What is an Ideal Heart Team? Our Approach and Recent Results against Coronary Artery Disease

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Objective: Guidelines are suggesting Heart Team is crucial to manage patients with multi vessel coronary disease. We have created the ideal Heart Team by creating a facility and having interactive conferences every day since 2011. Here we introduce our strategies and achievable outcomes. Materials and Methods: Numbers of CABG and PCI cases are collected retrospectively. Results: The number of isolated CABG also increased from 22 in 2011 to 61 in 2014. The ratio of PCI/isolated CABG dramatically decreased from 19.3 in 2011 to 5.0 in 2014. Conclusions: Number of CABG increased and the reduction in PCI/CABG ratio was observed between before and after establishment of new Heart Team.

KEY WORDS: CABG guideline, coronary artery disease, Heart Team

I. Introduction

The concept of a Heart Team was initially proposed in ESC/EACTS Guideline in 2010. This guideline informs us that the appropriate revascularization strategy for a patient with multi vessel disease should be managed and discussed by the Heart Team. Although many cardiac centers have embraced multidisciplinary teams following this announcement in Japan, they may not be well implemented at this stage due to the novelty of the concept, lack of experience, lack of proven benefit, logistical issues, as well as parochialism between specialties. Here we introduce our strategy to create an ideal Heart Team and its achievable outcomes.

II. Recent guidelines and enhancement in real world treatment

SYNTAX trial is a unique prospective randomized study in terms of stratifying severity of coronary disease by using score, which is counted depending on the portion and configuration of lesions. 0 to 22 correspond for low, 23 to 32 for intermediate, and 33 and above for high score. SYNTAX trial demonstrated a higher incidence of major adverse cerebrovascular and cardiac events in PCI than CABG during the 5 year follow up period. Responding to those results, ESC/EACTS Guideline 2014 produced these indices (Fig. 1). Although ACC/AHA/ACP - ASIM Practice Guidelines and JCS Guidelines are not reflected by SYNTAX trial, indications for PCI are limited to one or two vessel disease not including just proximal LAD lesion. After reviewing the transition of annual cases for CABG at the Japanese Association for Coronary Artery Surgery, we saw a steep decline in 2004 due to the appearance of drug eluting stent (DES). The number of cases were steady until 2010 in which SYNTAX trials and new ESC/EACTS Guidelines were published. Although a slight decrease was seen in 2010, the numbers have been steady in recent years. The report from The Japanese Circulation Society showed PCI/CABG ratio in 2012 was 7–8/1, which is higher than the ratio in other developed countries such as Canada, England, Germany, and the United States, also the average of OECD (Fig. 2).

III. Annual variations of CABG in USA and Japan

The number of CABG in the United States was still increasing even after the appearance of DES over 150,000 cases per year until 2010. Although ESC/EACTS Guideline published in 2010, the number in Japan steeply decreased and wandering around 145,000 in these years. On the other hand, the number firstly decreased in 2004 probably due to the appearance of DES. It was steady until 2010 and showed mild increment in 2011 possibly influenced by ESC/EACTS Guideline and SYNTAX trial (Fig. 3).

What is Heart Team?

Although the terminology of Heart Team was established in ESC/EACTS Guideline 2010, cardiac physicians have imple-
Amy C. Edmondson from Harvard business school mentioned about teaming how organizations learn, innovate, and compete in the knowledge economy. She proposed four pillars to establish an effective teamwork.

1. Speaking up
   Leader should tell respect for each member’s opinion and create a free discussion. Strong charisma like ordering as leader’s mind may collapse member’s opinions. This situation happened in the Columbia disaster. Engineers could not speak out even though they noticed the problem of insulating foam dropout. Decision making should be based on a vigorous and free discussion.

2. Collaboration
   Members should cooperate, respect each other, and share a number of trials to compare surgical and interventional/medical treatments. A Heart Team is composed of cardiac surgeons, interventional cardiologists, and non-interventional cardiologists who will be in a neutral position throughout decision making.

Team Building Japan indicates three key factors to create an ideal team:

1. Members share a clear goal
   Members understand what is the most appropriate treatment for a patient with coronary disease depends on a specific patient background.

