October 12, 2016

**silent ischemia LITerature REVIEWS -  
A. clinical limitation**

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NSTEMI is one of the three major categories of cardiovascular diseases: STEMI, NSTEMI, unstable angina

**COHN CLASSIFICATION OF SILENT ISCHEMIA**

* ***Type I*** silent ischemia is the least common form. It occurs in asymptomatic patients with obstructive CAD who do not experience angina symptoms at any time.
* ***Type II*** silent ischemia most commonly occurs in patients with a documented previous myocardial infarction (MI).
* ***Type III*** is the most common form; it occurs in patients with chronic stable angina, unstable angina, or variant angina.

**Art 1. Unstable Angina: Signs, Symptoms, Diagnosis and Treatment**

Link: <https://www.verywell.com/unstable-angina-1745300>

Once your doctor suspects ACS, he should immediately get an [**ECG**](https://www.verywell.com/the-electrocardiogram-ecg-1745304) and blood tests for [**cardiac enzyme**](https://www.verywell.com/what-are-cardiac-enzymes-1746030) testing.

If the portion of the ECG known as **"ST segments" are elevated** (which indicates that the artery is completely blocked), and the **cardiac enzymes are increased** (which indicates cardiac cell damage), a "large" myocardial infarction (MI) is diagnosed (also called an "ST-segment elevation MI," or [**STEMI**](https://www.verywell.com/stemi-st-segment-elevation-myocardial-infarction-1746032)).

If the **ST segments are not elevated** (indicating that the artery is not completely blocked), but the **cardiac enzymes are increased** (indicating that cell damage is present), a **"smaller" MI** is diagnosed (also called a "non-ST segment MI," or [**NSTEMI**](https://www.verywell.com/non-st-segment-elevation-myocardial-infarction-nstemi-1746017)).

If the ***ST segments are not elevated*** and the ***enzymes are normal*** (meaning the artery is not completely blocked and no cell damage is present), **unstable angina** is diagnosed.

**Art 2. Silent Ischemia – Clinical Relevant**

**Silent ischemia** **may be detected** in patients who have **no symptoms during an exercise** or pharmaceutical **stress test** but who do **have transient ST-segment changes**, ***perfusion defects***, or ***reversible regional wall motion abnormalities***. Additionally, silent ischemia may be detected with the use of AECG devices such as the **Holter** monitor. These AECG monitors can **detect ischemia** with as few as **2 leads** and are typically worn for **24 to 48 h** with recordings analyzed using various computer algorithms (7). ST segment changes during AECG monitoring can be nonspecific, and false positives do occur; thus, strict criteria are necessary to support a diagnosis of silent ischemia.

**AECG** monitoring and **implantable devices** (places a pacemaker lead at the right ventricular apex and continuously  
monitors intra-cardiac ECG signals) have allowed for **evaluation of silent ischemia** over longer periods of time and during routine daily activities.

Many studies have suggested **a** **demand mechanism** of ischemia by demonstrating an **increase in heart rate** prior to silent ischemic events (10). Additionally, **blood pressure has been shown to increase** in the minutes preceding silent ischemic episodes (11).

More recent studies have suggested that **ST-segment depression during AECG monitoring** may be **better** than **exercise tests** in predicting outcomes.

**Art 3. Transient asymptomatic S-T segment depression during daily activity.**

20 patients with coronary heart disease, 10 hour electrocardiographic recordings, 16 months,

All patients had ischemic type **S-T depression** **associated with angina pectoris during treadmill exercise**

Measurements of **heart rate**, **S-T depression** and **exercise level** at the onset of angina obtained during repeated controlled exercise tests at the start of each study period were compared with the measurements recorded during daily activity.

411 transient episode of ischemic type S-T depression were noted during usual daily activity. Only 101 (25 percent) of these episodes were associated with angina. The remaining episodes were unrelated to other symptoms or to posture.

**silent ischemia LITerature REVIEWS -  
B. DETECTION METHOD**

**Art 4: ST-Segment Analysis in Ambulatory ECG (AECG or Holter) Monitoring in Patients with Coronary Artery Disease: Clinical Significance and Analytic Techniques**

Although there is a **relationship** between **indices of ischemia during AECG monitoring** (e.g., number and duration of ischemic episodes) **and indices during exercise stress testing** (e.g., exercise duration to 1.0 mm segment depression, depth of ST-segment depression, etc.), these **correlations are quite weak**.

**20% of ischemic episodes** occurred in the **absence** of a **heart rate increase**, approximately **80%** of ischemic episodes were **preceded by an increase in heart rate**

There is a linear **association between the numbers of ischemic episodes** with **MI**

**Recurrent ischemia** detected by ECG monitoring was the **most powerful predictor** of adverse cardiac events

**Ejection fraction variables**, **ETT** and **continuous ECG monitoring variables**, **the presence of ECG ischemia** contributed the most significant prognostic information. Although continuous ECG had a **44% predictive value when nonfatal MI**

**AECG lead configuration should mimic those leads with the greatest ST-segment** change during exercise. **CM5** was the single lead with the **highest sensitivity** (89%) in detecting myocardial ischemia

The **variability of the frequency**, **duration and depth of ischemic ST-segment depression**, **heart rate** are substantial.

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| Task | Due Date | Done | Initials |
| --- | --- | --- | --- |
| Research on detection algorithms for AMI | October 4 |  |  |
| Research on pericarditis, non-ST MI | October 11 |  |  |
| Research on non-ST ischemia, Clinical limitation, current detection algorithms | October 18 |  |  |
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