Angina Pectoris Without Chest Pain

Clinical Implications of Silent Ischemia

Shlomo Stern, MD

We may never know whether the accuracy of William Heberden’s description in the 1770s of a new syndrome, centering around pain in the left chest and named by him “angina pectoris,” occurred because the author himself experienced the symptoms described. Heberden’s description of the symptoms has prevailed for centuries, as if it were written in stone. Decades later, this “pain in the chest” was clarified as being induced by myocardial ischemia at the time the patient experiences the pain.

Only rarely over the centuries and usually only through anecdotal cases did the medical literature report that ischemia can be present without accompanying pain in the chronic situation of angina pectoris or even during an acute myocardial infarction. Among these sporadic observations, James Herrick described in his historical treatise on acute myocardial infarction in 1912 two of his six patients who experienced no pain during their cardiac events.

In the 1970s, several groups of investigators began to use ambulatory monitoring of the ECG, and with this new technique, they described that ST depression, a cardinal sign of myocardial ischemia on the ECG, can occur in patients with ischemic heart disease (IHD) without accompanying pain. These studies prompted new investigations on the syndrome that is now called silent myocardial ischemia.

Why Myocardial Ischemia Is Painless in Some Individuals

A defective warning mechanism was proposed by some investigators as the reason for the absence of pain, stressing that sensibility to pain differs from patient to patient. On the basis of pertinent experiments on the pain threshold of patients with IHD, others suggested that a general decreased sensibility to pain is present in clinically silent patients. To explain this phenomenon, a central nervous system alteration was also posited. Intriguing observations have shown that there is a particular biochemical pattern of inflammatory system activation (an increased production of inflammatory cytokines) that explains the lack of anginal symptoms in these patients.

Clinical Relevance of Silent Ischemic Episodes

Patients with IHD who have painful anginal attacks during a 24-hour period are most probably having additional painless ischemic episodes, usually triggered by physical exertion or mental stress. In clinical studies, as many as 90% of ischemic episodes were found to be silent. Although there was an initial dispute as to whether these episodes represent an additional independent prognostic factor, it has been shown that patients with ambulatory ischemia are more likely to have multivessel coronary disease than patients without ambulatory ischemia. Thus, it appears that anginal pain is a poor indicator for IHD because it underestimates the frequency of significant ischemia. Episodes of documented ischemia, regardless of whether they are symptomatic or silent, do have prognostic significance. The drug treatments effective in painful ischemia are also effective in reducing or eliminating silent episodes.

Indications for Ambulatory Monitoring

The value of ambulatory monitoring for quantitative evaluation of the ischemic patient is hindered by its poor reproducibility and technical difficulties that have not yet been completely overcome. Although ambulatory monitoring does provide meaningful information about ischemia in IHD patients, as a potential test for those who are unable...
to exercise, it can detect Prinzmetal’s variant angina and hidden arrhythmias and assess the effectiveness of antiarrhythmic therapy.11 Because ambulatory monitoring does not appear to be useful for screening or for primary detection of IHD in asymptomatic patients, exercise testing remains the most important screening test for IHD.

The Importance of Pain During Exercise Testing
Arthur Master, who introduced exercise testing in the 1930s for detecting myocardial ischemia, tacitly accepted that the occurrence of pain during his classic 2-step test was not a criterion for diagnosing IHD. For many decades, the presence or absence of pain during bicycle or treadmill testing was neglected and usually not even noted on test interpretation. Investigations in the 1980s found that a silent exercise test expresses less pathology than a painful one.12,13 The pendulum, however, has now swung to the other side; exercise-induced silent ischemia was recently found to be a most powerful predictor of IHD in men who presented with any of the standard coronary risk factors.14 Exercise testing can thus identify the high-risk men, even if asymptomatic, who could benefit from risk reduction and preventive measures.

The Importance of Pain During New Myocardial Imaging Techniques
Myocardial perfusion defects detected on stress thallium testing or ventricular dysfunction seen on stress echo examinations are today accepted as evidence for transient ischemia, despite the lack of both accompanying ECG alterations and chest pain. These tests have provided the final proof for the existence of silent myocardial ischemia and, most importantly, they also have shown that the severity of ischemia detected by these methods is not correlated with the presence or absence of accompanying pain.15,16

Myocardial Infarction Without Pain
Myocardial infarction (MI) without concurrent chest pain was described in the 1950s in the Framingham heart study.17 This possibility should be borne in mind not only by the physician but also by the person who may potentially suffer a heart attack, especially those with risk factors such as diabetes and high blood pressure, since 20% to 60% of MIs are unrecognized by the patient and are diagnosed only subsequently. Of these unrecognized infarctions, approximately half are truly silent (ie, the patient is unable to recall any symptoms whatsoever). In other patients, the unexplained occurrence of shortness of breath, overwhelming fatigue not present earlier, irregular heart beats, etc, can be post factum signs of an MI. It is important to stress that the prognosis of patients with silent and with recognized infarctions appears to be similar both for 10-year survival and for subsequent heart failure. It is unfortunate that increased awareness and improved diagnosis of silent IHD over the years has not thus far decreased the incidence of unrecognized MI.17

Conclusions
- Lack of chest pain does not exclude ischemic heart disease.
- Asymptomatic ischemia can be induced by physical or mental stress but may occur without any obvious trigger.
- Patients with risk factors should realize the need for early diagnosis even if they have no symptoms.
- Silent ischemia can be detected by ambulatory or exercise ECG, perfusion, or myocardial function tests.
- The clinical significance of silent ischemia is similar to that of symptomatic (painful) ischemia.
- Screening with exercise testing is recommended for healthy asymptomatic subjects with 2 or more risk factors.
- Routine screening with ambulatory monitoring is not indicated.
- The diagnosis of ischemia is confirmed if myocardial perfusion/function studies confirm its presence, with or without pain.
- Because MI may also be silent, awareness is called for when sudden unexplained cardiac symptoms appear.

Sources

References


**Key Words:** angina ■ exercise ■ imaging ■ infarction ■ ischemia
Angina Pectoris Without Chest Pain: Clinical Implications of Silent Ischemia
Shlomo Stern

Circulation. 2002;106:1906-1908
doi: 10.1161/01.CIR.0000033486.25339.EF
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2002 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/106/15/1906

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org//subscriptions/