

at least moderate ischaemia on a stress test, is there a benefit to adding cardiac catheterization and, if feasible, revascularization to optimal medical therapy? The study team randomized 5179 patients into an invasive or conservative strategy. What is noteworthy from the baseline characteristics is the high proportion of diabetes, a preserved ejection fraction in the majority of patients, well-managed LDL, and history of angina in 90% of patients. Only 10% had silent ischaemia.

While the ISCHEMIA study—the largest trial of invasive vs. conservative strategy in patients with stable ischaemic heart disease—demonstrated that an initial invasive strategy of cardiac catheterization and revascularization in patients with stable coronary artery disease and moderate-to-severe ischaemia had no overall outcomes' advantage compared with medical therapy alone, the results also showed that patients with angina nevertheless derived a quality of life benefit. Procedural MIs were increased and spontaneous MIs were decreased with the invasive strategy. There was no heterogeneity of treatment effect on the primary endpoint, including by severity of ischaemia or extent of coronary disease.

'The implications', said Prof. Hochman, 'are that a validated measure of patient-reported quality of life should be collected before deciding about an invasive strategy.'

From a safety standpoint, it is not necessary to rush to the cath lab for patients diagnosed with stable ischaemic heart disease, and we should revascularize patients with symptoms if that is their preference after informing them of the ISCHEMIA results in the context of prior results. We should not revascularize people without symptoms if left main disease has been ruled out'.

She also noted that the trial findings do not apply to those who were excluded, including those with acute coronary syndrome within 2 months, ejection fraction <35%, highly symptomatic patients, or left main stenosis.

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## The 'Ten Commandments' for the 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

The 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation (NSTEMI-ACS) were developed by the effort of the European Society of Cardiology (ESC). The guidelines are intended to support the clinical practice by pragmatic recommendations based on the body of evidence available until mid-2020 and on professional experience where evidence is currently not available. For this purpose, the ESC assembled a Task Force of interventional cardiologists, non-interventional cardiologists, cardiac surgeons, and nurses. The Task Force built on the 2015 version of the guidelines on NSTEMI-ACS and reviewed more recent high-quality data from clinical trials and meta-analyses. The new guidelines underwent extensive independent review organized by the ESC pointing out areas of uncertainty or controversies due to inconclusive evidence. In the review process, the Task Force carefully appraised this valuable input.

Recommendations of previous guidelines remained unchanged unless the amendment was mandated by robust new evidence. To be able to present a document that covers all aspects of NSTEMI-ACS, overlap with other ESC Guidelines was also appreciated and recommendations were aligned wherever needed. Thus, previous

recommendations were kept, unless new evidence necessitated a revision.

The key factor in NSTEMI-ACS is the diagnostic process which includes assessment of ischaemic symptoms, the electrocardiographic (ECG) plus high-sensitivity cardiac troponin (hs-cTn). Based on the 0 h/1 h ESC algorithm using hs-cTn a rapid rule-out, rule-in, or observe strategy can be followed. Additional biomarkers are currently not recommended if hs-cTn is used.

Risk assessment (very high, high, or low risk) is the second key step. Accordingly, an initial immediate, early invasive, or a selective invasive approach after non-invasive imaging should be chosen.

Culprit lesion percutaneous coronary intervention (PCI) according to standard methods with radial access is the preferred strategy. In case of multivessel coronary artery disease, complete revascularization by either coronary artery bypass grafting or PCI may be indicated.

Special situations may emerge in case of spontaneous coronary artery dissection or myocardial infarction with non-obstructed coronary arteries (MINOCA). Intravascular imaging or cardiac magnetic resonance imaging plays a crucial role in assessment of the underlying cause and inform for possible further treatment strategies.

## The Ten 'Commandments'

### (1) Diagnosis

Chest discomfort without persistent ST-segment elevation (NSTEMI-ACS) is the leading symptom initiating the diagnostic and therapeutic cascade. The correlated pathology at the myocardial level is cardiomyocyte necrosis, measured by troponin release, or, less frequently, myocardial ischaemia without cell damage (unstable angina).

### (2) Troponin assays

High-sensitivity troponin assay (hs-cTn) measurements are recommended over less sensitive ones. However, many cardiac pathologies other than MI may also result in cardiac troponin elevations.

### (3) Rapid 'rule-in' and 'rule-out' algorithms

It is recommended to use the 0 h/1 h algorithm (best option) or the 0 h/2 h algorithm. Used in conjunction with clinical and ECG findings, the 0 h/1 h and 0 h/2 h hs-cTn algorithms allow identification of appropriate candidates for early discharge and outpatient management.

