

## Atypical Manifestation of Myocardial Ischemia in the Elderly

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Often, elderly patients have atypical clinical picture for myocardial ischemia, or are asymptomatic. This review intends to re-examine the pathophysiology of atypical manifestation in elderly persons, its prognostic and therapeutic implications.

The coronary atherosclerotic disease is an increasing public health problem, of particular importance in higher age groups. Its prevalence increases significantly at the sixth decade of life, becoming the leading cause of death in older people, as well as the greatest responsible for hospitalization and invasive procedures<sup>1</sup>.

The absent or atypical clinical signs in elderly persons hinder the management of coronary atherosclerotic disease. The cases of myocardial ischemia without pain, the so-called asymptomatic or silent ischemia, it is more frequent in elderly patient<sup>2</sup>. Considering patients with acute coronary syndrome, as myocardial infarction with ST-segment elevation, among those under 65 years of age, only 11.1% do not have precordial pain, unlike those over 85 years old, among which 43.2% have precordial pain<sup>3</sup>. Similarly, among elderly patients with Q wave in electrocardiogram (ECG), 78% did not have symptoms of precordial pain<sup>4</sup> (Figure 1).

Diabetes mellitus has been considered the biggest factor related to asymptomatic ischemia in patients with stable coronary disease. However, several studies found no such association<sup>5</sup>. These studies indicate that the only independent factor for silent ischemia is advanced age. In fact, progressive increase occurs in the interval between the beginning of ST segment depression and the onset of angina with increased age<sup>6</sup>, indicating increased pain threshold among elderly.

When an episode of coronary blood flow reduction occurs, the first alteration is the suffering of myocyte, following changes of myocardial relaxation and ST segment depression. Pain is the last manifestation of myocardial ischemia<sup>7</sup>.

The higher prevalence of asymptomatic myocardial ischemia or with atypical symptoms in elderly is explained by increased pain threshold related to nociceptive changes and by the great prevalence of diseases such as depression and diabetes mellitus. Increased beta-endorphins levels have also been described in patients with asymptomatic myocardial ischemia<sup>8</sup>. However, there are studies with

different findings<sup>9,10</sup>. Additionally, patients suffering from silent ischemia have central nervous activation different from those with angina when subjected to ischemic dobutamine stress, predominating the frontal cortex and ventral temporal activation<sup>11</sup>. Interestingly, the thalamic area, which is responsible for the recognition of pain, had similar activation in patients with and without angina<sup>12</sup>.

On the other hand, the elderly patients have comorbidities that may influence the clinical manifestation of myocardial ischemia. Even the diabetes mellitus is a condition whose prevalence increases with age, as well as diabetic neuropathy.

Fibromyalgia and depression are neuropsychiatric conditions that interfere with the painful sensation. Sometimes, elderly persons complain of precordial pain, with rejected diagnosis of myocardial ischemia, improve with antidepressants. The opposite can also occur, with elderly people with atypical pain for myocardial ischemia, generally attributed to depression, having significant coronary disease. The relationship between depression and coronary atherosclerotic disease is well defined<sup>13</sup>. However, there are several reasons why depression increases the occurrence of coronary disease. Patients with depression have less treatment adherence to drug and lifestyle changes. Additionally, depression<sup>14</sup> can cause change of endothelial function, deregulation of the hypothalamic-pituitary-adrenal axis, increased platelet reactivity and inflammatory markers with interleukin 6.

Memory changes, which are frequent in elderly patients, as Alzheimer's disease and vascular dementia, are characterized by the loss of short term memory. Consequently, in these patients, the reliable reporting of symptoms of recent onset is affected. Both Alzheimer's disease and vascular dementia have risk factors similar to those of coronary disease. As a result, besides frequent concomitance, memory deficit causes elderly to have memorization difficulty and describe the pain resulting from myocardial ischemia.

Among elderly patients with heart failure, 50-70% have myocardial ischemia as etiology, and considerable part of them have prior myocardial revascularization. Both heart failure<sup>15</sup> and myocardial revascularization reduce cognitive performance, especially in the field of attention. Thus, if a patient has myocardial ischemia, this cognitive deficit can impair description of the pain characteristics.

