In-hospital Course of Early Invasive Strategy in Acute Coronary Syndromes

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Abstract

Background- Unstable angina is emerging as a major public health problem worldwide. Two approaches - an early invasive strategy or a conservative strategy - are used for the management of non-ST elevation acute coronary syndrome (NSTE-ACS). An early invasive strategy involves the use of early coronary angiography and revascularization with percutaneous coronary intervention (PCI) or coronary artery bypass graft surgery (CABG). A conservative strategy involves initial treatment with aggressive pharmacologic treatment, and coronary angiography with revascularization is used if there is evidence of spontaneous or provoked ischemia within the hospital stay.

Method- Two hundred sixty-one patients with acute coronary syndrome were enrolled in this study for early invasive strategy. Patients received aspirin, heparin, clopidogrel, and lipid-lowering therapy. The primary endpoint was a composite of death, non-fatal myocardial infarction, cerebrovascular accident, and recurrent chest pain. Angiograms were assessed qualitatively by two expert invasive cardiologists.

Results- Sixty-seven percent of the patients underwent percutaneous (33%) or surgical (34%) revascularization. The overall death rate was 1.1%. In-hospital major adverse cardiac event (MACE) rate was 3.2% in the revascularization groups. According to the favorable in-hospital course in patients referred for PCI or CABG, it seems that accurate selection of patients who may be candidates for early invasive strategies is of paramount importance. We found that diabetes, cardiac enzyme elevations (Troponin T), ST/T changes, and the presence of two or more risk factors besides diabetes are powerful predictors of the patients who will undergo revascularization.

Conclusion-Proper selection of patients admitted with ACS for invasive strategy is warranted. Positive cardiac enzymes (Troponin T), diabetes mellitus, and presence of two or more major CAD risk factors are helpful for patient selection ***(Iranian Heart Journal 2010; 11 (1):6-9).***

Key words: acute coronary syndrome ■ non-ST elevation MI ■ percutaneous coronary intervention ■ coronary artery bypass graft

Unstable angina and non-ST segment elevation myocardial infarction comprise a growing percentage of patients with coronary artery disease and are emerging as a major public health problem the world over, resulting in considerable morbidity and mortality despite significant improvements in their management over the past two decades.[4]

Much attention has been directed toward optimizing the diagnosis and management of patients with acute coronary syndrome, particularly in light of the continued evolution of catheter-based interventions and newer pharmacologic strategies that afford more complete platelet and thrombin inhibition, and when used together, appear to have an important synergistic effect in reducing prognostically important ischemic events.[1] The preeminent objective for the management of acute ST-elevation myocardial infarction remains achievement of early and complete reperfusion of the infarct artery.[4] In contrast, goals for the management of patients with non-ST elevation acute coronary syndrome (NSTE-ACS) include the alleviation of symptoms and stabilization of the clinical condition to prevent further adverse outcomes.[3]

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Two general approaches in the management of patients with acute coronary syndromes exist: an early "invasive" strategy, involving routine early cardiac catheterization and revascularization with percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) in case the anatomy is suitable, and a "conservative" or ischemia-guided strategy including initial potent medical management with subsequent catheterization and revascularization only for recurrent ischemia either at rest or on a noninvasive stress test.[3-5] The merits of a routine invasive approach for NSTE-ACS include prompt anatomic definition and expedient revascularization to mitigate the early risk of recurrent ischemic events.[5] In contrast, a conservative recurrent ischemia-driven approach avoids potentially unnecessary invasive procedures.[5] To date, ten randomized trials have studied the relative merits of these two strategies. The first three and the most recent trial did not demonstrate a significant difference;[2-3-4] however, six trials have shown a significant benefit of an early invasive therapy.[4,1]

Methods

Two hundred sixty-one patients presenting with acute coronary syndrome were enrolled in an invasive strategy, consisting of punctual coronary angiography and revascularization (PCI or CABG) if indicated. Exclusion criteria were age greater than 75, previous history of revascularization, and significant valvular heart disease. All the patients were pretreated with aspirin and 300mg of clopidogrel. Indications for PCI or CABG were made by the attending physician after having reviewed the coronary angiography on the basis of clinical and paraclinical characteristics. Intention to treat was for the culprit vessel in the PCI patients and for complete revascularization in the CABG patients. The patients were followed up during the hospital course. Post-procedural electrocardiograms and biochemical markers (CK-MB) were evaluated, and the occurrence of cardiac and non-cardiac death, myocardial infarction (non-Q and Q-wave AMI), stroke, and need for emergent revascularization were recorded. The primary endpoint was a composite of in-hospital death, nonfatal myocardial infarction, or cerebrovascular accident, and recurrent chest pain.