2. Each member is focused on a common goal
   Members cooperate to accomplish the goal not to prioritize individual/territorial profit.

3. Each member has strong commitment to achieve a goal
   Members are assured of the therapeutic method, technique, and quality obtained from Heart Team discussion as best practice.

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2. Collaboration
   Members should cooperate, respect each other, and share a
and one hybrid OR (Fig. 5). OR is utilized for cardiac and vascular surgery, angiographic room is utilized for coronary examination/intervention and anti-arrhythmic treatment, whereas hybrid OR is utilized widely like coronary examination/treatment, anti-arrhythmic device implantation/exchange, numerous cardiac surgeries, and vascular surgery/intervention.

Thirdly, we are organizing the Heart Team conference every morning from Monday through Friday. It starts from PCI cases done the day before and followed by planned PCI cases on the day, surgical cases done the day before, and planned surgical cases on the day. Every surgical video completed yesterday is edited to one-minute video for whole Heart Team to be able to understand the structure of operation (Fig. 6).

In this conference, we also discuss about which treatment (surgery or catheter intervention) is beneficial for the patient with valvular heart disease or ischemic heart disease. After the Heart Team makes decision on a case, every staffs have to follow the policies of the treatment.

IV. Results

Since the cardiovascular center was established in 2011, we have worked as mentioned above.

After moving into the new facility we sometime met the situation of CABG in OR and PCI in hybrid OR simultaneously. Visitors for PCI could also observe CABG and found the operating time for CABG is shorter than the time for complex PCI in some cases. Not long after, calls from cardiologists gradually increased to discuss cases just after coronary angiograms in front of hybrid OR and angiographic room where we also asked non-interventional cardiologist to check the case and three-way discussion was held on site.

We also took care of urgent cases treating them as soon as possible with due consideration for patients’ safety. Sometimes we meet a patient with unstable angina which can be stabilized with IABP then schedule the case for a few days later. Cardiologists wonder if an additional coronary event will happen during the waiting time because they have an ability to treat the patient immediately. So we decided to treat the patient as soon as possible to diminish the gap between door to balloon time and door to CABG time.

Many cases went into CABG due to the complexity of coronary disease, which requires a longer time to treat, even if the SYNTAX score was below 22.

During the morning Heart Team conference surgical videos were very impressive for cardiologists. They started to ask numerous things related to the operations. As time went by questions from cardiologists became intrinsic and understanding efficacy, demerit, and risk of complication of each operation.

Although both numbers of PCI and CABG increased in 2011,
number of PCI slightly decreased recently. On the other hand, number of CABG increased gradually; it rose from 30 in 2011 to 78 in 2014. The total number of cardiac and great aortic surgical cases also increased from 114 in 2011 to 197 in 2014.

The number of isolated CABG also increased from 22 in 2011 to 61 in 2014. The ratio of PCI/isolated CABG dramatically decreased from 19.3 in 2011 to 5.0 in 2014 (Fig. 7).

V. Discussion

Medical multidisciplinary teams achieving better results started in oncology area as tumor boards which showed significant improvement in the quality of care\(^\text{15}\). Yet, the Evidence level of Heart Teams is still ranked as C because of the relatively short history and small number of implementations.

It was very fortunate for us to reestablish the facility in 2011 which is just one year after the announcement of the Heart Team concept which affected our thinking on how to create an ideal
Fig. 7 Annual variations of CABG cases and PCI/CABG ratio in our hospital. Steep decrement of PCI/CABG was observed between 2011 and 2012 whereas steep increment of CABG cases in the same period.

facility. We came up with the idea to work together in the same place, no matter where or when. Although the facility is very compact and has only one OR, one angiographic room, and one hybrid OR, we are now performing over 400 cases of cardiovascular surgeries and over 1,300 cases of catheter examinations and treatments. It is not essential to create an ideal facility but it will help facilitation to create an ideal Heart Team.

