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## CHRONIC ISCHAEMIC HEART DISEASE

## Angina: contemporary diagnosis and management

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## INTRODUCTION

Ischaemic heart disease (IHD) remains the leading global cause of death and lost life years in adults, notably in younger (<55 years) women.<sup>1</sup> Angina pectoris (derived from the Latin verb 'angere' to strangle) is chest discomfort of cardiac origin. It is a common clinical manifestation of IHD with an estimated prevalence of 3%–4% in UK adults. There are over 250 000 invasive coronary angiograms performed each year with over 20 000 new cases of angina. The healthcare resource utilisation is appreciable with over 110 000 inpatient episodes each year leading to substantial associated morbidity.<sup>2</sup> In 1869, Allen Burns (Lecturer in Anatomy, University of Glasgow) developed the thesis that myocardial ischaemia (supply:demand mismatch) could explain angina, this being first identified by William Heberden in 1768. Subsequent to Heberden's report, coronary artery disease (CAD) was implicated in pathology and clinical case studies undertaken by John Hunter, John Forberrigill, Edward Jenner and Caleb Hillier Parry.<sup>3</sup> Typically, angina involves a relative deficiency of myocardial oxygen supply (ie, ischaemia) and typically occurs after activity or physiological stress (box 1).

Six decades have passed since the first reported invasive coronary angiogram; however, many physicians still consider detecting obstructive epicardial CAD on coronary angiography a 'sine qua non' for the diagnosis of angina.<sup>4</sup> The detection of obstructive CAD allows evidence-based medical treatment and consideration of myocardial revascularisation. However, underlying pathophysiology is more nuanced with contributions from anatomical atherosclerotic and/or functional alterations of epicardial vessels and/or microcirculation (figure 1).<sup>5</sup> ESC guidelines<sup>6</sup> have revised nomenclature ('Chronic Coronary Syndromes') in part reflecting the importance of patients with signs and symptoms of ischaemia without obstructive coronary artery disease—INOCA.<sup>7,8</sup> Around half of all patients with angina undergoing elective coronary angiography have no obstructive epicardial CAD.<sup>9</sup> This large, heterogeneous chronic coronary syndrome is comprised of distinct vasomotor disorders including microvascular angina (MVA) and/or vasospastic angina (VSA)—the two most common underlying disorders of coronary vascular function in the INOCA population. Crucially, we stress that there are often multiple mechanisms of myocardial ischaemia occurring in various coronary compartments via different mechanisms. These frequently coexist in combination; however, an appreciation of this fact can help stratify treatment and help us understand patients with poor treatment response (eg, angina after revascularisation).

## Learning objectives

- ▶ Around one half of angina patients have no obstructive coronary disease; many of these patients have microvascular and/or vasospastic angina.
- ▶ Tests of coronary artery function empower clinicians to make a correct diagnosis (rule-in/ rule-out), complementing coronary angiography.
- ▶ Physician and patient education, lifestyle, medications and revascularisation are key aspects of management.

We begin by classifying angina according to pathophysiology. We then consider the current guidelines and their strengths and limitations for assessing patients with recent onset of stable chest pain. We review non-invasive and invasive functional tests of the coronary circulation with linked management strategies. Finally, we point to future directions providing hope for improved patient outcomes and development of targeted disease-modifying therapy. The aim of this educational review is to provide a contemporary approach to diagnosis and management of angina taking into consideration epicardial coronary disease, microcirculatory dysfunction and coronary vasospasm.

## CONTEMPORARY ANGINA CLASSIFICATION BY PATHOPHYSIOLOGY

The clinical history is of paramount importance to initially establish whether the nature of the presenting symptoms is consistent with angina (box 1). Indeed, recent data supports specialist physicians under-recognise angina in up to half of their patients.<sup>10</sup> Furthermore, contemporary clinical trials of revascularisation in stable IHD including the ISCHEMIA trial highlight the importance of good clinical history and listening to our patients to determine the nature and frequency of symptoms which helps to plan management. We propose a classification of angina that aligns with underlying aetiology and related management (table 1).

## Angina with obstructive coronary artery disease

2018 ESC guidelines on myocardial revascularisation define obstructive CAD as coronary stenosis with documented ischaemia, a haemodynamically relevant lesion (ie, fractional flow reserve (FFR)  $\leq 0.80$  or non-hyperaemic pressure ratio (NHPR) (eg, iwFR  $\leq 0.89$ ) or  $>50\%$  stenosis in a major coronary vessel (table 1). There is renewed interest in NHPRs (iwFR, resting full-cycle ratio (RFR) and diastolic pressure ratio (dPR)) as data have emerged



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# Contemporary Diagnosis Management

**Raffaela Di Napoli**



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