Report of a 2-year Fellowship in Milan: Introduction to the Italian Healthcare System and What I Learned at San Raffaele Hospital

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I experienced a 2-year fellowship in the Laboratory of Echocardiography at San Raffaele Hospital, which is recognized as a leading centre in the world for treatment of coronary artery and structural heart disease. In this report, I will describe the Italian healthcare system, which is unfamiliar to most Japanese people. Italy's indicators of health system outcomes and high standard of medical care are impressive. Life expectancy is the fifth highest among ‘Organization for Economic Co-operation and Development’ (OECD) countries. In addition, the World Health Organization (WHO) regarded Italy's healthcare system as the second best in the world in 2000. However, there are some concerns that need to be addressed.

In the second part of this report, I will discuss the Cardio-Thoracic-Vascular Department of San Raffaele Hospital and describe my work in the echo laboratory.

**Key words:** Italian healthcare system, echocardiography, structural heart disease, trans-catheter aortic valve implantation

**Italian healthcare system**

Healthcare spending in Italy accounted for 9.2% of the Gross Domestic Product (GDP) in 2012, of which 75% was public, and is almost equal to the average (9.3%) of OECD countries (Figure-1). This rate of spending in Italy is much lower than in the US and other European countries including Netherlands, France, Switzerland, and Germany. In Japan, healthcare spending is 9.4% of GDP. Italy's indicators of healthcare system outcomes, quality of care, and efficiency are very impressive. The life expectancy in Italy was 82.3 years (80.2 years for men and 85.0 years for women) in 2012. Only Japan, Iceland, Switzerland, and Spain have a higher life expectancy than Italy. In 2000, WHO ranked Italy's healthcare system as the second best in the world after France. However, this ranking has been subject to several varied criticisms since its publication.

After World War II, Italy established a Social Security System that included social health insurance administered by sickness funds. In the 1970s, social health insurance faced several equitable problems as coverage differed between sickness funds and approximately 7% of the population remained uninsured. Moreover, sickness funds nearly went bankrupt by the mid-1970s. Due to growing public dissatisfaction with the existing healthcare system, Italian policymakers proceeded with a structural reform. In 1978, the government established the *Servizio Sanitario Nazionale* (SSN) — the Italian version of a National Health Service (NHS) — that includes universal coverage and tax funding. Healthcare is provided for all citizens and residents through a mixed public–private system. The public component is the SSN, which is organized under the Ministry of Health, and is administered at a regional basis (21 regions and autonomous provinces). The Italian healthcare system was severely damaged by the global economic and financial crisis that began in 2008.
Many regional health budgets ran a substantial deficit, which led to central authorities imposing *Piani di Rientro* (Recovery Plans) on ten of them. Although the Ministry of Health maintained its role in ensuring that essential levels of care were provided at a regional level, the Ministry of Finance became actively involved in designing and approving healthcare delivery. As in many other European countries, healthcare spending has decreased in recent years.

Italy is a very heterogeneous country, in both social and economic terms. The southern regions of Italy are among the poorest. The autonomous province of Bolzano has a GDP per capita that is more than double that of Campania, and the difference in the unemployment rate between these two areas is almost five-fold. Such heterogeneity is reflected in the healthcare system. Patients’ satisfaction levels vary across Italy. Patients may opt for healthcare in another region for several reasons. The main reason why patients move from southern Italy to northern Italy is to seek higher quality healthcare.

Relative to its population, Italy has slightly more doctors than most OECD countries, with 3.9 practicing doctors for every 1,000 citizens. Japan, for example, has 2.3 doctors for every 1,000 citizens. Specialists outnumber generalists in Italy. Generalists represent only 23% of all physicians, compared to an average of 30% across other OECD countries. Family doctors act as ‘gatekeepers’ for the Italian healthcare system. They are paid entirely by the SSN, must offer visiting hours at least 5 days a week, and have been limited to seeing only 1,500 patients. The SSN assigns patients to a doctor, but if they are dissatisfied, they are able to change doctors. Visits to specialized doctors and diagnostic tests are provided by both public and private hospitals, and if prescribed by a family doctor, either requires copay or are free for the poor. Waiting periods are usually a few months at the large public facilities and a few weeks at the smaller private facilities. However, patients can opt for the ‘free market’ option, provided by both public and private hospitals, which is paid completely out-of-pocket and generally has a much shorter waiting period. Surgery and hospitalization are provided by both public and private hospitals completely free of charge for everyone, regardless of income. For planned surgery, waiting periods can be several months, especially in more populated cities.

While the primary healthcare system has served an important role up to now, Italy faces a demographic and epidemiological shift with a growing elder population and a rising burden of chronic conditions similar to Japan. The percentage of citizens over 65-years-old was one of the highest...
among the OECD countries. This implies an increased prevalence of chronic disease and long-term health conditions. Long-term healthcare and preventive services are underdeveloped in Italy compared to the other OECD countries. The development of such services is one of the highest priorities in the Italian policy agenda given the challenges brought on by the demographic and epidemiological shift.

In Italy, medical school lasts 6 years. Traditionally, the first three years are devoted to basic science, whereas the last three years are devoted to clinical medicine. At the end of the 6 years, students have to present a final thesis to a board of professors. The subject of this thesis may be a review of academic literature or an experiment work, and usually takes more than a year to complete. The title awarded at the end of the presentation ceremony is ‘Dottore in Medicina e Chirurgia’ (‘Doctor of Medicine and Surgery’). After graduating, new doctors must complete a three-month, unpaid, supervised ‘post-degree training’ consisting of two months in their university hospital (one month in a medical service and one month in a surgical service) and one month shadowing a general practitioner. After receiving a statement of successful completion for each month from their supervisors, new doctors take an examination to obtain their full license to practice medicine. They will then choose between various career paths, each usually requiring a specific admission exam. Most new doctors either choose to train as a general practitioner (a 3-year course run by each Region, including both general practice and rotation at non-university hospitals), or choose to enter a 5-year program at a Scuola di Specializzazione (‘specialty school’) at a university hospital.

