

## Adherence to practice guidelines for coronary artery bypass graft surgery in Shiraz, Iran

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### Short Communication

#### Abstract

**BACKGROUND:** There is an increasing tendency to use evidence-based medicine (EBM) and guidelines among physicians. This is also true for concordance of coronary artery bypass graft (CABG) surgery and guidelines; therefore, we aimed to address the adherence to 2011 American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) guideline for CABG.

**METHODS:** In this cross-sectional study, we assessed 246 patients who underwent CABG in Shiraz, Iran, during 2011-2012, using a data collecting form provided through studying ACCF/AHA guideline 2011. The patients were categorized into clinical subgroups and then grouped into appropriate, in-appropriate and uncertain classes. Chi-square was used to compare categorical variables and t-test was used for continuous variables.

**RESULTS:** Of the 246 patients, 70.3% were grouped into "class I," 12.6% into "class IIa," 6.9% into "class IIb" and 10.2% into "class III." Therefore, 82.9% of the patients were grouped into "appropriate," 6.9% into "uncertain," and 10.2% into group "inappropriate."

**CONCLUSION:** We suggest that more attention is needed to be paid to these guidelines. Using these guidelines may help surgeons to have a uniform approach for patients.

**Keywords:** Adherence, Guidelines, Coronary Artery Bypass Graft, Iran

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#### Introduction

Coronary artery bypass graft (CABG), as a category of coronary revascularization, is one of the most frequent procedures performed and annually about 50000 open-heart surgeries are performed in Iran, 50-60% of which is allocated to CABG.<sup>1</sup>

Despite the advantages of CABG in treating patients and increasing the chance of survival; we have increasingly encountered the public accusation of inappropriateness of this procedure.<sup>2,3</sup>

The rate of inappropriateness in different studies varied from 2 to 14%.<sup>2,4,5</sup> since CABG is very costly and can cause post-operation mortality and morbidity, we should always select the patients for this operation carefully and consider the benefits of this procedure for them.<sup>6,7</sup>

There is an increasing tendency to use the evidence-based medicine (EBM) and guidelines among the physicians, too.<sup>8</sup> EBMs can help

physicians to select the best plan for the right patient in the right way.<sup>9</sup> We conducted this study to address the adherence to 2011 American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) guideline for CABG surgery in the current clinical care in Shiraz, Iran.

#### Materials and Methods

In this cross-sectional study, we assessed 246 patients who underwent CABG in Shiraz during 2011-2012. CABG was performed in Shiraz in six hospitals during the study period. These hospitals are of three types: governmental, private, and charity. Precisely, 3482 CABG operations were performed for a year in Shiraz, starting from March 2011. We selected patients based on random stratification of hospitals. We used a random numbers generation website to have randomized numbers according to our sample size to reach the

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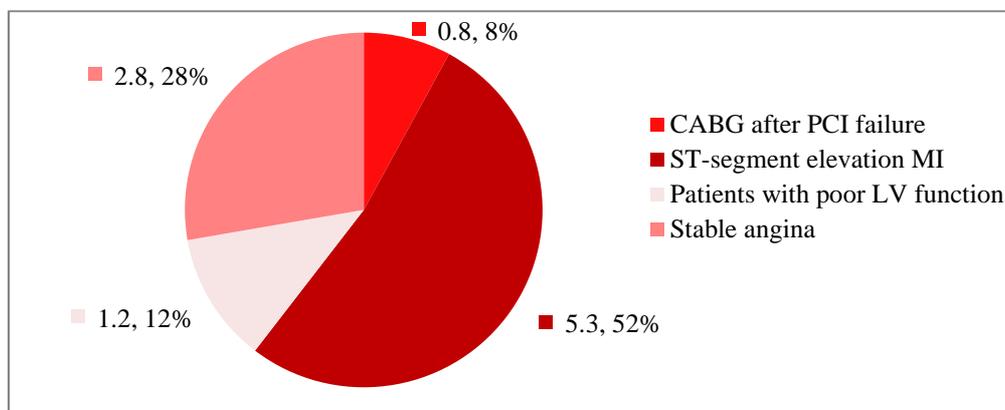
proportional study sample. All selected patients, who were operated on in Shiraz in 2011, were included in this study. We only excluded 28 patients whose medical records were incomplete.

Primarily, a data collection form was provided through studying and investigating the ACCF/AHA guideline 2011. This form was modified based on the existing information of hospitalized patients in cardiac surgery wards. After the data were collected, we assigned patients into clinical subgroups according to ACCF/AHA guideline. According to these clinical subgroups, the patients were classified into four classes (class I, IIa and IIb, III). CABG was appropriate for all patients who were classified in class I, IIa. Patients classified in class IIb were uncertain, and operation for patients in class III was inappropriate. Finally, our classification can be summarized as follows: class I (useful and effective), class IIa (evidence favors usefulness), class IIb (evidence less well-established), and class III (not useful or effective).<sup>10</sup>

Chi-square was used to compare categorical variables and t-test was used for continuous variables. All statistical analyses were performed using the SPSS software (version 15, SPSS Inc., Chicago, IL, USA).  $P \leq 0.05$  were considered significant, and the 95% confidence interval (CI) was calculated.

## Results

In our study, 35.4% of patients were female and 64.4% male and there was a significant difference in the mean age between these two groups ( $P = 0.01$  and 95% CI: -5 to -0.136). The mean age of all patients, men and women were  $62.24 \pm 10.01$ ,  $61.33 \pm 10.7$ , and  $63.90 \pm 8.83$  years, respectively.



