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Do We Apply Guidelines During Our Daily Practice in Coronary Revascularization?

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Abstract

Myocardial revascularization guidelines help cardiologist and cardiovascular surgeons to determine the best treatment option for revascularization of the diseased coronary arteries. However, in daily practice compliance to guidelines are generally insufficient. Cardiologist might prefer ad hoc coronary stent implantation without discussing the patients with the surgeons. Creating a "heart team" and activating it, during the decision-making period is recommended in the guidelines. In addition, the importance of patient participation is emphasized in determining the treatment strategy. In this article we aimed to investigate the compliance of the cardiologist and cardiovascular surgeons to the guidelines, and to determine the factors that interfere with the application in daily practice.

Keywords: Coronary artery disease, coronary artery bypass grafting, percutaneous coronary intervention

Introduction

In patients with coronary artery disease, coronary revascularization improves symptoms, survival and quality of the life. Coronary revascularization might be performed in two ways: Coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI). Although both have been proven to be effective and safe, there are still great variations in clinical practice. Guidelines have been developed in clinical practice to solve confusion and determine the most appropriate treatment for the patient[1]. However, compliance with guidelines has not been reached the desired level in daily clinical practice.

Guidelines on myocardial revascularization are constituted by Cardiologist and cardiovascular surgeons together with meticulous work. Latest ESC/EACTS

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guidelines related to myocardial revascularization which was published in 2018, was prepared using 786 references[2]. In order to constitute the current Guidelines, Task Force performed a systematic review of all randomized controlled trials performed since 1980, comparing different revascularization strategies and retrieved at least 100 RCTs involving almost 90,000 patients[2].

Guidelines help health care professionals to individualize their decision for all patients. However, patients should play active role in the decision-making process about the treatment strategy, especially in the presence of the conflict among different treatment options (Table 1). During determination of the treatment strategy, not only the results of the studies and the physician's evaluation, but also the active participation of the patient results in better outcomes[2].

In routine daily practice mostly, cardiologists decide for PCI during the coronary angiography. Cardiologists consult the patient to a surgeon if the patient is not suitable for single stage procedure. Also, consultant cardiovascular surgeon decides and gives information about the process to the patients who are candidates for surgery, instead of council decision. In stable complex coronary artery diseases, multidisciplinary decision-making has become more important in determining optimal treatment strategy. However, it is still not widely used. As a result, there are variations in the PCI/CABG application rates due to physician-related factors. Daily practice is changed due to increasing concerns about treatment practices that are not in accordance with the established criteria.

Table 1. Recommendation for decision making process[2]

Recommendation	Class[a]	Level[b]
It is recommended that patients undergoing coronary angiography are informed about benefits and risks, as well as potential therapeutic consequences, ahead of the procedure	I	C
It is recommended that patients are adequately informed about short- and long-term benefits and risks of the revascularization procedure with information about local experience and allowed enough time for informed decision-making	I	C
It is recommended that institutional protocols are developed by the Heart Team to implement the appropriate revascularization strategy in accordance with current Guidelines	I	C
In PCI centres without on-site surgery, it is recommended that institutional protocols are established with partner institutions providing cardiac surgery	I	C

[a]Class of recommendation, [b]Level of evidence, PCI: Percutaneous coronary intervention

In this article, it is aimed to emphasize the importance of the council in which the patient is involved in decision making process by drawing attention to the applications in real life.

Results

Guidelines have three basic features in general: They address almost all clinical scenarios that a clinician may encounter; importance of multidisciplinary approach of the heart team; importance of patients' information[3]. Collaboration of the patient and health professionals is important to cope up with the complications after the procedure. However, it was found that, in the patients undergoing PCI and CABG alternative therapies were not discussed in 70% of PCI patients, and in 60% of CABG patients[4].