San Raffaele Hospital

San Raffaele Hospital is a healthcare institution and research centre that was established in the 1970s (Figure-2). The hospital is affiliated with the School of Medicine and the School of Nursing of the Vita-Salute San Raffaele University. San Raffaele Hospital is situated over a 300,000 m² area in north-east Milan. The hospital is accredited with the SSN and has approximately 1,300 beds. In 2014, San Raffaele received 50,950 inpatients, carried out more than 35,000 surgical interventions, and dealt with 63,500 emergencies. The hospital also serves 895,000 outpatients. The Cardio-Thoracic-Vascular Department includes the clinical cardiology unit, interventional cardiology unit, thoracic and vascular surgery unit, heart surgery unit, rehabilitation functional re-education services unit, intensive care unit (ICU), and coronary care unit (CCU). The interventional cardiology unit is internationally renowned for the large spectrum of its performance at cutting-edge clinical and research activities. The unit specializes in the treatments of complex coronary pathology, peripheral vascular disease, and structural heart disease. An important function of the unit is the percutaneous treatment of structural heart disease, including percutaneous trans-catheter aortic valve implantation and percutaneous mitral valve repair. Research plays an important role at San Raffaele Hospital. San Raffaele Hospital has been at the forefront of the development and evaluation of new cardiac devices, which have been utilized commercially and benefited thousands of patients. The interventional cardiology unit has been involved in numerous multicentre international randomized trials that have changed the practice of interventional cardiology.

My work in echo laboratory

My husband, Tadashi Miyazaki, studied at San Raffaele Hospital under the supervision of Dr. Antonio Colombo, in the interventional cardiology unit since April 2013 for two years. I decided to accompany him. Due to Dr. Colombo’s kindness, I started my fellowship with the echo team, which is my area of expertise. I was able to take part in approximately 30 cases of transthoracic echo (TTE) and approximately 10 cases of transoesophageal
echo (TEE) per day. My mentor was Dr. Eustachio Agricola, an expert of echocardiography, especially in structural heart disease. With his support, I was able to experience a lot of echo for catheter-based intervention for structural heart disease. At San Raffaele, there were a multitude of catheter interventions for structural heart disease, such as transcatheter aortic valve implantation (TAVI) and percutaneous mitral valve edge-to-edge repair (MitraClip). In addition, I was able to learn echo for left atrial appendage device closure and left ventricular dyssynchrony assessment while collaborating with an electrophysiology (EP) team. In Japan, TAVI was covered under the insurance reimbursement scheme in 2013. San Raffaele is considered one of the highest volume centres for TAVI with over 700 cases since 2007. Figure-3 shows some examples of TAVI prostheses implanted at San Raffaele. I participated not only in pre and during procedure examinations, but also followed up with outpatients after TAVI and MitraClip, which was an excellent opportunity for me. In addition, I took part in a TAVI follow up research project under Dr. Agricola’s direction, and was able to complete clinical research on TAVI complications, particularly, paravalvular leak (PVL), which is known as a prognostic factor after the procedure \(^{2,3}\) (Figure-4). In our research, we assessed whether the baseline ejection fraction (EF) affects the impact of PVL on mortality after TAVI. We analysed 514 consecutive patients with native severe aortic stenosis who underwent TAVI. Patients were divided into two groups – EF < 40% group and EF ≥ 40% group– according to baseline EF. The mean age was 79.5 years and 49% of participants in our study cohort were male. Patients in the EF < 40% group were younger and had a higher logistic EuroSCORE compared to patients in the EF ≥ 40% group. Diabetes, coronary artery disease, atrial fibrillation, and renal insufficiency were more prevalent in the EF < 40% group. Patients in the EF < 40% group had more mitral regurgitation. In-hospital mortality was significantly higher in the EF < 40% group (8.3% vs. 0.9%, p < 0.0001). More than moderate PVL was significantly associated with an increase in 2-year estimated mortality only in the EF < 40% group (65% vs. 20%, log-rank p < 0.0001) whereas no difference was seen in the EF ≥ 40% group (21% vs. 19%, log-rank p = 0.509). The interaction between PVL more than moderate and EF < 40% was statistically significant. Prognosis and symptom improvement after valve replacement is partially due to the reverse remodelling of the left ventricular. Remodelling, however, might be attenuated by volume overload due to significant PVL. Since EF is an index of systolic dysfunction, patients
with reduced EF might have decreased tolerance to volume overload caused by significant PVL, according to the Frank–Starling mechanism. The findings of our study could have significant clinical implications. In patients with reduced EF, TAVI operators should pay particular attention to minimizing PVL, as these patients demonstrated worse outcomes and had increased mortality rates when left with at least moderate PVL at the end of the procedure. We concluded that the impact of more than moderate PVL on mortality after TAVI was significant in the EF < 40% group but not in the EF ≥ 40% group. Even though operators should aim to minimize PVL in all TAVI patients, special attention is required for patients with reduced baseline EF. I presented this research at the European Society of Cardiology (ESC) congress and the European Association of Cardiovascular Imaging (EACVI) congress in 2014. My findings were published in the International Journal of Cardiology.

I had some difficulty communicating with patients and medical staffs due to language barriers as most conversations took place in Italian. Fortunately, most Italians are friendly and I was able to adjust and fit in well with the work environment. I deepened my friendship with my colleagues and keep frequent contact with them. I would like to contribute to Juntendo by utilizing this valuable experience in Milan.

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References