It is not sufficient to create a figurehead Heart Team. We have to check how the Heart Team are functioning. It is crucial to discuss whether PCI or CABG is applicable for patients along with the guidelines as making consideration for patient’s background. The benefits of surgeries are not only achieving better results but also checking the diseased lesions directly. As showing surgical videos to cardiologists, they will understand disease or lesions profoundly and discussions between cardiac surgeons and cardiologists will be enhanced in the same field. Through the Heart Team discussion every morning, we, cardiac surgeons have also gradually become more understanding cardiologists’ mind. Therefore, we now correspond to urgent coronary cases as soon as possible. It is not only cardiologists but also cardiac surgeons have changed their mind.

There are many differences in the competency of cardiac surgeon and interventional cardiologist between each facility. For example, a patient who is the indication for PCI in a hospital could be the indication for CABG in the other hospital. Decision-making should be considered with the view of the competency of cardiac surgeon and interventional cardiologist in each facility. Consequently, decision-making with the patient should be determined by the multidisciplinary Heart Team in each hospital.

VI. Limitations and perspectives

This is only a single center study. Additional studies will be required to be more evident. We are now searching overall patient outcome before and after creating Heart Team to make sure the effectiveness of creating Heart Team.

VII. Conclusion

Number of CABG increased and the reduction in PCI/CABG ratio was observed between before and after establishment of new Heart Team.

All authors declare no conflict of interest.

References

1) Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS); European Association for Percutaneous Cardiovascular Interventions (EAPCI); Kolh P, Wijns W, Danchin N, et al: Guidelines on myocardial revascularization. Eur J Cardiothorac Surg 2010; 38 Suppl: S1-S52
2) Généreux P, Palmertini T, Caixeta A, et al: SYNTAX score reproducibility and variability between interventional cardiologists, core laboratory technicians, and quantitative coronary measurements. Circ Cardiovasc Interv 2011; 4: 553–561
3) Kolh P, Windecker S, Alfonso F, et al: Task Force on Myocardial Revascularization of the European Society of Cardiology and the European Association for Cardio-Thoracic Surgery: European Association of Percutaneous Cardiovascular Interventions: 2014 ESC/EACTS Guidelines on myocardial revascularization: the Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). Developed with the special contribution of the European Association of Percutaneous Cardiovascular Interventions (EAPCI). Eur J Cardiothorac Surg 2014; 46: 517–592
4) Hillis LD, Smith PK, Anderson JL, et al: 2011 ACCF/AHA Guidelines for Coronary Artery Bypass Graft Surgery: executive summary: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation 2011; 124: 2610–2642
5) JCS Joint Working Group: Guidelines for elective percutaneous coronary intervention in patients with stable coronary artery disease (JCS 2011) published in 2012-digest version. Circ J 2013; 77: 1590–1607
6) Head SJ, Kaul S, Mack MJ, et al: The rationale for Heart Team decision-making for patients with stable, complex coronary artery disease. Eur Heart J 2013; 34: 2510–2518
7) STS national database. http://www.sts.org/national-database/database
8) Japanese association for thoracic and cardiovascular surgery annual report. http://www.jpats.org/modules/investigation/index.php?content_id
9) The European Coronary Surgery Study Group: Prospective randomised study of coronary artery bypass surgery in stable angina pectoris. Second interim report by the European Coronary Surgery Study Group. Lancet 1980; 2: 491–495
10) Murphy ML, Hultgren HN, Dette K, et al: Treatment of chronic stable angina. A preliminary report of survival data of the randomized
11) King SB 3rd, Lembo NJ, Weintraub WS, et al: A randomized trial comparing coronary angioplasty with coronary bypass surgery. Emo- ry Angioplasty versus Surgery Trial (EAST). N Engl J Med 1994; 331: 1044-1050

12) The Bypass Angioplasty Revascularization Investigation (BARI) Investigators: Comparison of coronary bypass surgery with angioplasty in patients with multivessel disease. N Engl J Med 1996; 335: 217–225

13) http://www.teambuildingjapan.com/about/idea/

14) Amy C. Edmondson. Teaming: How organizations learn, innovate, and compete in the knowledge economy. Jossey-Bass, New York, 2012, pp.352

15) Long J, Luckraz H, Thekkudan J, et al: Heart team discussion in managing patients with coronary artery disease: outcome and reproducibility. Interact Cardiovasc Thorac Surg 2012; 14: 594–598