In conclusion, elderly patients with myocardial ischemia often have atypical clinical manifestations, due to comorbidities as diabetes mellitus, nociceptive changes, depression and dementia. Therefore, in elderly patients, atypical symptoms of coronary insufficiency should be valued, and to confirm or not diagnosis of myocardial ischemia, the search through additional tests should be more rigorous. Additionally, these research tests on myocardial ischemia also identify patients at higher risk that should be treated more intensively.

### Keywords

Myocardial Ischemia / physiopathology; Aged; Heart Failure; Coronary Artery Disease; Angina Pectoris.

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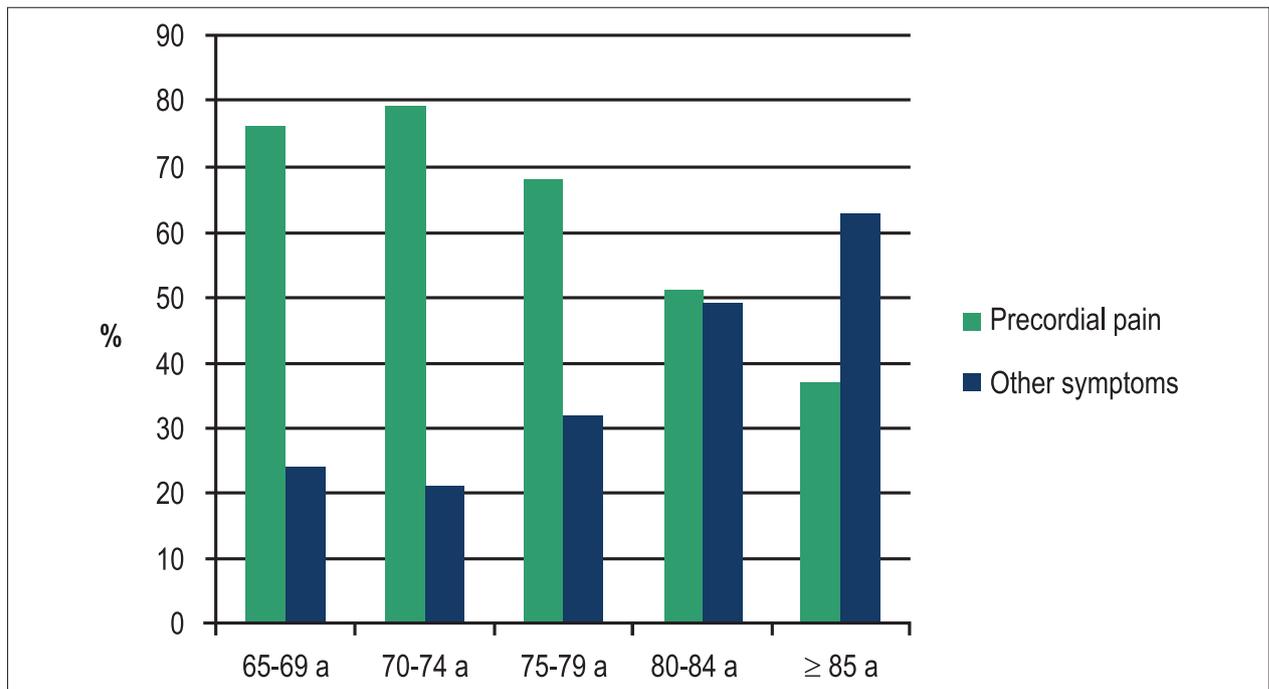


Figure 1 – Clinical presentation of acute myocardial infarction according to age. Bayer AJ, Chadha JS, Farag RR, Pathy MS. *J Am Geriatr Soc.* 1986; 34:263-6.

### Author contributions

Conception and design of the research: Ochiai ME, Lopes NH, Buzo CG, Pierri H; Acquisition of data and Critical revision of the manuscript for intellectual content: Ochiai ME, Lopes NH, Pierri H; Writing of the manuscript: Ochiai ME, Buzo CG, Pierri H.

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## Viewpoint

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