**Figure 1.** Proportion of class III based on clinical subgroup (n = 25)

PCI: Percutaneous coronary intervention; CABG: Coronary artery bypass graft; LV: Left ventricular; MI: Myocardial infarction

### *Appropriateness of CABG procedure in all patients*

According to the 2011 ACCF/AHA guideline for CABG surgery, of the 246 patients, 70.3% were grouped into “class I,” 12.6% into “class IIa,” 6.9% into “class IIb,” and into 10.2% “class III.” Therefore, 82.9% of the patients were grouped into “appropriate,” 6.9% into “uncertain” and 10.2% into group “inappropriate.”

### *Appropriateness of CABG procedure based on hospitals*

Appropriateness of CABG surgery into governmental, charity and private hospitals was 84.1, 83.8, and 77.4 percent, respectively. There was no statistically significant difference between kinds of hospital and appropriateness ( $P = 0.40$ ).

### *Appropriateness of CABG procedure based on sex of patients*

Table 1 shows the distribution of appropriateness classes for men and women. CABG surgery appropriateness was 83.6% for men and 78.2% for women. However, among men in the present study, 5.0% were grouped into uncertain and 10.6% into inappropriate, and 10.3% of women were grouped into uncertain and 9.2% into the inappropriate groups.

### *Inappropriateness of CABG procedure according to clinical subgroups*

Of all patients, 10.5% were grouped in class III. Figure 1 shows the analysis of this class. Class III patients in our study were placed into one of the four clinical subgroups, respectively: ST-segment elevation myocardial infarction (MI), stable angina, and patients with poor left ventricular (LV) function and CABG after percutaneous coronary intervention (PCI) failure.

**Table 1.** Distribution of coronary artery bypass graft (CABG) procedure based on patients' sex

Sex	Classification				Total
	Class I	Class IIa	Class IIb	Class III	
Male [n (%)]	113 (45.9)	21 (8.5)	8 (3.3)	17 (6.9)	159 (64.6)
Females [n (%)]	60 (24.4)	10 (4.1)	9 (3.7)	8 (3.3)	87 (35.4)
Total [n (%)]	173 (70.3)	31 (12.6)	17 (6.9)	25 (10.2)	246 (100)

### Discussion

In our study, 70.3% of patients were grouped in class I and 12.6% in class IIa. These two groups are the ones who benefit from surgery. Hence, CABG was "appropriate" for 82.9% of the patients, 6.9% were grouped in the "uncertain" and 10.2% in the "inappropriate" subgroups. Our findings are different with study of O'Connor et al.<sup>2</sup> in Northern New England. In that study, 96.1% were grouped in the "appropriate," 2.5% in the "uncertain" and 1.4% in the "inappropriate" subgroups. As can be seen, the appropriateness of CABG surgery in our patients is lower. Hence, it is necessary to use guidelines properly and to select the patients carefully. It is important that the proper procedure be done for the right patient in the right way. Furthermore, appropriate patient selection may be helpful in improving the outcomes after treatment. However, it is obvious that these guidelines are unlikely to be enough for decision making. Physicians can use these guidelines as a means to support their decision because nothing can be a substitute for clinical judgment. Using these guidelines about which the experts have agreed together with physician's clinical judgment may mean a better outcome for the patient. In addition, we are able to use multidisciplinary approaches for patients to make the best decision. Not only overuse of procedures but also their underuse may harm the patients.

As shown, the maximum appropriateness was in governmental and charity hospitals. This may be due to the fact that governmental hospitals are academic centers, and training of medical students is done in these centers. Leape et al.<sup>11</sup> found that academic hospitals had a greater agreement with guideline and inappropriateness was 1.6% in these hospitals. These findings were in agreement with those of our study. Regarding the appropriateness of CABG surgery for men and women; there was no statistically significant difference between appropriateness of CABG surgery in men and women. The study of O'Connor et al.<sup>2</sup> demonstrated that there are no statistically significant differences between appropriateness of

CABG surgery in men and women and this finding was consistent with our results. Bernstein et al.<sup>12</sup> also showed that inappropriateness of CABG surgery was 2.0% in men and 3.0% in women, and there was no statistically significant difference by gender. Of all the patients coded into class III, 52.0% were in ST-segment elevation MI clinical subgroup. This clinical subgroup included patients who presented with refractory ischemia, cardiogenic shock, life-threatening arrhythmia or failed PCI. These patients were often operated on in emergency or urgent conditions. Due to this condition, morbidity and mortality of patients increased.<sup>7</sup>

Bernstein et al.<sup>13</sup> showed that inappropriateness varied from 1.5 to 3.7%, and appropriateness was more in patients who were undergoing CABG than PCI. Patients with poor LV function benefit from CABG surgery if the reason of this problem is ischemic and the myocardium is viable as well. Hannan et al.<sup>14</sup> showed that most physicians recommend CABG surgery for patients with poor LV function. However, these guidelines may need to be revised over the years, but we recommend that clinical judgment of physicians, using guidelines and multidisciplinary approaches lead to the best decision.

### Conclusion

We suggest that more attention is needed to be paid to these guidelines. Using these guidelines may help surgeons to have a uniform approach for patients. We recommend that clinical judgment of physicians, using guidelines and multidisciplinary approaches lead to the best decision.

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### Conflict of Interests

Authors have no conflict of interests.

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