Statistical analysis

The data were entered in a Microsoft Excel database and transferred to a statistical program for analysis. The data were presented as number or percent for the categorical variables and mean ± SD for the continuous variables. The groups were compared using the *X2* analysis or Fisher's exact test for the categorical variables and Student's *t*-test for the continuous variables. *P* values of <0.05 was considered significant.

Results

The demographic and clinical characteristics of the study patients are shown in Table I. The majority of the patients (72.8%) were male, and the mean age was 56.6±10.2 years. Coronary risk factors were common, and dyslipidemia was the commonest cardiac risk factor in the study patients. One hundred two (39.1%) patients were diabetic. Significant ST-T changes defined as greater than 0.1 mV ST-segment depression or greater than 0.3 mV T-wave inversion were seen in 134 (77%) patients. Seventy-six (29%) patients had elevated troponin-T levels above the 99th percentile of the normal population along with normal CK-MB levels; we defined these as troponin-positive ACS patients in this study. Revascularization was performed in 175 (67.1%) patients, of whom 90 (34.5%) underwent PCI and 85 (32.6%) CABG. Medical management was considered an initial therapeutic strategy in 32.9% of the patients.

Significant ST-T changes as defined before, were associated with the presence of coronary artery disease. 14.2% of patients with angiographically normal coronary arteries had significant ST-T changes, while patients with single-, double- and triple-vessel disease had significant ST-T changes in 22.1%, 26.3% and 37.4%, respectively (p=0.007).

	No. revascularized patients = 174
In-hospital death	3 (1.1%)
Non-fatal MI	7 (2.7%)
Emergent revascularization	0 (0%)
Stroke	1 (0.38%)

Table I. Demographic and clinical characteristics

	No. Patients=261
Age	56.6±10.2
Sex: male/female	190/71
Coronary risk factors:	
Dyslipidemia	47.1%
Hypertension	23%
Diabetes mellitus	39.1%
Cigarette smoking	41.8%
Family history	9.6%
ST-T change	72.8%
Positive troponin-T	29.1%

Coronary anatomy:	
Normal vessels/minimal CAD	18%
1-vessel disease	23.8%
2-vessel disease	26%
3-vessel disease	32.2%
Left main stenosis	6%

Diabetes mellitus was also associated with the presence of coronary artery disease (p=0.007). Patients with positive troponin-T levels had a significantly higher prevalence of coronary artery disease in coronary angiography (p<0.005).

In the revascularized group, in-hospital major adverse cardiac events (MACE) occurred in 10 (3.8%) patients. In-hospital mortality rate was 1.1% and non-fatal myocardial infarction defined as CK-MB rise greater than three times of the baseline with or without ST-segment deviation post-procedurally, occurred in 7 (2.7%) of patients during hospital stay. Stroke was seen in one patient (0.38%). In-hospital events of these patients are outline in Table II.

Table II. In-hospital events of revascularized patients

Discussion

The majority of studies have proven the efficacy and relative safety of an "early invasive strategy" in selected patients with non ST-segment elevation acute coronary syndromes, especially those with clinical and paraclinical high-risk criteria such as old age, presence of diabetes mellitus, and associated significant ST-T changes and positive troponin enzyme.[7-8] It is well-recognized that coronary revascularization improves clinical outcomes in these patients.[7-8] There are several randomized clinical trials comparing the early invasive and conservative strategies in patients with acute coronary syndromes. These studies are different in inclusion criteria, availability, and use of coronary stents and glycoprotein IIb-IIIa inhibitors, frequency of revascularization in invasive arms, and clinical outcomes. In a meta-analysis regarding the benefit of a routine invasive versus "selective" invasive strategy for patients with unstable angina and non ST-elevation myocardial infarction, results were in favor of early invasive therapy. FRISC-II, TRUCS, TIMI-18, VINO, RITA-3, ISAR-COOL, and ICTUS were included in this meta-analysis.

The merits of a routine invasive strategy were also revealed in our study. Acceptable rates of in-hospital major cardiac events in revascularized patients, including death (1.1%), non-fatal myocardial infarction (2.7%), and stroke (0.38%) led us to select an aggressive method for the treatment of these patients. These results were quite comparable and slightly better than those of some other studies. However, caution should be exercised in the analysis of these results; we did not include patients older than 75 years of age and those with a history of previous revascularization in the study. On the other hand, GpIIb/IIIa inhibitors, an effective and approved antiplatelet treatment in these patients, were not administered in the study patients because of financial problems. Potent antiplatelet therapy in such patients could result in even lower rates of adverse events.

In this study, we found that in patients with unstable angina, presence of diabetes mellitus, ST-T changes, and positive troponin-T were predictors of coronary artery disease, and early invasive strategy in patients with acute coronary syndrome showed an acceptable in- hospital course.

Conflict of Interest

No conflicts of interest have been claimed by the authors.

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