Chest pain and angina pectoris – or the ugly swan and the beautiful duckling

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The original description of Heberden's angina pectoris is put forward to stress the importance of proper history-taking in identifying patients. In a market-driven approach to improve cost-effectiveness in healthcare, angina pectoris as an entity seems stripped to its bare minimum: chest and pain. The diagnostic yield of exercise testing, however, depends on the pre-test likelihood of disease and therefore knowledge of its clinical utility and pitfalls is essential to refine an initial and subjective diagnosis based on anamnesis. Nowadays chest pain units attempt to improve diagnostic accuracy by submitting all sorts of patients to the (stress) test. In the end protocol-driven policies like these may very well prove to be contraproductive when fundamentals are ignored. (Neth Heart J 2010;18:561-4.)

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Learning lines of a piece of literature by heart not only serves our memory well but seems to mark some sort of common heritage which identifies a specific group of consentient too. So the first lines of *'Io vivat'*¹ will spur almost everyone to revive old, forgotten and sometimes stolen memories. Others find it difficult to suppress an inclination to recite additional verses of Homer when they hear: *'Tell me of the man, O muse, who travelled much and was tossed about in many ways.'* For some of us this may sound like romantic belch, but metaphors such as these for the conveyance of traditional knowledge may help in stressing the importance of the original description of angina pectoris in modern medicine.

The fact that a notion of common heritage enhances a genuine group feeling is incontestable. Is it not time for cardiologists to identify themselves not only by specific idiom but by means of knowledge of a – for their profession – so specific piece of literature too? One could argue for or against the possible benefits of a group culture for

Figure 1. *Odyssey, Tell me of the man, O muse. The sirens as a metaphor for the enticement of 'efficient market' thinking.*

highly trained professionals, but then again it will have an effect on their overall functioning in practising cardiology in terms of socialisation, a sense of belonging and the overall feeling of being part of something that is greater than oneself. In an ever-changing society where the rules of the game are continuously changing, successful performance of the group as a whole is of the utmost importance.

William Heberden (1710-1801)

For more than 20 years Heberden was active in London as a successful and highly esteemed physician, after having been a fellow of St. John's College in Cambridge for ten years. He retired partly from practice at the age of 73, staying in Windsor.

His concise and remarkably accurate description of angina pectoris was presented at the Royal College of Physicians in London in 1768. He described some 20 cases in 1768, collected over 20 years. By 1782 he had identified almost five times that number; it was only after his initial report that his contemporaries noted similar patients and it was almost 50 years later that reports of similar symptoms appeared in Europe and America. Although there may have been adequate communication at the time, conveyance of new ideas was certainly hindered by the Napoleonic wars and the fact that as a consequence Heberden made use of his native language instead of Latin, as common practice thus far.²

An account of a disorder of the breast

There is a disorder of the breast, marked with strong and peculiar symptoms, considerable for the kind of danger belonging to it, and not extremely rare, of which I do not recollect

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Figure 2. William Heberden, the 'founding father' of angina pectoris.

any mention among medical authors. The seat of it, and sense of strangling and anxiety with which it is attended, may make it not improperly be called angina pectoris.

Those who are afflicted with it are seized, while they are walking, and more particularly when they walk soon after eating, with a painful and most disagreeable sensation in the breast, which seems as if it would take their life away, if it were to increase or to continue: the moment they stand still, all this uneasiness vanishes. In all other respects the patients are at the beginning of this disorder perfectly well, and in particular have no shortness of breath, from which it is totally different. After it has continued some months, it will not cease instantaneously by standing still; and it will come on, not only when the persons are walking, but when they are lying down and oblige them to rise up out of their beds every night for many months together.

Some pathophysiological aspects of angina pectoris

Edward Jenner (1749-1823) was the first to suspect the coronary origin of angina pectoris on the basis of autopsies. Around 1900 the diagnosis of coronary thrombosis became possible during the life of the patient but it was regarded to be a new condition to be distinguished from angina pectoris. In the 1930s the concept of a gliding scale of quantitative differences reaching from angina on effort to coronary thrombosis and cardiac infarction became on firm ground. How ischaemic pain is processed in each stage in the peripheral and central nervous system is still under investigation. It seems that adenosine triphosphate (ATP) can be released from various cells as a consequence of tissue injury and may stimulate specific local nociceptors.³ There is dual control of vascular tone by ATP released from perivascular nerves and by ATP

released from endothelial cells in response to changes in blood flow and hypoxia.⁴ Myocardial ischaemia activates vagal and sympathetic cardiac afferent fibres. This might provide a neural mechanism for referred pain that originates in the heart or other visceral organs but is perceived in the neck and jaw region.⁵ Especially electrical stimulation of a cardiac branch of the left vagus nerve in humans can cause referred craniofacial pain.⁶ Of interest is the lack of pain alarm in some patients, which of course leads to increased morbidity and mortality. It seems that reduced systemic pain perception as well as cognitive personality variables play an important role in the aetiology of this condition.⁷ It takes a tough guy to know one. Awareness of these mechanisms is important to weigh individual symptoms as they are.