Hannan et al.[5] investigated the impact of evidence-based guidelines on referral decisions in daily practice with evaluating a total of 16,000 patients who had undergone catheterization in hospitals of New York. Of the patients who were indicated for CABG, only 53% were recommended for CABG and 34% were recommended for PCI. Otherwise, of the patients indicated for PCI, 94% were recommended for PCI. Patients who were indicated for both CABG surgery and PCI, 93% were recommended for PCI and only 5% for CABG (Table 2).

Drug eluting stents encouraged cardiologists to perform PCI in the patients with Class I indication for CABG[6]. Currently, the rates of CABG and PCI applications have been varied considerably due to physican-related factors. A significant number of patients do not receive

treatment on the basis of common consensus guideline. This is sometimes an obstacle for patients to receive the optimum treatment. Most appropriate way to cope up with this problem is to do final decision with discussion by cardiologists and surgeons ''Heart Team'', and taking the opinion of patients especially for the complex disease. In this century, patients can easily reach information about their disease from the internet and media. This increases patient expectations and they want to be informed about all treatment options. Transparency about the treatment options and cooperation with the patient will improve patient's satisfaction during the treatment period[7].

Performing therapeutic intervention in the same procedure with diagnostic angiography is named as ad hoc. Patient might be treated at single stage with decreased complication rates related to the second procedure. Patient with LMCA or proximal LAD and three vessel disease should be discussed by the heart team instead of ad hoc PCI[2]. In the evaluation of more than 45,000 patients, revascularization rates and mortality in 3 years were significantly higher in ad hoc procedure[8]. Also, it was revealed that 30% of patients who were candidates for CABG referred to ad hoc procedure[2,8].

Desai et al.[9] evaluated the patients who had undergone PCI or CABG and their optimal treatment recommendation according to the ACC/AHA guidelines. While 90% of the patients who had undergone CABG were appropriate for revascularization, this rate was 36% for PCI. It was found that 14% of the patients with PCI were inappropriate, and 50% were uncertain according to the guidelines.

After determining Appropriate Use Criteria in 2009, inappropriate intervention rate of non-acute PCI was decreased from 26% to 13%. However, inappropriate PCI still persists in different levels (from 5.9% to 23%) in different hospitals[10]. It was revealed that physicians do not mention alternative treatment options in 59% of CABG patients and 68% of PCI patients[4]. In contrast, 4,684 patients who had undergone CABG was evaluated and it was found that 98.6 (87.7% Class I and 10.9% Class II) of the operations were appropriate[11].

In the guidelines, development of the "heart team" protocol and discussing the benefits and risks of the revascularization procedures are recommended as Class 1 indication[2]. The member of the heart team should include at least one cardiac surgeon, one interventional, and one non-interventional cardiologist[12]. The "heart team" application has emerged to determine the optimal treatment strategy for patients with stable complex coronary artery disease. However, in daily practice ''Heart Team'' concept is not widespread due to physician-related factors. Approach to the patients with stable, complex coronary artery disease varies between the countries. While PCI/CABG ratio was 0.67 in Mexico, it was increased to 8.63 in Spain. Even within the same health care system, a large difference in PCI-to-CABG ratios has been reported across different regions[13]. As a member of the heart team, cardiologist should be in cooperation with cardiovascular surgeon for decision making based on the guidelines[3].

In the comparison of CABG and PCI for 5 years follow up of the SYNTAX trial; myocardial infarction

Table 2. Comparison of revascularization procedure and ACC / AHA indications vs catheterization recommendation[5]

ACC / AHA indications vs catheterization recommendation	CABG, n (%)	PCI, n (%)	Medical treatment, n (%)	None, n (%)	Total, n (%)
CABG	712 (53)	455 (34)	156 (12)	14 (1)	1337 (100)
PCI	124 (2)	5660 (94)	255 (4)	12 (<1)	6051 (100)
CABG and PCI	84 (5)	1608 (93)	26 (2)	4 (<1)	1722 (100)
Neither CABG or PCI	70 (6)	261 (21)	873 (71)	19 (2)	1223 (100)
Total	990 (10)	7984 (77)	1310 (13)	49 (<1)	10,333 (100)

