Diagnostic Approach in the Elderly

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Abstract: At the onset of acute myocardial infarction (AMI) in the elderly, atypical manifestations, such as symptoms of heart failure, gastrointestinal symptoms and disturbance of consciousness, increase with aging. Moreover, early diagnosis is important so as not to miss the optimal period for coronary artery reperfusion therapy. Because elderly patients tend to develop complications, and their mortality rate is high, the assessment of dementia, activities of daily living and complications involving other organs (especially cerebrovascular disease, renal dysfunction and aortic aneurysm) in addition to taking the history and physical findings is important in deciding the indication of reperfusion therapy. Since many elderly patients often have ECG abnormalities, such as bundle branch block and ST, T changes, if prior ECGs are available, the present ECG should be compared with prior ECGs. Because of lack of the elevation in CPK values often within 3 hours after the onset of AMI, the measurement of troponin-T is useful as a means of improving specificity and prompt diagnosis for myocardial ischemia. Echocardiography is useful in the diagnosis of high posterior wall, lateral wall and non-Q wave myocardial infarction, which are difficult to diagnose electrocardiographically. Thus, comprehensive examinations including ECG, serum enzymes and echocardiography are necessary, irrespective of the clinical symptoms in the elderly.

Key words: Elderly; Painless myocardial infarction; Reperfusion therapy; Complications in other organs

Introduction

Acute myocardial infarction (AMI) in the elderly is characterized in comparison with the middle aged patient as follows, 1) more cases in women, with the lack of sex difference, 2) more painless or asymptomatic cases, 3) old and non-Q wave infarctions are common due to a high proportion of multivessel coronary artery disease, 4) heart failure, shock and cardiac rupture are relatively common, and prognosis is poor, 5) a high rate of complications involving other organs with aging, such as cerebrovascular disease and renal dysfunction.

Thus, despite the presence of serious underlying conditions, the clinical manifestations are
mild in the elderly. Elderly patients tend to develop complications and the mortality rate tends to increase. Therefore, early diagnosis of AMI is more important so as not to miss the optimal period for coronary artery reperfusion therapy.

Manifestations of AMI in the Elderly

The typical symptom is chest pain, characterized by a squeezing sensation and a feeling of pressure in the center of the sternum, that persists for a long time and is so severe that nitrates are ineffective and narcotics are required. However, a typical chest pain decreases with aging. Atypical manifestations, such as symptoms of heart failure (dyspnea, shock), gastrointestinal symptoms (vomiting, upper abdominal pain) and disturbance of consciousness, tend to increase with aging even among patients admitted to the coronary care unit (CCU) within the first 24 hours after the onset of AMI 1) (Fig. 1).

In our study of autopsy cases with AMI, the incidence of chest pain was only 36%. Cases occurring under such circumstances as infection or postoperative states and cases with only non-specific symptoms, such as anorexia or weakness, were found 2) (Table 1). Cerebrovascular disease, in particular, impairs activities of daily living (ADL) and communication. These disorders are largely responsible for asymptomatic myocardial ischemia. 3) In addition, simultaneous occurrence of AMI and stroke is not rare. Thus, comprehensive examinations including ECG, serum enzymes and echocardiography are necessary, irrespective of the clinical symptoms in the elderly.

Diagnosis of AMI in the Elderly and Points Requiring Caution

(1) Taking history and physical examination:
It is important to take history carefully that includes coronary risk factors and to identify the time of onset. However, taking history in the elderly is often difficult by reason of uncertain memory, dementia and living alone.

The time from the onset of AMI is important when deciding on the indication of coronary artery reperfusion therapy (usually within 6 to 12 hours). Since the survival rate is higher if reperfusion therapy can be performed in the early stage, especially in the elderly, 4) it is important to estimate the time from the onset of AMI taking adequate history that includes information from the family. The assessment of dementia, activities of daily living and complications involving other organs (especially cerebrovascular disease, renal dysfunction and aortic aneurysm), in addition to taking the history and physical findings, is important when deciding on the indication of reperfusion therapy.

(2) ECG: Many elderly patients often have ECG abnormalities, such as bundle branch
block and ST, T changes, and also exhibit non-Q wave infarction with only ST depression or negative T wave. In cases with left bundle branch block or right ventricular pacing wave it is difficult to diagnose AMI from the ECG findings. Therefore, the ECG should be made out with caution, and if prior ECGs are available, the present ECG should be compared with them. In addition, AMI-like ECG changes may be caused by disseminated intravascular coagulation (DIC), blood transfusion, pneumonia, infection and cerebral infarction in the elderly.

(3) Serum enzymes: Elevation of creatine phosphokinase (CPK) value is not often found within 3 hours of the onset of AMI. In regard to measurement of the CPK value, there are some problems as follows: 1) myocardial specificity (particularly differentiation from the increase due to circulatory failure in patients with heart failure), 2) prompt diagnosis for myocardial ischemia, 3) short duration of abnormal values. A useful kit for measuring troponin-T (TROP-T®), which enables the quantitative measurement of a small sample of whole blood, has recently become commercially available as a means of improving specificity and prompt diagnosis for myocardial ischemia. In addition, another kit for measuring myocardial fatty acid binding protein (H-FABP) as an early marker of myocardial ischemia has been developed.

(4) Echocardiography: If abnormal motion in the left ventricular wall that corresponds to an ST, T change in the ECG is shown in the echocardiogram, the diagnosis of myocardial ischemia or infarction is definitive. Echocardiography is useful for the diagnosis of high posterior wall, lateral wall and non-Q wave infarctions, which are difficult to diagnose electrocardiographically. However, some elderly patients show poor visualization of the left ventricular short axis view because of pulmonary emphysema or an S-shaped interventricular septum. In those cases, the diagnosis of myocardial ischemia is difficult in the territory of the left circumflex and right coronary artery.

Conclusions

The procedure for early diagnosis of myocardial ischemia and to transfer elderly patients from the primary care clinic to CCU is as follows; (1) Take a precise history and physical examination, and always record the ECG regardless of whether cardiac symptoms are present. (2) Since many elderly patients often have ECG abnormalities, if prior ECGs are available the present ECG should be compared with them. (3) In addition to the routine blood examination, if possible, determine whether myocardial ischemia is present by using a prompt diagnosis kit, such as TROP-T®. (4) If myocardial ischemia or infarction is diagnosed in the acute phase after the onset of AMI, transfer the patients to the nearest CCU with their medical history and ECGs.

REFERENCES