Natural history of angina pectoris

Curiously enough, it now appears that the angina pectoris described by Heberden fits exactly the clinical syndrome of mild coronary heart disease (without any relation to an anatomical substrate at the time). Heberden noted that the natural tendency of this malady was to kill its victims suddenly. The Framingham study showed that 25% of all patients with angina will suffer a myocardial infarction within five years. Fifty percent of those over 45 years develop a complicating myocardial infarction in eight years. The risk of myocardial infarction in females with angina, however, is only one-half that of males and thus close to the general population at the time.⁸ The mortality risk of angina pectoris varies from 25% in the first year and 9%/year in the Framingham study to 3%/year in another survey.⁹ The findings in this study are in line with an epidemiological survey in 1998, some 30 years later where in men with uncomplicated angina pectoris an adjusted relative risk of coronary heart disease related death was reported of 4% during the first four years and of some 3% during the last four-year period.¹⁰

Nowadays, the influence of all sorts of interventions, from early prevention to multiple invasive procedures,

Figure 3. Down to earth; activated nociceptors are responsible for pain perception.

Figure 4. The true nature of angina pectoris, adapted from a patient brochure from the Dutch Society of Cardiology.

of course assert themselves. Of interest then are specific subgroups such as the elderly. In the 'Rotterdam Elderly Study', almost 7% of both sexes had anamnestic symptoms of angina pectoris.¹¹ It seems that both angina symptoms and diagnosis still have an adverse effect on survival among men aged 70 to 90 years.¹² In older women with ischaemic heart disease, angina symptoms were associated with mortality too, highlighting the importance of a correct diagnosis and proper treatment of angina in old age.¹³

Discussion

In the 19th century, debate was on about the significance and interpretation of the original findings of Heberden, mainly because all sorts of side issues such as pulse irregularities, dyspnoea and recollections of precordial pain not specifically related to exercise were brought in, which then resulted in an increasing misrepresentation of the facts. Many of the misapprehensions were caused by authors who did not read his accounts carefully enough or departed from his delineation of the clinical syndrome, a situation quite familiar with the modus operandi of those who seek instantaneous fame today, thereby not seldom making haste to create reality instead of reflecting it. Comparing Heberden with common practice in modern times, it seems to be the other way around now because his masterly description of angina pectoris has been stripped to its bare minimum, chest and pain, thus eroding the significance of proper history-taking and turning a diagnostic tool such as exercise electrocardiography into a method of screening instead of an instrument to confirm a pre-existing diagnosis and to calculate risks. All sorts of patients with chest discomfort are put to the (stress) test nowadays, even at unseasonable hours.

Many studies conducted in the field of chronobiology report diurnal fluctuation in cognitive and physical performance that occurs in phase with the body temperature circadian rhythm. They are not influenced by prior waking or other countermeasures such as consumption of a light meal.¹⁴ During Ramadan mild changes in cardio-

respiratory responses to exercise occur too.¹⁵ Not seldom, however, results are policy determining, putting doctors minds at rest, at the same time ignoring limitations and flaws. For it was already common knowledge in the 1980s that the pre-test likelihood of disease has a major influence on the predictive value in tests with a given sensitivity and specificity. Lessons we have already learned but dispersed in time. For some this may just ring a faint and distant bell, but in fact rules like these should sound like a big band today, covering ethnic differences and inequalities too. For immigrants carry a worse prognosis after admittance for cardiovascular disease. Socio-cultural influence (seeking medical assistance) and genetics (risk factors) may be responsible for these divergences, which should be kept at the back of our minds.

Tendencies like these, seeking 'hard evidence' probably carry back to our continuous strive to be in control in a ICT-dominated environment, where figures and numbers are supposed to mean exactly what they say. Rather soft and subjective criteria such as emotional distress, fear of death and discomfort no longer really fit in these desirable and objective indicators of disease, ready to plug in and to play back repeatedly in a uniform tune. Furthermore, in an ever-changing and complex society where increasing juridisation seems the only constant, problem-solving became the core business and along came a conveyor belt approach in specific outpatient clinics to deal with the problem at favourable costs rather than the patient. Doing so, acting in a problem-solving way and using stress testing as the method of choice for screening patients presenting with chest pain we should at least pay attention to the necessary shading of the value of results, which are not absolute per definition. Interpretation requires skills different from those for managing a business-like process.

For instance, self-respecting institutions now profile themselves with a chest pain unit or a parallel facility for evaluating patients with chest pain. Often the economic perspective taken is departmental rather than from a healthcare system or societal perspective.¹⁸

Emergency Heart Units equals a quick scan to separate chaff from wheat with instant stress testing as a prominent feature. It is known that exercise treadmill testing safely stratifies most intermediate-risk patients with unstable angina.¹⁹ Using stress testing for the management of low-risk patients with chest pain, however, we have to realise that the positive predictive value for coronary artery disease among admitted patients was only 35.7%, and sensitivity was 95.2%,²⁰ still leaving us with an occasional mistake. Furthermore, it seems that stress testing has limited value in chest pain patients younger than 40 years. Routine stress testing added little to the diagnostic evaluation of this patient group and was falsely positive in all patients who consented to diagnostic coronary angiography.²¹ So every bit of information is essential in weighing individual complaints. We simply cannot ignore the very fundamentals on which medical professionalism was built: conscious attention for a meaningful communication with our patients.²²

Neither questionnaires nor nurse practitioners can be expected to deliver the necessary shading and instinctive feeling in collecting data on an individual basis. In the long run it may cost dearly not only in terms of expenditure but in patient lives as well, when 'the sirens' of the grinding and monotone noise of an cycloergometer distract us from the individual tone trying to make itself heard. But then there is this marvellous piece of literature, masterly written and not to be forgotten to guide and enlighten us. So let us not only learn it by heart but take it to our very heart as well! ■

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