CABG: Coronary artery bypass grafting, PCI: Percutaneous intervention, ACC: American College of Cardiology, AHA: American Hospital Association

(3.8% vs 9.7%) repeat revascularization (13.7% vs 25.9%), all-cause mortality (11.4% vs 13.9%) were significantly high in PCI patients. While MACCE scores were similar in the patients with low SYNTAX score, MACCE score was significantly high with PCI in the patients with intermediate and high scores[14]. In 3-vessel disease and/or left main coronary patients, CABG has superiority to PCI with lower rates of death, myocardial infarction and repeat revascularization. CABG is still best treatment option in 71% patients according to the five-year results of SYNTAX[15]. Similarly, in the comparison of the 3 years follow up of the everolimus-eluting stents and CABG, although mortality rates were similar, myocardial infarction and repeat revascularization rates remained higher in PCI group[16]. CABG should be the gold standard for the coronary revascularization. PCI might be an alternative in the patients with low SYNTAX scores[14].

Recent guidelines recommend approach to the CAD with the guidance of SYNTAX score (Table 3). Clinical condition of the patients, comorbidities and confounding factors such as diabetes should be evaluated by the heart team in the decision process[10].

Conclusion

Currently, more or less than necessary and improper myocardial revascularization is still frequently encountered and significant differences are observed between different geographic regions and hospitals. Underuse of revascularization when it is necessitated increases mortality[16]. Performing optimal technique is important to improve postoperative outcomes. It is obvious that the wide variations of the interventions are related to the physician and this will be turned into a necessity for reimbursement by a health system (state and private) in the near future. In other words, it will be attempted to ensure that the practices are patient-based rather than physician-based[11].

A well-balanced multidisciplinary "Heart Team" consisting of clinical cardiologist, interventional cardiologist and cardiac surgeon helps to better interpret the data, to apply appropriate treatment according to the guidelines and to make a more objective and uniform decision by considering the experiences and patient preferences[17,18]. In our hospital we discussed the gray zone patients by the heart team with the patients' clinical

Table 3. Recommendation for revascularization procedure[2]

Disease	CABG		PCI	
	Class[a]	Level[b]	Class[a]	Level[b]
One vessel CAD				
With proximal LAD stenosis	I	A	I	A
Two vessel CAD				
With proximal LAD stenosis	I	B	I	C
Left main CAD				
Left main disease with low SYNTAX score (0-22)	I	A	I	A
Left main disease with intermediate SYNTAX score (23-32)	I	A	IIa	A
Left main disease with high SYNTAX score (>33)	I	A	III	A
Three-vessel CAD without diabetes mellitus				
Three-vessel disease with low SYNTAX score (0-22)	I	A	I	A
Three-vessel disease with intermediate or high SYNTAX score (>22)	I	A	III	A
Three-vessel CAD with diabetes mellitus				
Three-vessel disease with low SYNTAX score (0-22)	I	A	IIb	A
Three-vessel disease with intermediate or high SYNTAX score (>22)	I	A	III	A

[a]Class of recommendation, [b]Level of evidence, PCI: Percutaneous coronary intervention, LAD: Left anterior descending, CAD: Coronary artery disease

status and angiographic findings. Then we decided our approach after informing the patients about advantages and disadvantages of the both procedures.

The physicians are responsible for taking the patient's and their relatives' opinions on the basis of the scientific data and for implementation of the most appropriate and correct treatment. It is necessary to decide the intervention, base on the guidelines prepared by keeping all randomized controlled trials. In cases where more than one treatment option may be valid, the final decision must be given by the "Heart Team", which is composed of the surgeon and cardiologists. Involvement of the patients in the decision-making process is important in order to start the treatment process as a team with the patient. Also, it is important to protect the health professionals from legal problems when complications are developed.

Ethics

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.D., Concept: E.D., Design: E.D., Data Collection or Processing: İ.D., M.U., Analysis or Interpretation: E.D., İ.D., M.U., Literature Search: İ.D., M.U., Writing: E.D., İ.D., M.U.

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