear power plant disaster, and the Hyogo railway accident. FCH staff worked to prevent the local expansion of the world-wide swine influenza pandemic in the Fukuoka district in 2009 (Table 3).

Discussion

In Japan, which has a population of 128 million, the number of medical doctors relative to the population is smaller than that of western countries. A ratio of 2.0 : 1000 in the former and 3.0 : 1000 in the latter comes from a comparison of

Table 3 A list of disasters and accidents to which the disaster relief team of Fukuoka City Hospital responded

		Disasters and accidents	Number of deaths
2004	March October	Fukuoka earthquake	1
		Niigata earthquake	68
2005	April	Hyogo railway accident	107
2009	May	New type swine influenza	198
2011	March	Tohoku-Pacific Ocean earthquake with Fukushima nuclear power plant disaster	15,869 as of August, 2012

the average as reported by the Organization for Economic Co-operation and Development (OECD) countries in 2009⁸). A serious lack of emergency department staff is an outstanding problem in Japan. Consequently, EM in Japan has frequently been provided by physicians without specialized training in EM¹).

The shortage of EM doctors was caused by the Japanese government, which did not make EM a significant priority and did not supply adequate financial support for EM staff³). Such treatment of ER doctors reduced their social status due to the relatively low financial support they received in spite of their high medical problem solving abilities and hard work¹). The Japanese Association for Acute Medicine (JAAM) was established in 1973 and a specialty board was created in the 1980's; however, the decrease in the number of emergency physicians did not stop²).

The low supply of facilities does not produce an adequate income for hospitals to be able to maintain ER's. As a result, many secondary care facilities withdrew services in this area due to an imbalance between low amounts of financial income and significant, but costly medical techniques. The entire activities of second level hospitals were weakened, and this pressure was passed on to tertiary level hospitals. Consequently, the original work of tertiary facilities for highly critical patients has been disturbed⁵).

The number of patients taken by ambulance to hospitals in the Fukuoka district was approximately 60,000 out of a population of 1.4 million. In 2010, the arrival time at the scene and the arrival time at the hospital were approximately seven and twenty-eight minutes, respectively,

which were among the best reported times in Japan. However, the status of EM practice in Fukuoka city was not as satisfactory as that in other leading countries, such as those in Europe and North America⁹). Although the number of tertiary facilities was fixed at three in the area, the number of secondary facilities decreased from 44 in 2001 to 36 in 2011, a 18% decrease.

These phenomena have created serious social problems, such as the refusal by hospitals to accept emergency patients. To improve such a state of affairs, systemic changes for EM implemented by the central government are expected, especially in light of the nation-wide consensus that increasing the numbers of emergency specialists is required¹).

EM at FCH was initiated in response to these social pressures in order to avoid a breakdown of the EM system in Fukuoka city. We adopted an ER model in which emergency physicians first provide care to various kinds of patients²). We successfully provided the same EM techniques as tertiary facilities, such as percutaneous coronary intervention (PCI), intra-aortic balloon pumping (IABP), percutaneous cardiopulmonary support (PCPS) for acute coronary diseases, tissue-plasminogen activator therapy for cerebral infarction, and high-level techniques demanding surgery for subarachnoid hemorrhage or other acute care traumatic diseases. Additionally, we supplied unique one-night stay systems for the comfort of patients with mild diseases.

By competing with teams from several tertiary emergency facilities and achieving good results in the FMR, resident doctors at FCH came to understand EM and to develop deep interests in

emergency care. When disasters such as earthquakes occurred, FCH did not have its own disaster medical assistance team (DMAT); however, a volunteer team of FCH responded under the command of the anti-disaster head-quarters in corporation with DMATs from tertiary emergency facilities.

As we have related above, FCH constructed a system for EM as a secondary emergency facility in a short period of time. Growth in the ability of secondary level emergency facilities to accept emergency patients will remove the burden from tertiary facilities in the area. The above described project is therefore expected to help improve the entire emergency medical system and infra-structure of Japanese society.

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Competing interests

None declared

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(和文抄録)

日本の二次救急病院における救急医療 —福岡市民病院での経験—

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日本の救急医療体制は、救急科専門医師数の不足、不十分な財源支援、社会的認知度の低さ等が指摘されており、搬送患者の病院収容時間の遅延、二次病院の救急医療からの離脱などが生じ停滞状況にあると考えられる。病床数 200 床の二次救急病院である当院では、地域の救急医療に貢献するために、2003 年以来救急患者受け入れ体制の充実を図って来た。救急疾患に対応するために、神経内科、脳外科、循環器内科の各診療科を新設し、救急部、集中治療部、脳卒中集中治療室、冠動脈疾患集中治療室等の設備を拡充した。また、全医師、看護師に対する一次、二次心肺蘇生法講習会開催や、研修医に対する救急患者の診療、救急関連学会での発表、メディカルラリー出場の指導、また全職員に向けた救急症例検討会の開催等の教育活動を行って来た。地域の救急隊員へは、メディカルコントロール事後検証、救急ワークステーションでのドクターカー出動、救急疾患の講義、手術場での気管挿管実習などを行い、また災害救助活動として JR 福知山線事故や、東北太平洋沖地震被災地への出動、新型インフルエンザ流行時の全病院挙げての患者受け入れ等を行って来た。これら救急診療体制の充実により、救急搬送患者の受け入れが進み、その数は 2002 年の年間 129 名から、2011 年には 2,316 名に増加した。二次病院において、救急診療体制の進展を図り、急性期重症患者に対する高度な治療を行うことにより、地域内の三次救急病院の負担を減らすこと、ひいては我が国の救急医療体制の維持、発展に寄与することが可能ではないかと考える。