### (4) Ischaemic/bleeding risk assessment

Initial hs-cTn levels add prognostic information in terms of short- and long-term mortality to clinical and ECG variables. The Global Registry of Acute Coronary Events (GRACE) risk score is superior to (subjective) physician assessment for the occurrence of death or MI. The Academic Research Consortium-High Bleeding Risk may be used to assess the bleeding risk.

### (5) Non-invasive imaging

Even after the rule-out of MI, elective non-invasive or invasive imaging may be indicated according to clinical assessment. Coronary computed tomography angiography or stress imaging may be options based on risk assessment.

### (6) Risk stratification for an invasive approach

An early routine invasive approach within 24 h of admission is recommended for Non ST segment elevation myocardial infarction (NSTEMI) based on hs-cTn measurements, GRACE risk score  $\geq 140$ , and dynamic new or presumably new ST-segment changes. Immediate invasive angiography is required in highly unstable patients according to hemodynamic status, arrhythmias, acute heart failure, or persistent chest pain. In all other clinical presentations, a selective invasive approach may be performed according to non-invasive testing or clinical risk assessment.

### (7) Revascularization strategies

Radial access is recommended as the preferred approach in NSTEMI-ACS patients undergoing invasive assessment. Percutaneous coronary intervention of the culprit lesion is the treatment of choice. In multivessel disease, timing and completeness of revascularization should be decided according to the functional relevance of stenoses, age, general patient condition, comorbidities, and left ventricular function.

### (8) MINOCA

Myocardial infarction with non-obstructive coronary arteries incorporates a heterogeneous group of underlying causes that may involve both coronary and non-coronary pathological conditions. Cardiac magnetic resonance imaging is one of the key diagnostic tools as it allows to identify the underlying cause in the majority of patients.

### (9) Post-treatment antiplatelet therapy

Dual antiplatelet therapy consisting of a potent P2Y<sub>12</sub> receptor inhibitor in addition to aspirin is generally recommended for 12 months unless there are contraindications. Dual antiplatelet therapy duration can be shortened (<12 months), extended (>12 months), or modified by switching DAPT or de-escalation depending on individual clinical judgement driven by ischaemic and bleeding risk.

### (10) Triple antithrombotic therapy

Non-vitamin K oral anticoagulants (NOACs) are preferred over vitamin K antagonists in patients undergoing PCI with an indication for long-term oral anticoagulation. Dual antithrombotic therapy with a NOAC and single antiplatelet therapy is recommended as the default strategy up to 12 months after a short period of up to 1 week of TAT. Triple antithrombotic therapy may be prolonged up to 1 month when the ischaemic risk outweighs the bleeding risk.

An important adjunctive treatment in NSTEMI-ACS is antithrombotic drugs. It is not recommended to start the P2Y<sub>12</sub> inhibitor until the coronary anatomy is known. Dual antiplatelet therapy (DAPT) consisting of a potent P2Y<sub>12</sub> receptor inhibitor in addition to aspirin is generally recommended for 12 months unless there are contraindications. Dual antiplatelet therapy duration can either be shortened (<12 months), extended (>12 months), or modified by switching DAPT or de-escalation depending on individual clinical judgement driven by ischaemic and bleeding risk assessment. For patients with an indication for oral anticoagulation, the new default strategy is dual antithrombotic therapy after a short period (<7 days) of triple antithrombotic therapy (TAT).

Additional newly defined chapters in the guidelines are quality indicators which are tools to evaluate the level of implementation of the guidelines and may be used by the ESC, hospitals, healthcare providers, and professionals, to measure clinical practice to improve quality of care and clinical outcomes. In addition, a summary of the gaps in evidence in NSTEMI-ACS has been provided which hopefully will trigger additional research to close these gaps.

The Full Text document is available at [www.escardio.org/guidelines](http://www.escardio.org/guidelines).

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## Data availability

Data are available in the main document of The 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation.

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# Dwindling myocardial infarctions

Lessons from a pandemic are discussed from Cape Town, South Africa



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Tygerberg Academic Hospital (TAH), with a network of 17 satellite hospitals, provides coronary care to an estimated 2.4 million people in and around Cape Town, South Africa.<sup>1</sup> Recent reports from developed countries suggest an inverse relationship between rising Covid-19 cases and admissions for acute coronary syndromes (ACS).<sup>2</sup> We evaluated the effect of the Covid-19 pandemic on the admission rates of ACS to the TAH network as

well as the number of ST-elevation myocardial infarctions (STEMI) undergoing cardiac catheterization.

Weekly ACS admissions for the 9-week period following the first reported Covid-19 case in South Africa (5 March 2020),<sup>3</sup> was compared to an identical period exactly 1 year earlier and with a long-term average. This *early Covid-19 period* represents the 9-week period from patient zero to the end of hard lockdown in South Africa.<sup>3</sup> Hard lockdown in